CMS UI

Software Version: 2018.08

CMS UI Guide

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Release Highlights for CMS UI 2018.08

Updated 2018.08

This release of the CMS UI introduces the following new features and enhancements:

- **Integration job email notification**

  Implemented this feature in CMS UI with a new setting **Email Notification Enabled** added in the Integration Studio module.

- **Improvements to the LDAP Manager module**
  - Added the capability to search for an LDAP user by its user unique ID (UID)
  - Added two LDAP server settings for retrieving all the LDAP search results entries successfully when the LDAP server has a size limit configured for the search results
- **Performance Improvements:** The UCMDB Browser module now supports many more concurrent users per server node; the Reports Dashboard is loaded much faster with no display results limit in reports.
- **Improvements to the CMS UI landing page**
  - Added the possibility to view the CIs displayed in a report widget grouped by CI Type, or by attribute, according to the type of grouping you have defined for the report
  - Capability of deleting out-of-the-box (OOTB) widgets using the **Settings** icon on the landing page
- **Improvements to the Topology Map**
  - The Topology Map has a cleaner look
  - Zoom In the Topology Map to view the Core Properties of a CI; Zoom Out to view only the CI Type of a CI
- **Scheduled Reports Improvements:** The scheduled reports view enables you to sort and filter scheduled reports. You can also run scheduled reports immediately, delete scheduled reports, and pause pending scheduled reports.
- **Improvements to the Assisted Modeling module:**
  - You can enable and disable the Start Assisted Modeling link in the Service Modeling module for specific users

  - Group CIs in a model by CI Type
  - View in a model only CIs that are directly related to a selected CI
- Other general improvements

Previous Versions:

- CMS UI 2018.05
- Universal CMDB Browser 11.0
- Universal CMDB Browser 4.15.1
- Universal CMDB Browser 4.14
- Universal CMDB Browser 4.13
- Universal CMDB Browser 4.12
- Universal CMDB Browser 4.10
- Universal CMDB Browser 4.05

Read more

Documentation Library

The *Configuration Management System (CMS) Documentation Library* provides download links for all Universal CMDB documents of 10.20 and later releases, and all UD Content Pack documents for CP11 and later releases, available on the Software Support portal (SSO), including all CMS documents for the most recent releases.

You can use this library to access any of the guides and release notes relevant to UCMDB version 10.20 or later, and UD Content Pack 11 or later, or to download the full documentation set as a bundle.

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Video Library

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Additional Resources

- ITOM Marketplace
- ITSM Blog
- Documentation Forum
- Support and News Forum
- Software Support Online
- Software Education Services

Release notes

This document provides an overview of the CMS UI 2018.08 release.

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What's new

CMS UI version 2018.08 includes the following enhancements:

- **Enhanced High Availability**

  This release added the High Availability Notification Service which keeps the notification listener alive within a UCMDB cluster. Now, when a UCMDB instance that has a listener registered to it goes down, the listener is passed to another instance inside the cluster, and the client continues to receive notifications. This new notification service is available in the client SDK, and it is an optimization of the old notification process which was bound to the topology query service.

- **Improvements to the LDAP Manager module**
  - Added the capability to search for an LDAP user by its user unique ID (UID).
  - When the LDAP server has a size limit configured for the search results, the two newly added LDAP server settings allow you to properly configure the LDAP sever so that all the LDAP entries can be successfully retrieved. For more information, see "Number of users requested from the LDAP server" on page 189 in CMS UI Help.

- **Improvements to the CMS UI landing page**
  - Added the possibility to view the CIs displayed in a report widget grouped by CI Type, or by attribute, according to the type of grouping you have defined for the report.
  - **Capability of deleting out-of-the-box (OOTB) widgets:** You can use the **Settings** icon on the landing page to delete OOTB widgets. This feature replaces the capability of hiding the out-of-the-box widgets.

- **Improvements to the Topology Map**
  - The Topology Map has a cleaner look by displaying a single connecting link for multiple relationships between the same two CI.
  - Now you can view the Core Properties of a CI simply by Zooming In the Topology Map. Also, you can view only the CI Type of a CI by Zooming Out the Topology Map.
- **Integration job email notification**

  Implemented the integration job email notification feature in CMS UI with a new setting **Email Notification Enabled** in the Integration Studio module. At the same time, removed the integration job email notification related settings from UCMDB UI. For details about how to enable the integration job email notification, see Working with integration jobs in the CMS UI Help.
- **Improvements to the Assisted Modeling module**
  - You can enable and disable the Start Assisted Modeling link in the Service Modeling module for specific users
  - Group CIs in a model by CI Type
  - View in a model only CIs that are directly related to a selected CI
- Other general improvements

Related topics

"Enhancements" below

"Fixed issues" on the next page

"Known issues" on the next page

Enhancements

The following table includes all the enhancements that were implemented after the release of CMS UI 2018.05.

ID	Component	Summary
QCCR1H112257	CMS UI - Assisted Modeling	Added the possibility to view in the model only the CIs directly related to a selected CI (as defined by the selected template).

ID	Component	Summary
QCCR1H119100	CMS UI - Reports	Added the possibility to view the execution status, last execution time, and next execution time for a scheduled report.
QCCR1H120951	CMS UI - LDAP Manager	Added the capability to search for an LDAP user by its user unique ID (UID).
QCCR1H121039	CMS UI - LDAP Manager	When the LDAP server has a size limit configured for the search results, the two newly added LDAP server settings allow you to properly configure the LDAP sever so that all the LDAP entries can be successfully retrieved. For more information, see "Number of users requested from the LDAP server" on page 189 in CMS UI Help.
QCCR1H121649	CMS UI - Assisted Modeling	Added the possibility to group the CIs in a module by CI Type.

Fixed issues

The following table includes all the defects that were fixed after the release of CMS UI 2018.05.

ID	Component	Summary
QCCR1H122034	CMS UI	Splash screen does not display correctly when multiple web browser windows all click the **OK** button. Fixed the issue by adding the splash screen to securityFilter.
QCCR1H122339	CMS UI	Columns without data are not exported in the UCMDB Browser reports, by contrast they are exported in UCMDB Server reports. The issue is fixed, now empty columns can be displayed in exported reports.
QCCR1H122802	CMS UI - Login	After upgrading to version 2018.05, users fail to log in with LDAP with a supported character **$** in their password. The issue is fixed. Also, if the submit field is a password, it will not be printed into the error log.

Known issues

This release has the following known issues and limitations.

> **Important:** CMS UI 2018.08 works only with UCMDB server 2018.08.

ID	Issue
N/A	(Google Chrome only) Sometimes, the Get Related map exported to SVG is empty. **Workaround:** Position your topology map on the top left side of the screen, and then click **Export to SVG** ( ).
N/A	(Mozilla Firefox only) When trying to export all widgets to PDF, multiple blocked pop-up windows are created. **Workaround:** To view the PDF file, check the available options for the pop-up windows, and then select **Allow pop-ups for <*UCMDB_URL*>**.
N/A	(Mozilla Firefox only) When you log in to CMS UI and choose to save the password for this site, other password fields are auto-filled with your saved password. **Workaround:** To avoid this issue, when the **Remember Password** prompt is displayed, click **Don't Save**.
QCCR1H120605	After UCMDB server is restarted, scheduled report is still sent even after the scheduler is deleted. **Workaround:** Restart CMS UI.
QCCR1H114723	The notification message from the CMS UI module Package Manager may display date time format incorrectly on non-English UI. This is a third-party limitation as date time is formatted by the Notification component from Grommet.
N/A	(Internet Explorer 11 only) When using Internet Explorer 11, only one UCMDB Browser widget can be added to the Home page. Otherwise, CMS UI might get stuck due to memory leaks. **Workaround:** To add more than one UCMDB Browser widget to the Home page, use a different supported web browser.
N/A	When hovering the mouse over the label of a CI in the Topology Map, the tooltip with the full name of the Display Label attribute is not displayed. **Workaround:** Hover the mouse over the icon of a CI.
N/A	After grouping the CIs in the Topology Map by CI Type, the magnification level of the Topology Map cannot be changed. Also, this applies to the dragging option too. **Workaround:** To change the magnification level of the Topology Map, or to be able to drag the view, make sure that the **Layout Settings** ( ) is

ID	Issue
	closed. Otherwise the view is set to **Fit to screen**.
QCCR1H116886	In certain non-English environments of CMS UI, some strings on the Home page are not translated into proper languages.
QCCR1H118145	The date and time format is incorrect on the page where you edit UCMDB integration point population jobs in non-English versions of Integration Studio in CMS UI.
QCCR1H118146	The date and time format is incorrect on the page where you edit the details of UCMDB integration point population jobs in non-English versions of Integration Studio in CMS UI.
QCCR1H120235	The text string "Total" is displayed in English in some modules in Korean versions of CMS UI.
QCCR1H120506	In Brazilian Portuguese versions of CMS UI, the localized name of the Smart Software Analytics module is displayed incorrectly on the UI.
QCCR1H120514	The final warning message that is displayed when a non-root user installs a Probe in non-English versions of CMS UI on Linux is not translated.
QCCR1H120545	The warning message that is displayed when you try to create an integration job with a name that includes special characters in non-English versions of CMS UI is not translated.
QCCR1H120491	CMS UI does not work properly in a multi-customer environment. **Workaround:** None for this release.
QCCR1H119301	"There is no data available for this report" message is displayed for individual default report widgets (such as Installed Software) on the Home page. It is highly possible that the reports are querying over a large amount of data from the UCMDB server which exceeds the maximum number of elements allowed in view, and you may find "server view query over limit" error in log. **Workaround:** To resolve the display issue, go to **UCMDB UI > Administration > Infrastructure Settings Manager**, locate the **Maximum number of elements (nodes) in TQL result for view** setting (default value: 30000) and increase its value to meet your need.
QCCR1H104135	On Mozilla Firefox, the plug-in container for Firefox stops working and sometimes, when clicking **Logout**, nothing happens. This is a known issue with Mozilla Firefox ESR 38.4 (JavaScript garbage collection crash with Java applet). **Workaround:** Use a different supported Firefox version.
QCCR1H113157	The language of the system categories is the one used when the CMS UI is deployed. This is because the system categories are deployed only once, on the

ID	Issue
	first login, using the current locale. On subsequent logins, the system categories are not re-deployed, so the name is not updated either. **Workaround:** To change the language of the system categories: 1. Stop the Tomcat. 2. Change the locale. 3. Restart the Tomcat. **Note:** If you change the language, all the users that are connected to the same CMS UI instance will view the system categories with the updated language.
QCCR1H114520	LW-SSO fails to work with CMS UI. **Workaround:** If you deploy CMS UI in your own Tomcat, for Tomcat 8 the following line should be added to the **<Tomcat_installation_folder>/conf/context.xml** file: `<CookieProcessor className="org.apache.tomcat.util.http.LegacyCookieProcessor" />`
QCCR1H111354	(Safari only) The export of reports/CIs/widgets in the PDF format does not work on Safari. **Workaround:** Check the address bar and if it is marked with Pop-ups blocked, allow the pop-ups for this site.
QCCR1H112827	When a UCMDB server is reconfigured to use a new schema, the new schema has the OOTB packages deployed at the UCMDB server startup. If a standalone CMS UI is already connected to the UCMDB server, the CMS UI's packages are not present in the new schema. **Workaround:** Restart the CMS UI Tomcat in order for the CMS UI's packages to be redeployed on the new schema.
QCCR1H113171	Sometimes, when SSL is configured and OpenJDK is used, the CMS UI may become unresponsive. This is because the hand shake between the CMS UI server and the browser client fails due to unnamed elliptic curve algorithm. **Workaround:** Follow these steps to resolve the issue: • If Tomcat is started by invoking **.\ucmdbbrowser\bin\startup.bat**: a. Create the **setenv.bat** file (if one has not already been created). b. Type the following line in the **setenv.bat** file:

ID	Issue
	set CATALINA_OPTS=–Dcom.sun.net.ssl.enableECC=false **Caution:** Do not use a copy-and-paste operation to add the above line to the file. Type every character one by one. **Note:** If the variable **CATALINA_OPTS** already exists, just append the **–Dcom.sun.net.ssl.enableECC=false** value to the variable. c. Restart the Tomcat server. • If Tomcat is started as a service: a. Run the **CMS-Browserw.exe** file (or the **tomcat7w.exe** file). b. In the dialog box that opens, go to the **Java** tab, and add **–Dcom.sun.net.ssl.enableECC=false** in the **Java Options** container. c. Restart the Tomcat server.
QCCR1H107689	Currently it is not possible to load the federated CITs' icons from the remote server.
QCCR1H110354	On Internet Explorer 11, sometimes the loading animations get stuck. **Workaround:** Restart Internet Explorer.
QCCR1H111026	The port number of CMS UI URL changes to **8143** when Configuration Manager 10.22 is connected to UCMDB Server 10.30, resulting that the CMS UI is no longer available. After Configuration Manager is installed, CMS UI URL becomes **https://<server name or IP address>.<domain name>:8143/ucmdb-browser/**, which is the URL of the CMS UI embedded in CM. **Workaround:** After Configuration Manager is installed, make sure you change the port number of CMS UI URL from **8143** back to **8443** (go to **UCMDB UI > Administration > Infrastructure Settings Manager**, locate the **UCMDB Browser URL** setting by searching **Name** with a keyword **Browser**, and then change the port number from **8143** to **8443** and save the change.
QCCR1H111352	Sometimes, the export of a report fails with the following error message: "`Cannot initialize class net.sf.jasperreports.engine.util.JRStyledTextParser`". **Workaround:** Restart the CMS UI server.

ID	Issue
QCCR1H110609	The **View Discovery Log** action in the Discovery Progress Widget is supported only with one of the following web browsers: Microsoft Internet Explorer 11 or later versions, Google Chrome latest versions, and Mozilla Firefox latest versions. This is because Grommet does not provide support for other web browsers.
QCCR1H111482	CMS UI does not support the Platform for Privacy Preferences Project (P3P) header in Internet Explorer for the widgets that can be directly embedded into Micro Focus Service Manager. **Workaround:** Follow these steps to open in the Internet Explorer the widgets that can be directly embedded into Micro Focus Service Manager: 1. Assign the CMS UI and the Service Manager to the same domain. 2. Add the CMS UI and the Service Manager in the hosts file. 3. Configure the CMS UI URL with a fully qualified domain name (FQDN).
QCCR1H106412	Currently, in the Get Related Map, the double relations between two related CIs are displayed as a single relation.
QCCR1H108187	Currently, when more than 1000 CIs are displayed in the Get Related Map, you might encounter a performance issue.
QCCR1H107420	To view the TQLs for SM widgets (Defects widget, Incidents widget, and Change Request widget) in UCMDB, go to the JMX console, set the value of the **ucmdb_browser.query_services** JMX method to **true**, and then restart the CMS UI.
QCCR1H104887	To view the error messages related to probe's issues under Probe Errors discovery issues type in the UCMDB Browser module, after upgrading UCMDB to version 10.22, manually redeploy the **AutoDiscoveryInfra** package located in the **<UCMDBServer>\content\basic_packages** directory.
QCCR1H104553	There are times when a CI that is not visible in the Service Modeling map, has a Discovery Indicator. When this happens, the indicator appears on all the CIs that are in the map and have a direct or indirect link to the CI that is not visible.
N/A	Currently it is not possible to create two service models with the same name in the UCMDB Browser module, even if different tenants are used. This is because the **Views** that the service models use as resources must have a unique name.
QCCR1H99251	If accessing the UCMDB Browser module from Configuration Manager, you might not be able to use a lot of features like Notification and Reports.
QCCR1H92299	For exporting the Stakeholder widget, when the Person CIT has an avatar image set and the CMS UI is behind a proxy, the exported document will not contain the avatar image, instead the default image is used for that person. This is because the Java Environment on which the server runs cannot access

ID	Issue
	the image. On the Web Browser, the configurations are set inside the LAN Settings, so the link can be accessed.
QCCR1H99461	UCMDB Browser 4 may not load on Internet Explorer 9 or 10 when **Check for newer versions of stored pages** is set. **Workaround:** In case you use Internet Explorer 9 or 10, set **Check for newer versions of stored pages** to **Automatically**. To do that, in the Internet Explorer window, go to **Tools > Internet Options > General**, and then in the **Browsing history** section, go to **Settings**.
QCCR1H94718	Browser CI Access Control permissions only apply when a user is connected in Actual state.
N/A	If many users run reports simultaneously, and those reports contain many results, there will be increased memory usage on the CMS UI web server (Tomcat or Jetty). **Workaround:** To decrease the load on the web server, do one of the following: • Increase the maximum heap memory size on the web server. • Decrease the session timeout specified in the **web.xml** file. • Set up high availability to spread the load over multiple CMS UI instances. For more information, see "Configure High Availability Mode" in the CMS UI Help. • Instruct users to log out after finishing to work with the CMS UI.

Deprecations

There is no deprecations for this release.

Get started

This section provides information that helps you get started in using the latest version of the CMS UI.

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Home Page 30
Add the UCMDB URL to the Trusted Sites List in Your Web Browser 32
UCMDB Browser Videos 33

Logging In

To log in to CMS UI, enter the following in a web browser:

https://<*server_name*>:8443/ucmdb-browser

where **<*server_name*>** represents the fully qualified domain name (FQDN) of the UCMDB server.

Note:

- To log in to CMS UI , your UCMDB license must be valid.
- If you attempt to log in to CMS UI and a UCMDB server is not available, an error message is displayed.
- HTTP protocol is disabled by default, and embedded CMS UI is not accessible with the HTTP protocol. However, if necessary, you can still enable HTTP communication by adding the following setting into the **C:\UCMDB\UCMDBServer\conf\settings.override.properties** file, and then restart the UCMDB server:

  ```
  jetty.connections.http.enabled=true
  ```

  If you enabled the HTTP communication, then the login for the embedded CMS UI is not possible on HTTPS protocol. The HTTP protocol and the port 8080 should be used.
- If you attempt to log in to the CMS UI in a multi-customer environment and you have not been assigned a role with the permission, an error message is displayed.

If a default password or password policy has been defined, and you attempt to log in to the CMS UI using that default password, you will receive a message asking you to change it. Select a new password and log in again using the new password.

After enabling or disabling the default password feature, the CMS UI cache settings must time out once before the new setting takes effect. To specify the cache value:

In UCMDB, go to **Administration > Infrastructure Settings > UCMDB Browser Settings**, and set **Time for which information in the Browser cache is valid**=X, where X is a number of minutes.

You can specify a redirection URL when you log out of the CMS UI. Use the **Logout forward URL** setting in the Infrastructure Settings Manager in UCMDB. Be sure to add **http://** to the URL if required.

No user administration is possible from within the CMS UI (this is only performed in UCMDB).

> **Note:**
>
> - The initial launch after the installation of the CMS UI (prior to login) can take from 30 seconds up to a couple of minutes.
> - When logging in to the CMS UI for the first time with any given UCMDB Server, the login takes longer (from 30 seconds up to a couple of minutes) due to automatic deployments.
> - If you are using the CMS UI, after login the logged-in user locale information is taken from the UCMDB server and the CMS UI uses the user's locale. If there is no locale defined for the user, the locale of the CMS UI is used.

Login to the CMS UI occurs as follows:

- **UCMDB users.** The users of the CMS UI are the same as the users of UCMDB, therefore, only users that exist in UCMDB are able to log in to the CMS UI.
- **LDAP users.** When the UCMDB server is configured to authenticate on LDAP, the CMS UI automatically detects this and uses this configuration to authenticate users against the same LDAP.

  > **Note:** All LDAP configuration and group mapping is performed only on the UCMDB server, as well as all authentication processing, including LDAP integration.

How to Enable Logging In to CMS UI Automatically

Advanced login options enables you to automate login, limit login access, and provide direct login capabilities to specific pages in CMS UI.

When automatic login is enabled from the login page, and when you close the browser tab without using the **Logout** button, the next time you enter this URL to access CMS UI (**http://<server_name>:<8088>/ucmdb-browser**), the login page does not open, the login name and password do not have to be entered, and the default page that is set to open opens automatically.

> **Caution:** This option could be considered a security risk and should be used with caution.

To enable automatic login:

1. In the CMS UI login page, select the option **Remember me**.
2. When completing your session, do not click **Logout**, but close the browser tab.

   When you open a new browser tab and navigate to link **http://<server_name>:<8088>/ucmdb-browser**, the login page should be skipped.

The **Remember me** option can only be manually canceled by the user when he/she logs in next time, by using the **Logout** button.

Home Page

You can remove any content from the Home page, rearrange or resize the existing widgets, or add new widgets. Also, you can navigate through the available web-based CMS modules and access them directly from the CMS Modules pane.

> **Important:** CMS UI 2018.08 requires UCMDB server 2018.08.

The following table describes the user interface elements on the Home page.

UI Element (A-Z)	Description
CMS	You can open the Home page from anywhere else in the CMS UI simply by clicking the CMS icon in the upper left corner of the CMS UI window.
	CMS Modules. Opens the CMS Modules pane, and allows you to navigate through the available web-based CMS modules. For detailed information about the available modules, see "CMS Modules" on page 114.
<Top Search Bar>	**Search.** Allows you to search within the following categories: • **Configuration Item**. Allows you to search for a CI. The search results are opened directly in the Configuration Item Search module. • **Queries and Models**. Allows you to search for queries and models. The search results are opened directly in the Resource Manager module. • **Views and Reports**. Allows you to search for views and reports. The search results are opened in the Resource Manager module or in the Topology Map. • **Reconciliation**. Allows you to search for a CI and to view all its changes. Also, you can view the reason why the CI was changed. This includes a

UI Element (A-Z)	Description
	list of identification candidates, and the reasons for matching the searched CI with them. For detailed information about Reconciliation Analyzer, see "Working with the Reconciliation Analyzer" on page 133 For more information, see "Search Functionality" on page 125.
<username>	***<username>.*** Displays the user that is currently logged in to CMS UI. Clicking it allows you to log out from CMS UI.
	Help. Opens the Help menu: • **Help.** Opens the CMS UI Help page. • **Online Help for CMS UI.** Opens the online help for the current CMS UI version available on the Micro Focus Software Information Portal. • **Online Help for UCMDB Server.** Opens the online help for the current UCMDB Server version available on the Micro Focus Software Information Portal. • **Online Help for Content Pack.** Opens the online help for the current Content Pack version available on the Micro Focus Software Information Portal. • **About.** Opens the About dialog box. The **ABOUT** tab provides version, patch (if available), copyright, and third-party notice information. For more information, see "About Window" on page 122. The **LICENSE** tab provides license information, including license status, license summary, and a license status link. Clicking the license status link opens the license summary report, which contains license consumption summary and available licenses, and a link that allows you to export a detailed license consumption report. For more information about licenses, see "Universal Discovery Licensing Overview" on page 422. Clicking **OK** exits the About window.
	Walk-throughs. Opens a list of predefined workflow scenarios. Click one of the available workflows to open a set of step-by-step-instructions. This allows you to complete an end-to-end workflow by yourself. The following walk-throughs are available: • How to Search for a CI For more information, see "Run a Walk-through " on page 128
	Add New Widget. Enables you to add different types of widgets to the Home page. Opens the Add a New Widget layer. The following types of widgets are available:

UI Element (A-Z)	Description
	• UCMDB Browser Widgets (History, Get Related, and Impact Simulation). For more information, see "Add a UCMDB Browser widget to the Home page " on page 126 • Reports. For more information, see "Add a report widget to the Home page " on page 127
	Settings. Enables you to hide the out-of-the-box content. For more information, see "Hide the out-of-the-box content" in the "Home Page Overview" on page 115 section.

The following table describes the user interface elements on each tile on the Home page.

UI Element (A-Z)	Description
	Delete <*tile name*>. Removes the widget from the Home page.
	Map mode. Opens the topology map for a view associated with a widget.
	Widget Settings. Allows you to customize the widget title, and to view some of the widget properties. To customize the title of a widget, follow these steps: 1. In the Home page, hover the mouse over a widget, and then click the **Settings** icon ( ) in the top-right corner of the widget. 2. In the Widget Settings pane, replace the existing title with a new one, and then click **Save**.
	Re-size widget. Changes the size of the widget. To do this, click the icon and then drag the mouse.

Add the UCMDB URL to the Trusted Sites List in Your Web Browser

When you access CMS UI, if the following error message appears:

```
Something went wrong. You're probably using a self signed certificate. Please click
'OK' to visit the UCMDB URL, then add it as an exception in your browser and
refresh this page.
```

Add the UCMDB URL to your browser's list of Trusted Sites or Exceptions, and then refresh the CMS UI page.

> **Note:** If you click **OK** and the UCMDB website does not open, check the address bar and if it is

> marked with Pop-ups blocked, allow the pop-ups for this site.

To add the UCMDB URL to the Trusted Sites list in your web browser, do the following:

Google Chrome

1. Click the Application menu button on the right side of the Address bar.
2. Go to **Settings > Show Advanced Settings > Change proxy settings > Security > Trusted Sites > Sites**.
3. Enter the UCMDB URL, and then click **Add**.
4. Click **Close** > **OK**.

Mozilla Firefox

1. Click the Application menu button on the right side of the Address bar, and then choose **Options**.
2. Go to **Advanced > Certificates > View Certificates > Servers > Add Exception**.
3. Enter the UCMDB URL, click **Get Certificate**, and then click **Confirm Security Exception**.

Internet Explorer

1. Click the **Tools** button on the right side of the Address bar, and then choose **Internet options**.
2. Go to **Security > Trusted Sites > Sites**.
3. Enter the UCMDB URL, click **Add**, and then click **Close**.

UCMDB Browser Videos

Version	UCMDB Browser Videos
4.14	• Assisted Modeling Force Validation through TQL Query • History • Smart Software Analytics Demo
4.13	• UCMDB Browser 4.13 What's New
4.10	• Consume any service using the Service Modeling Dashboard • Get related widget embedded in Service Manager • Impact Simulation widget embedded in Service Manager

For more UCMDB Browser videos, see UCMDB Browser community on the ITOM Marketplace.

Install

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Introduction

Before installing CMS UI, ensure that your system meets the following requirements:

- **UCMDB version.** UCMDB Server 2018.08.
- **CMS UI Server.** OpenJDK 8 (64 bit) must be installed on the server where you install the CMS UI (the Apache Tomcat version gets its Java from the JAVA_HOME environment variable).

> **Important:** The latest version of CMS UI works only with the latest released version of UCMDB server.

The CMS UI installation currently comes in two formats:

- **Windows Installation Package.** A zip file called **CMS_UI-<display_version_number>_Windows.zip** that contains the following packages, depending on the type of installation you have:
  - **CMS UI Package.** A zip file called **CMS_UI-<display_version_number>-all-in-one-standalone.zip** that consists of the **ucmdb-browser.war** file, **discovery-log.war** file, **discovery.war** file, and a **/conf** folder with the CMS UI configuration files. Use this format if you already have an Apache Tomcat Server installed, or you want to install the Tomcat server on your own.

    > **Note:** If you are planning to install CMS UI with a Tomcat server, it is not recommended to do this on the same machine that runs the UCMDB Server. For details about installing both applications on the same machine, see "Install CMS UI on the Same Machine that Runs the UCMDB Server" on page 54.

  - **Pre-configured Apache Tomcat Server package for Windows.** A zip file called **CMS_UI-<display_version_number>-tomcat-assembly-windows.zip** that consists of a pre-configured

Apache Tomcat server for Windows with the **ucmdb-browser.war** file, **discovery.war** file, and **discovery-log.war** file. The CMS UI configuration files reside under the **/conf** folder.

- **Existing Apache Tomcat server package.** A zip file called **CMS_UI-<display_version_number>-standalone.zip** that consists of the **ucmdb-browser.war** file, and a **/conf** folder with the CMS UI configuration files. Use this format if you have an Apache Tomcat sever installed and you want to upgrade the CMS UI to the latest version.

- **Linux Installation Package.** A zip file called **CMS_UI-<display_version_number>_Linux.zip** that contains the following packages, depending on the type of installation you have:
  - **CMS UI Package.** An archive file called **CMS_UI-<display_version_number>-all-in-one-standalone.tar.gz** that consists of the **ucmdb-browser.war** file, **discovery-log.war** file, **discovery.war** file, and the CMS UI configuration files. Use this format if you already have an Apache Tomcat Server installed, or you want to install the Tomcat server on your own.

    > **Note:** If you are planning to install CMS UI with a Tomcat server, it is not recommended to do this on the same machine that runs the UCMDB Server. For details about installing both applications on the same machine, see "Install CMS UI on the Same Machine that Runs the UCMDB Server" on page 54.

  - **Pre-configured Apache Tomcat Server package for Linux.** An archive file called **CMS_UI-<display_version_number>-tomcat-assembly-unix.tar.gz** that consists of a pre-configured Apache Tomcat server for Linux with the **ucmdb-browser.war** file, **discovery.war** file, **discovery-log.war** file, and the CMS UI configuration files.
  - **Existing Apache Tomcat server package.** An archive file called **CMS_UI-<display_version_number>-standalone.zip** that consists of the **ucmdb-browser.war** file, and the CMS UI configuration files. Use this format if you have an Apache Tomcat sever installed and you want to upgrade CMS UI to the latest version.

> **Caution:** Apart from the OOTB files, DO NOT ADD any additional resources into the ***<UCMDB_Server_Home>*\deploy** directory. Because UCMDB will try to deploy every file from this location, which may cause the **ucmdb-browser.war** file not deployed completely, and as a result the CMS UI will fail to start.

Support Matrix

CMS UI Requirements

This section provides information about the supported hardware and software that you must have to successfully install and run CMS UI 2018.08.

Hardware

CMS UI 2018.08 standalone is supported on the following hardware:

<table>
<tr><th>Component</th><th>Requirement</th></tr>
<tr><td>Computer/processor</td><td>
Windows/Linux:
To fulfill the CPU requirements, you must have one of the following:
Intel Dual Core Xeon Processor 2.4 GHz or later
AMD Opteron Dual Core Processor 2.4 GHz or later
Recommended: The latest generation of Intel/AMD processors are recommended.
In addition to the above requirements, you must have the following number of CPU Cores, depending on your deployment configuration.
CPU Cores:
<table>
<tr><th>Deployment</th><th>Minimum</th><th>Recommended</th></tr>
<tr><td>Standard</td><td>2 Cores</td><td>4 Cores</td></tr>
<tr><td>Enterprise</td><td>8 Cores</td><td>More than 8 Cores</td></tr>
</table>
Note: To ensure proper CMS UI performance, it is recommended that you use the fastest possible processor speed.
</td></tr>
<tr><td>Memory</td><td>
<table>
<tr><th rowspan="2">Deployment</th><th>Windows/Linux:</th><th></th></tr>
<tr><th>Minimum</th><th>Recommended</th></tr>
<tr><td>Standard</td><td>8 GB RAM</td><td>16 GB RAM</td></tr>
<tr><td>Enterprise</td><td>32 GB RAM</td><td>32 GB RAM</td></tr>
</table>
Note: CMS UI is dependent upon memory. To ensure proper CMS UI performance, it is recommended that you allocate memory as much as
</td></tr>
</table>

Component	Requirement
	possible from the machine where Tomcat is installed.
Memory Swap File	**Windows:** The virtual memory for Windows should be at least 1.5 times the size of the physical memory. **Linux:** The Linux swap file size should be equal in size to the physical memory.
Free hard disk space	**Standard/Enterprise:** At least 2.5 GB **Note:** Support for Storage Area Network (SAN) is available for usable disk space for CMS UI. You can install CMS UI on Storage Area Network (SAN) disk storage attached to a server.

Operating Systems

CMS UI 2018.08 runs on the following operating systems:

OS	Edition	Platform (bit)
Windows Server 2012, 2012 R2, and 2016	Essentials/Standard	64 bit
Red Hat Linux v5.x	Enterprise/Advanced	64 bit
Red Hat Enterprise Linux Server 6.3, 6.7, 6.8, and 6.9		64 bit

Hardware Platform	OS Type	OS Version and Edition	Supported	Recommended
x86-64	Windows Server 2016	Datacenter and Standard, 64-bit (without the **Nano Server** installation option)	Yes	Yes
x86-64	Windows Server 2012 R2	Datacenter and Standard, 64-bit	Yes	
x86-64	Windows Server 2012	Datacenter and Standard, 64-bit	Yes	
x86-64	Windows Server 2008 R2	Enterprise/Standard, SP1, 64-bit	Yes	
x86-64	Red Hat Linux Server 5.10	Enterprise/Advanced	Yes	

Hardware Platform	OS Type	OS Version and Edition	Supported	Recommended
	and 5.11	64-bit		
x86-64	Red Hat Enterprise Linux Server 6.4 ~ 6.9, 7.0 ~ 7.5	64-bit	Yes	
x86-64	Oracle Enterprise Linux Server with Red Hat Compatible Kernel v6.4 ~ v6.9, v7.0 ~ v7.4	Enterprise/Advanced 64-bit	Yes	
x86-64	Oracle Enterprise Linux Server with Oracle Unbreakable Enterprise Kernel v6.4 ~ v6.9, v7.0 ~ v7.4	Enterprise/Advanced 64-bit	Yes	
x86-64	CentOS 7.0, 7.1, 7.2, 7.3 , and 7.4	x86-64	Yes	
Any	SUSE Linux Enterprise Server 11.3 and 12	Enterprise 64-bit	Yes	

Supported Resolutions

CMS UI 2018.08 requires the following screen resolutions:

- Minimum resolution: 1024x768
- Recommended resolution: 1600x1050
- Recommended High Definition resolution: 1920x1080

Open-Source Software Dependencies

CMS UI 2018.08 requires the following open-source software dependencies:

- OpenJDK 8

  To download OpenJDK 8, go to the Azul's site at http://www.azul.com/downloads/zulu/.

Databases

CMS UI 2018.08 does not use a database.

UCMDB Server Compatibility

Product Name	Supported UCMDB Version	Comments
CMS UI standalone 2018.08	2018.08	The latest version of CMS UI requires the latest released version of UCMDB server.
CMS UI embedded 2018.08	2018.08	The latest version of CMS UI can be embedded only in the latest released version of UCMDB server.

Application Servers

The following supported application server is required to run CMS UI 2018.08:

- Wildfly, version 11
- JBoss EAP, version 6.4.0

Web Application Servers

One of the following supported web servers is required to run CMS UI 2018.08:

- Apache Tomcat, version 8.5.24
- Jetty versions that are included with UCMDB Server version 2018.08

> **Note:** Jetty is not supported in standalone mode, only in embedded mode in UCMDB.

Web Browsers and Plug-ins

One of the following supported web browsers with the following plug-ins is required to run CMS UI 2018.08:

Browser	Client OS	Remarks
Internet Explorer 11	Windows OSs	To enable CMS UI to always retrieve data from UCMDB server instead of loading cached data in IE, make sure you do the following: 1. In IE, go to **Settings > Internet Options > General > Settings**. 2. In the Website Data Settings dialog, go to the **Cashes and databases** tab. 3. Make sure you deselect the **Allow website caches and databases** check box. 4. Click **OK** twice.
Google Chrome latest version	Windows OSs	
Mozilla Firefox latest version	Windows OSs	

CMS UI Compatibility

This section provides information about software and configurations that are compatible with CMS UI 2018.08.

Network Level Support

CMS UI supports the following network levels:

- IPv4
- IPv6

Virtualization Products

CMS UI 2018.08 can be used with the following virtualization products:

- VMware ESX 4
- VMware ESX 4.1
- VMware ESXi 5
- VMware ESXi 5 update 1
- Microsoft Hyper-V Server 2008 R2 SP1

SSO

Single Sign On Product	Web Server in Front	Comments
CA Site Minder	IIS	Only a stand-alone CMS UI is supported. When the CMS UI runs on the jetty of the UCMDB server, you can only use the http protocol (the SSL protocol is not available).
	Apache	
IBM WebSeal	IIS	
	Apache	

High-Availability Products

CMS UI 2018.08 is compatible with the following high-availability products:

- The **F5 BIG-IP version 10.x** load balancer

  For details on configuring the load balancer, refer to the High Availability section in the interactive *Universal CMDB Deployment Guide*.

  If you are using a different load balancer, the configuration should be performed by a network administrator who has a wide knowledge about how to configure your load balancer, and similar principles should be applied.

> **Note:** The load balancer used for High Availability must have the ability to insert cookies and must be able to do health checks ("keepalive").

Micro Focus Software Integrations

Product Integrations

Product Name	Supported Version	Comments
UCMDB	2018.08	The latest version of CMS UI requires the latest released version of UCMDB server. The latest version of CMS UI can be embedded only in the latest released version of UCMDB server.
UCMDB Configuration Manager	10.10 and later	
BSM	9.12 and later	
Service Manager	According to UCMDB integration support - 9.30, 9.31, and 9.40	
ALM	11	
Enterprise View	1	
Operations Orchestration	10.51	

Widget Integrations

Widget	Integrated Product
Properties	UCMDB
Environment	UCMDB

Widget	Integrated Product
Impact	UCMDB
Policy	UCMDB Configuration Manager
Change Requests	Service Manager
Incidents	Service Manager
Monitoring	BSM
Stakeholders	UCMDB
Automation	Operations Orchestration
Security	Enterprise View
Defects	ALM
Problems	Service Manager
History	UCMDB
Discovery Progress	UCMDB
Get Related	UCMDB

Information about Micro Focus software that integrates with CMS UI 2018.08 can be found at the Micro Focus Software Support site (https://softwaresupport.softwaregrp.com/).

UCMDB Server Coverage

Functionality	UCMDB Server Version
Properties Widget	2018.08
Environment Widget	2018.08
Impact Simulation Widget	2018.08
Policy Widget	2018.08
Change Request Widget	2018.08
Incidents Widget	2018.08
Monitoring Widget	2018.08
Stakeholder Widget	2018.08
Automation Widget	2018.08

Functionality	UCMDB Server Version
Security Widget	2018.08
Defects Widget	2018.08
Problems Widget	2018.08
History Widget	2018.08
Embeddable Widgets	2018.08
Enterprise Collaboration integration	2018.08
Direct link to external application	2018.08
Lightweight SSO	2018.08
LDAP support	2018.08
Multiple UCMDB Servers support	2018.08
Server side configuration	2018.08
Localization	2018.08
Online Help	2018.08
Data update	2018.08
RTSM certification	2018.08
Plain search	2018.08
Advanced search engine	2018.08
Search Auto-Completion	2018.08
Properties categorization	2018.08
Most Searched	2018.08
Most Visited	2018.08
Assisted Modeling (Lightweight Modeling)	2018.08
Multi-tenancy	2018.08
Reports	2018.08
Notifications	2018.08
Browser CI Access Control	2018.08
Categorization	2018.08

Functionality	UCMDB Server Version
Dynamic Widgets	2018.08
Branding	2018.08
Service Modeling	2018.08
Get Related Widget	2018.08
Discovery Progress Widget	2018.08
Discovery	2018.08
Package Manager	2018.08
LDAP Manager	2018.08
Home	2018.08
Smart Software Analytics	2018.08
Probe Dashboard	2018.08
Integration Studio	2018.08
Resource Manager	2018.08

Micro Focus Software Coexistence

No coexistence information for CMS UI 2018.08 is available.

Obsolescence Plans

CMS UI support is aligned with the official Universal CMDB Product Obsolescence plans and dependent on the compatibility against the main stream versioning (for example, 10.1x, 10.2x, and 10.3x). For example, CMS UI versions supported only with Universal CMDB 10.1x will be following the Obsolescence plans of Universal CMDB 10.1x.

Change Log

The table below lists the changes to this document since the release of UCMDB Browser version 4.05.

Document Date (product version)	Change
May 2016 (4.05)	**Product Integrations:** Updated the UCMDB Supported Version to 10.01 and later **UCMDB Server Coverage:** Updated the Minimal UCMDB Server Version to 10.01
September 2016 (4.10)	**Application Server:** Updated Apache Tomcat version to 8.0.24 **Added Support for the following:** • Red Hat Enterprise Linux Server 6.7 • Firefox 31 ESR and 38 ESR • Safari on Mac OS X **Removed Support for the following:** • Windows Server 2008 SP2 • Windows Server 2008 R2 and R2 SP1 • Microsoft Internet Explorer 8
November 2016 (4.11)	Reintroduced Automation Widget
December 2016 (4.12)	• Added hardware requirements for UCMDB Browser 4.12 standalone • Added support for Windows Server 2016 • Added open-source software dependencies • Added the supported UCMDB version for UCMDB Browser 4.12 embedded • **UCMDB Server Coverage:** Added Package Manager functionality • **Web Browsers and Plug-ins** Added supported web browsers required for the Package Manager
April 2017 (4.13)	• **Web Browsers and Plug-ins** Added supported web browsers required for the CMS-LDAP Manager module Added supported web browsers required for the Probe Dashboard Added Internet Explorer as a supported web browser for the

Document Date (product version)	Change
	Package Manager module • **UCMDB Server Coverage:** Added CMS-LDAP Manager module Updated the Minimal UCMDB Server Version to 10.10 • **Application Server:** Updated Apache Tomcat version to 8.5.12
July 2017 (4.14)	• **Web Browsers and Plug-ins** Added supported web browsers required for the Smart Software Analytics module Added supported web browsers required for UCMDB Home Updated supported web browsers required for UCMDB Browser • **UCMDB Server Coverage:** Added Smart Software Analytics module Added UCMDB Home • **Application Server:** Updated Apache Tomcat version to 8.5.15
November 2017 (4.15.1)	Added supported UCMDB version for UCMDB Browser 4.15.1 embedded
February 2018 (11.0)	• Added IBM WebSeal as a Single Sign On product • Updated the JBoss from version 7.0 to Wildfly version 11 • Updated Apache Tomcat version to 8.5.23 • Updated the UCMDB Supported Version to 2018.08 • Updated the Minimal UCMDB Server Version to 2018.08 • Added new supported modules
August 2018 (2018.08)	• Updated Apache Tomcat version to 8.5.24

Install CMS UI on a Different Server than the UCMDB

This section includes:

Install CMS UI on an Existing Tomcat 48

Install CMS UI with Preconfigured Apache Tomcat Server on Windows 49
Install CMS UI with Preconfigured Apache Tomcat Server on Linux 51
Install CMS UI on the Wildfly 11 Application Server 53

Install CMS UI on an Existing Tomcat

Note:

- It is strongly recommended to secure the existing Tomcat installation. To do this, enable the HTTPS protocol, use the latest TLS, and use the latest ciphers.
- The installation directory must not contain spaces, and can use only English letters (a-z), digits (0-9), the hyphen sign ('-'), and the underscore sign (_).

Important: HTTP Protocol is disabled by default, and the standalone CMS UI is not accessible with the HTTP protocol. However, if necessary, you can enable HTTP communications by setting to **False** the following settings into the **<Tomcat installation path>\conf\esapi\esapi.properties** file, and then restart the UCMDB Server:

```
HttpUtilities.SecureSession=false
HttpUtilities.ForceSecureCookies=false
```

1. Download and install Apache Tomcat version 8.5.24.
2. Unzip the file **CMS_UI-<display_version_number>-all-in-one-standalone.zip** to an accessible location.
3. Go to the folder where you extracted the contents and in the **ucmdb_browser_config.xml** file (located at **<CMS_UI_installation_folder>\conf**), configure the connection to UCMDB as follows:
   - **protocol.** CMDB Server protocol
   - **host_name.** CMDB Server name
   - **host_port.** CMDB Server port
   - **context_name.** CMDB Server context name

     Note:

> - If the root context has a default value “/” this setting can be omitted.
> - UCMDB and CMS UI must have the same protocol.

4. Change the UCMDB integration user credentials, as described in "Change the UCMDB Integration User Credentials" on page 67
5. Update the **context.xml** file in the Tomcat **conf** folder to include the configuration files in the class path. It can be found under **<Tomcat installation path>\conf\context.xml**.

   Add under the `<context>` tag:

   ```
   <Environment name="ucmdb_browser_home" value="<folder path of the CMS_UI_
   installation_folder>" type="java.lang.String" override="false"/>
   ```

   For example:

   ```
   <Environment name="ucmdb_browser_home" value="C:\cms-ui-install\"
   type="java.lang.String" override="false"/>
   ```

   > **Note:** The **conf** folder should not be part of the path setting for **value**, as shown in the example above.

6. Place the **.war** files under the webapps folder of Tomcat (located at **<Tomcat installation path>\webapps**).
7. Start the Tomcat server.
8. Go to http://<server name>:<tomcat port>/ucmdb-browser.

Install CMS UI with Preconfigured Apache Tomcat Server on Windows

> **Note:**
>
> - The Tomcat Server comes with a configured self-signed certificate. However, if you want to change the SSL, follow the steps described in "Configure SSL" on page 79.
>
> The SSL protocol is TLSv1.2.
>
> TLSv1.1 and older versions are not supported.
>
> - The default port value of the Tomcat Server is 8443, and the default protocol is **HTTPS**.

If the port value of the UCMDB server is 8443, you need to change the port value of the Tomcat Server, as described in "Change the Default Port of the Tomcat Server" on page 90.

- The installation directory must not contain spaces, and can use only English letters (a-z), digits (0-9), the hyphen sign ('-'), and the underscore sign (_).
- To edit the Tomcat service properties, run the **CMS-Browserw.exe** file.

  When upgrading from UCMDB Browser to CMS UI 2018.05 or later versions, open the **\bin** folder and manually rename the **tomcat7w.exe** file to **CMS-Browserw.exe**.
- To run Tomcat as a service, OpenJDK 8 for Win 64 bit should be installed (not JRE). The Apache Tomcat version gets its Java from the JAVA_HOME environment variable.
- The pre-configured Apache Tomcat Server has pre-defined user credentials to access the Tomcat Manager Application. The user credentials for the pre-configured Apache Tomcat Server are: admin/admin. It is strongly recommended to change these credentials after installation to prevent unauthorized access to the Tomcat Manager Application.

  To change the user credentials for the pre-configured Apache Tomcat Server go to the Tomcat **conf** folder, and change the credentials in the file **tomcat-users.xml**. For more details, see the Tomcat online documentation at: http://tomcat.apache.org/tomcat-8.5-doc/manager-howto.html

Important: HTTP Protocol is disabled by default, and standalone CMS UI is not accessible with the HTTP protocol. However, if necessary, you can enable HTTP communications by setting to **False** the following settings into the **<Tomcat installation path>\conf\esapi\esapi.properties** file, and then restart the UCMDB Server:

```
HttpUtilities.SecureSession=false
HttpUtilities.ForceSecureCookies=false
```

To install CMS UI:

1. Unzip the file **CMS_UI-<display_version_number>-tomcat-assembly-windows.zip** to an accessible location.
2. Go to the folder where you extracted the contents and in the **ucmdb_browser_config.xml** file (located at **<CMS_UI_installation_folder>\conf**) configure the connection to the UCMDB server as follows:
   - **protocol.** CMDB Server protocol
   - **host_name.** CMDB Server name

- **host_port.** CMDB Server port

> **Note:** UCMDB and CMS UI must have the same protocol.

3. Change the UCMDB integration user credentials, as described in "Change the UCMDB Integration User Credentials" on page 67
4. Install the Tomcat server as a service using **<CMS_UI_installation_folder>/install_ucmdb_browser_service.bat**.

> **Note:** The above step must be performed using administrator privilege.

5. Start the Tomcat server using **<CMS_UI_installation_folder>/start_ucmdb_browser_service.bat**.
6. Go to https://<server name>:8443/ucmdb-browser.

> **Note:** After restarting your computer, the Tomcat server starts automatically. To stop the Tomcat server, run: **<CMS_UI_installation_folder>/stop_ucmdb_browser_service.bat**. To uninstall the Tomcat server, run: **<CMS_UI_installation_folder>/uninstall_ucmdb_browser_service.bat**.

Install CMS UI with Preconfigured Apache Tomcat Server on Linux

> **Note:**
>
> - The Tomcat Server comes with a configured self-signed certificate. However, if you want to change the SSL, follow the steps described in "Configure SSL" on page 79.
>
> The SSL protocol is TLSv1.2.
>
> TLSv1.1 and older versions are not supported.
>
> - The default port value of the Tomcat Server is 8443, and the default protocol is **HTTPS**.
>
> If the port value of the UCMDB server is 8443, you need to change the port value of the Tomcat Server, as described in "Change the Default Port of the Tomcat Server" on page 90.
>
> - The installation directory must not contain spaces, and can use only English letters (a-z), digits (0-9), the hyphen sign ('-'), and the underscore sign (_).

- OpenJDK 8 (64 bit) must be installed on the server where you install the CMS UI (the Apache Tomcat version gets its Java from the JAVA_HOME environment variable).
- The pre-configured Apache Tomcat Server has pre-defined user credentials to access the Tomcat Manager Application. The user credentials for the pre-configured Apache Tomcat Server are: admin/admin. It is strongly recommended to change these credentials after installation to prevent unauthorized access to the Tomcat Manager Application.

  To change the user credentials for the pre-configured Apache Tomcat Server go to the Tomcat **conf** folder, and change the credentials in the file **tomcat-users.xml**. For more details, see the Tomcat online documentation at: http://tomcat.apache.org/tomcat-8.5-doc/manager-howto.html

Important: HTTP Protocol is disabled by default, and standalone CMS UI is no longer accessible with the HTTP protocol. However, if necessary, you can still enable HTTP communications by setting to **False** the following settings into the **<Tomcat installation path>\conf\esapi\esapi.properties** file, and then restart the UCMDB Server:

```
HttpUtilities.SecureSession=false
HttpUtilities.ForceSecureCookies=false
```

To install CMS UI:

1. Extract the contents of the archive file **CMS_UI-<display_version_number>.<build_number>-tomcat-assembly-unix.tar.gz** into the folder **CMS_UI** on your home directory.
2. Go to the **ucmdb_browser_config.xml** file in the folder **./CMS_UI/conf** and configure the connection to UCMDB as follows:
   - **protocol.** CMDB Server protocol
   - **host_name.** CMDB Server name
   - **host_port.** CMDB Server port

   Note: UCMDB and CMS UI must have the same protocol.
3. Change the UCMDB integration user credentials, as described in "Change the UCMDB Integration User Credentials" on page 67
4. Ensure that all shell scripts (**./CMS_UI/bin/*.sh** files) have 'execute' permission. You can use the command **ls –l ./CMS_UI/bin/** to do this.

If the shell scripts do not have 'execute' permissions, add them by invoking **chmod a+x ./CMS_UI/bin/*.sh**.

5. Start the Tomcat server with the pre-installed CMS UI by invoking **./CMS_UI/bin/startup.sh**.

> **Note:**
>
> - To stop the Tomcat server, use the command **./CMS_UI/bin/shutdown.sh**.
> - When CMS UI is embedded on the UCMDB Server and installed on Linux, ensure that the **/etc/hosts** file is updated with: 127.0.0.1 localhost.

Install CMS UI on the Wildfly 11 Application Server

1. Extract the contents of **CMS_UI-<display_version_number>-all-in-one-standalone.zip** to an accessible location on a local drive.

   > **Note:** The installation directory must not contain spaces, and can use only English letters (a-z), digits (0-9), the hyphen sign ('-'), and the underscore sign (_).

2. Go to the folder where you extracted the contents, and deploy the **ucmdb-browser.war** file on Wildfly 11.
3. Go to the folder where you extracted the contents and in the **ucmdb_browser_config.xml** file (located at **<CMS_UI_installation_folder>/conf**) configure the connection to the UCMDB server as follows:
   - **protocol.** CMDB Server protocol
   - **host_name.** CMDB Server name
   - **host_port.** CMDB Server port
4. Add **system-properties** in the server element in **$JBOSS_HOME\standalone\configuration\standalone.xml** as follows:

```
<server ...>
     <extensions>...</extensions>

     <system-properties>
          <property name="ucmdb_browser_home" value="<CMS_UI_installation_
folder>"/>
```

```
    </system-properties>

    <management>...</management>
    ...
</server>
```

where "<CMS_UI_installation_folder>" is the root folder to which you extracted the contents of the installation zip file in step 1.

5. Restart the Wildfly 11 application server.
6. **Optional:** If you receive a timeout error message after performing the previous step, add the attribute **deployment-timeout="1200"** to the **deployment-scanner** element in $JBOSS_HOME\standalone\configuration\standalone.xml. For example:

   ```
   <deployment-scanner path="deployments" relative-to="jboss.server.base.dir"
   scan-interval="5000" deployment-timeout="1200"/>
   ```

   It is possible to add a timeout value of even more than 1200 if needed.
7. If you performed the previous step, restart the Wildfly 11 application server.

Install CMS UI on the Same Machine that Runs the UCMDB Server

Note:

- The installation directory must not contain spaces, and can use only English letters (a-z), digits (0-9), the hyphen sign ('-'), and the underscore sign (_).
- CMS UI should not be installed on the same machine that runs the UCMDB server if you want the CMS UI to work with multiple UCMDB Servers (as described in "Configure Multiple UCMDB Servers" on page 88). Rather, you should install the CMS UI on a separate machine.

Important: HTTP Protocol is disabled by default, and embedded CMS UI is no longer accessible with the HTTP protocol. However, if necessary, you can still enable HTTP communications by adding the following settings into the **<UCMDB installation folder>\conf\esapi\ESAPI.properties** file, and then restart the UCMDB Server:

```
HttpUtilities.SecureSession=false

HttpUtilities.ForceSecureCookies=false
```

If the settings already exist, modify the value to **False**, and then restart the UCMDB Server.

> **Important:** The latest version of CMS UI works only with the latest released version of UCMDB server.

1. Unzip the file **CMS_UI-<display_version_number>-embedded.zip** to an accessible location.
2. Stop the UCMDB server.
3. Go to the folder where you extracted the content and copy the file **ucmdb-browser.war** to the UCMDB server in the folder **%UCMDB-Server%\deploy**, overriding the existing file.

   > **Note:** **%UCMDB-Server%** is the UCMDB server root folder. For example: **C:\UCMDB\UCMDBServer**.

4. Start the UCMDB server.
5. After starting the UCMDB server, open the CMS UI with the following URL:

   https://<UCMDB_server_name>:8443/ucmdb-browser

Connect CMS UI to an RTSM Instance

> **Note:** RTSM must have the same version as UCMDB.

CMS UI can connect to an RTSM by applying the RTSM port and an integration user. The RTSM port is usually deployed on 21212. You should also modify the UCMDB user integration credentials that the CMS UI uses to connect. Create an integration user in the RTSM JMX or use an existing one and modify it according to the instructions in "Change the UCMDB Integration User Credentials" on page 67.

If the BSM is configured to authenticate users on LDAP, the RTSM should be configured with the same LDAP settings as the BSM.

To copy BSM LDAP settings to the RTSM:

1. In BSM, go to **Admin > Platform > Users and Permissions > Authentication Management**.
2. Open another tab with the RTSM JMX console (http://<server-name>:21212/jmx-console) and find the method **LDAP Settings > configureLDAP**.

   > **Note:** For **<server-name>**, enter the RTSM server name. 21212 is the default RTSM port.

3. Copy all LDAP settings from the BSM to the RTSM. The following table shows the correspondence between setting names in the BSM and RTSM:

BSM Setting name	RTSM JMX Setting	
	Name	Description
LDAP server URL	ldapURL	LDAP connection string
Users filter	userFilter	Users filter
Distinguished Name (DN) Resolution	isEnableSearchForDN	Distinguished Name (DN) Resolution
Distinguished Name of Search-Entitled User	searchUser	LDAP Search User
Password of Search-Entitled User	searchUserPassword	LDAP Search User Password
Groups base DN	groupBase	Group Base
Groups search filter	groupBaseFilter	Group Base Filter
Root groups base DN	rootGroup	Root Group
Root groups filter	rootGroupFilter	Root Group Filter
Group class object	groupClass	Group class object
Groups member attribute	groupMemberAttribute	Groups member attribute
Users object class	userClass	Users object class
UUID attribute	userUID	UUID attribute

4. From the same method **RTSM JMX > LDAP Settings**, invoke **allowLDAPAuthentication** with the parameter “true”.

> **Note:** Copying LDAP settings from the BSM to the RTSM does not influence RTSM integrations since they do not work with LDAP.

Upgrade

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Upgrade CMS UI

Important:

- You can upgrade UCMDB Browser to CMS UI version 2018.08, only if the version of the UCMDB server is 2018.08.
- This section is relevant only for the CMS UI standalone.

To upgrade to the latest version of CMS UI, follow these steps:

1. Unzip the file **CMS_UI-<display_version_number>-standalone.zip** to an accessible location:
2. Stop the web application (Tomcat or UCMDB Server).
3. Clear the user preferences for the users that have scheduled reports as follows:
   a. Go to **JMX Console > UCMDB-UI:name=User Preferences > clearUserPreferences**.
   b. In the **user name** field, enter the user's name.
   c. Click **Invoke**.
4. Delete the old **ucmdb-browser.war** file from **<Tomcat installation path>\webapps**. Also, in **<Tomcat installation path>\webapps** delete the **ucmdb-browser** folder.
5. Copy the new **ucmdb-browser.war** file to **<Tomcat installation path>\webapps**.

   > **Note:** If the server is running, use a cut-and-paste operation to put the new WAR file in place, rather than copy-and-paste. Using cut-and-paste copies the file instantly and causes the server to deploy the full application (instead of possibly deploying an incomplete WAR file).

6. Copy the necessary update resources, depending on the type of installation you have, as follows:
   - If you have your own Tomcat installation (meaning, you installed the CMS UI according to the instructions in "Install CMS UI on an Existing Tomcat" on page 48), copy the **setenv.bat** file to the **bin** folder.
   - If you installed the CMS UI according to the instructions in "Install CMS UI with Preconfigured Apache Tomcat Server on Linux" on page 51, copy the **setenv.sh** file to the **bin** folder.

- If you installed the CMS UI according to the instructions in "Install CMS UI with Preconfigured Apache Tomcat Server on Windows" on page 49, copy the **update_ucmdb_browser_service.bat** file to the root folder of your installation (the same place where the **install_ucmdb_browser_service.bat** is located) and run it.

7. For the SAML authentication mode to work properly, from the **CMS_UI-<display_version_number>-standalone.zip/conf** folder, copy the **saml_configuration.properties** file and the **server.truststore** file to the **<Tomcat installation path\conf** folder.
8. From the **CMS_UI-<display_version_number>-standalone.zip/conf/esapi** folder, copy the **esapi.properties** file to the **<Tomcat installation path>\conf\esapi** folder.
9. Read the release notes for the latest version to determine which features and functionality you want to use and update your CMS UI settings accordingly.
10. Open the **ucmdb_browser_lwsso_config.xml** file in the **\conf** folder, and replace the following lines:

```
<logoutURLs>
   <url>.*/logout.jsp.*</url>
</logoutURLs>
```

with:

```
<logoutURLs>
   <url>.*/logout*</url>
</logoutURLs>
```

11. Check if the following lines exist in the **<Tomcat installation path>\conf\context.xml** file, and delete them:

```
<JarScanner>
        <JarScanFilter defaultPluggabilityScan="false" />
</JarScanner>
```

12. Start the Tomcat server.

All features and functionality from the previous installation are active in the new installation, as well as the new features and functionality for the latest version.

Integrate

Configure Integration with Service Manager 59
Configure a Direct Link to Service Manager for a Selected Problem, Incident, or Change Request 60
Configure Integration with SiteMinder 60
Configure Integration with Configuration Manager 63

Configure Integration with Service Manager

1. In UCMDB, go to **Data Flow Management > Integration Studio**.
2. Create a new integration point with the following settings:
   - **Adapter:** select the appropriate adapter for the version of Service Manager that you have installed.
   - **Hostname/IP:** enter the hostname or IP address of theService Manager server.
   - **Credentials ID:** select the credentials for the Service Manager server.
   - **Data Flow Probe:** select a data flow probe.
3. Select the **Is Integration Activated** checkbox.
4. Save the integration point.
5. Click the Federation tab of the integration point and verify that the relevant Service Manager items are selected.
6. Create a data push job:
   - For integration points that use adapters earlier than the ServiceManagerAdapter9.x adapter, create a data push job that includes the CI types and relation types that you need, and run the job. For details, see the *Data Flow Management section of the UCMDB Help*.
   - For integration points that use the ServiceManagerAdapter9.x adapter, synchronize data using the out-of-the-box data push job.

Configure a Direct Link to Service Manager for a Selected Problem, Incident, or Change Request

1. In UCMDB, go to **Administration > Infrastructure Settings Manager > UCMDB Browser settings**.
2. In the Name column, choose **Service Manager application URL for problem CIs**.
3. In the Value column, enter the Service Manager URL. Ensure that you enter the correct Service Manager IP address or hostname and the correct port number. The URL must contain the element {$PROBLEM_ID} for a Problem, {$INCIDENT_ID} for an incident, or {$RFC_ID} for a change request. This element is replaced with the actual ID at runtime.

   For example:

   http://10.0.0.1:8080/webtier-9.30/index.do?ctx=docEngine&file=rootcause&query=id%3D%22{$PROBLEM_ID}%22

4. Click **Save** .

Configure Integration with SiteMinder

> **Note:** Integration with SiteMinder can be performed only when the CMS UI is configured to one UCMDB Server, since there is no option to select a server from the server list on login.

1. **Configure the CMS UI to enable LW-SSO:**
   a. Follow the instructions in "Configure LW-SSO" on page 68.
   b. Add the following code to the **ucmdb_browser_lwsso_config.xml** configuration file, just after the tag `</in-ui-lwsso>` and before the tag `</validation>`:

```
<in-ui-identity-management>
    <identity-management>
        <userNameHeaderName>sm_user</userNameHeaderName>
        <cookieName>SMSESSION</cookieName>
    </identity-management>
</in-ui-identity-management>
```

2. **Configure Reverse Proxy server and CA SiteMinder Client Agent**

> **Note:** It is strongly recommended to install and configure the Reverse Proxy web server before installing the CA SiteMinder Client Agent. For more details, see to the SiteMinder documentation.

Configure reverse proxy either for the Apache web server or Microsoft IIS, according to the following instructions:

- **Configure Apache Web Server as Reverse Proxy**

  i. **Prerequisites:**

     - Ensure that CA SiteMinder is installed on your user environment.
     - Ensure that the Apache Web Server is installed on the same machine as the CA SiteMinder Client Agent.

  ii. Install Apache 2.2.x on Windows (Apache 2.4.x on Linux).

     Download 32-bit binaries with OpenSSL (**httpd-2.2.25-win32-x86-openssl-0.9.8y**).

  iii. Go to **C:\Apache24\conf** and open the Apache Web Server **httpd.conf** configuration file with a text editor.

     - Uncomment the following two proxy modules:

```
LoadModule proxy_module modules/mod_proxy.so
LoadModule proxy_http_module modules/mod_proxy_http.so
```

     - Add the following lines:

```
ProxyRequests off
<Proxy *>
Order deny,allow
Deny from all
Allow from all
</Proxy>
ProxyPass / http://[UCMDB_SERVER_NAME]:8080/
ProxyPassReverse / http://[UCMDB_SERVER_NAME]:8080/
ProxyPass /ucmdb-ui http://[UCMDB_SERVER_NAME]:8080/ucmdb-ui
ProxyPassReverse /ucmdb-ui http://[UCMDB_SERVER_NAME]:8080/ucmdb-
ui
ProxyPass /status http://[UCMDB_SERVER_NAME]:8080/status
ProxyPassReverse /status http://[UCMDB_SERVER_NAME]:8080/status
ProxyPass /jmx-console https://[UCMDB_SERVER_NAME]:8443/jmx-
console
ProxyPassReverse /jmx-console https://[UCMDB_SERVER_
NAME]:8443/jmx-console
ProxyPass /ucmdb-browser http://[UCMDB_SERVER_NAME]/ucmdb-browser
```

```
ProxyPassReverse /ucmdb-browser http://[UCMDB_SERVER_NAME]/ucmdb-
browser
```

If needed, feel free to add more URLs.

iv. Restart Apache 2.2 service.

- **Configure Microsoft IIS as Reverse Proxy**

  i. **Prerequisites:**

  Before downloading and installing ARR, make sure that you have already installed Internet Information Services (IIS).

  ii. Install ARR from the following URL using the Microsoft Web Platform Installer:

  http://www.iis.net/downloads/microsoft/application-request-routing

  Once installed, the **Server Farms** item should be present in the Connections tree inside the IIS Manager.

  iii. Right-click **Server Farms** and select **Create Server Farm…**.

  Specify **Server Farm** name (make sure the **Online** checkbox is checked) and click **Next.**

  iv. Enter the address of the CMS UI together with the port on which the CMS UI can be accessed, and then click the **Add** button. (The port can be entered in the **Advanced settings…**.)

  v. After IIS knows which is the server behind, it is necessary to create a simple URL rewriting rule. When prompted for that, select **Yes**.

3. **Configure SiteMinder LogoffUri**

   The CMS UI logout page (**logout.jsp**) must be defined on CA SiteMinder to ensure correct logout from the CMS UI. If you do not do this, you will need to open a new Browser window to re-enter the CMS UI application.

4. **Verify successful integration of the CMS UI with SiteMinder**

   Access the reverse proxy frontend URL. If all settings are correct, you are prompted to input your user name and password in the CA SiteMinder authentication dialog. After successful authentication, you are forwarded to the CMS UI application without having to enter your UCMDB user name and password.

Configure Integration with Configuration Manager

1. In UCMDB, go to **Data Flow Management > Integration Studio**.
2. Create a new integration point with the following settings:
   - **Adapter:** select the CM New Policy Adapter.
   - **Configuration Manager Application URL:** enter the hostname or IP address of the Configuration Manager server.
   - **Credentials ID:** select the credentials for the Configuration Manager server.
   - **Data Flow Probe:** select a data flow probe.
3. Select the **Is Integration Activated** checkbox.
4. Save the integration point.
5. Click the Federation tab of the integration point and verify that the Policy and PolicyResult checkboxes are selected.

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Grant Access to CMS UI

For a user to access CMS UI, you must assign access permission to the relevant role.

1. In UCMDB, go to **Security > Roles Manager**.
2. Select the role to which you want to add the permission.
3. Click the General Actions tab.
4. In the System Access Actions section, select **Access to UCMDB Browser** in the Available Actions list and add it to the Selected Actions list.
5. Click **Save** .

Create a UCMDB Integration User

You can create a dedicated user for integrations between other products and UCMDB. This user enables a product that uses the UCMDB client SDK to be authenticated in the server SDK and execute the APIs. Applications written with this API set must log on with integration user credentials.

> **Caution:** It is also possible to connect with a regular UCMDB user (for instance, admin). However, this option is not recommended. To connect with a UCMDB user, you must grant the user API authentication permission.

To create an integration user:

1. Launch the Web browser and enter the server address, as follows:

   https://localhost:8443/jmx-console

   You may have to log in with a user name and password (the default user name is **sysadmin**).
2. Under `UCMDB`, click **service=UCMDB Authorization Services**.
3. Locate the **createUser** operation. This method accepts the following parameters:

- **customerId**. The customer ID.
- **username**. The integration user's name.
- **userDisplayName**. The integration user's display name.
- **userLoginName**. The integration user's login name.
- **password**. The integration user's password.

  The default password policy requires the password to include at least one of each of the four following types of characters:

  - Uppercase alphabetic characters
  - Lowercase alphabetic characters
  - Numeric characters
  - Symbol characters **,\:/. _?&%=+-[]()|**

  It also requires the password to adhere to the minimum length, which is set by the **Password minimum length** infrastructure setting.

4. Click **Invoke**.
5. Locate the **setRolesForUser** method and enter the following parameters:
   - **userName**. The integration user's name.
   - **roles.** SuperAdmin.

   Click **Invoke**.
6. Locate the **setUserServerAdministratorValue** method and enter the following parameters:
   - **customerID**. The customer ID.
   - **userLoginName**. The integration user's login name.
   - **serverAdministratorValue**. Select **True**.

   Click **Invoke**.
7. Either create more users, or close the JMX console.

> **Note:** The integration user is per customer. To create a stronger integration user for cross-customer usage, use a **systemUser** with the **isSuperIntegrationUser** flag set to **true**. The system user should have the same user name and password as the integration user.

Change the UCMDB Integration User Credentials

> **Note:** This section is relevant only for the CMS UI standalone.

CMS UI connects to the UCMDB server through the API using the UCMDB UI integration user credentials. If you changed the UCMDB integration user credentials from the initial default settings, perform the following steps:

1. Create a **credentials.txt** file and put it in the same directory as the **ucmdb_browser_config.xml** file.
2. In the file **credentials.txt**, enter the following content:
   - user=<user-name>
   - password=<user-password>

   Where **user-name** is the integration user's user name and **user-password** is the integration user's password.

   > - The integration user's name and password can contain Unicode characters **\uFFFF**, where **F** can be replaced with the following characters: **a-f**, **A-F**, **0-9**.
   > - If the integration user's name or the integration user's password contains the **** (backslash) character, then in the **credential.txt** file, you must use **** instead of ****.
   >
   > For example, if the integration user's name is **admin**, and the integration user's password is **admin12\3**, in the **credentials.txt** file enter the following content:
   >
   > user=admin
   >
   > password=admin12\\3

3. Restart the Tomcat server.

   > **Caution:** For multiple UCMDB configurations (as described in "Configure Multiple UCMDB Servers" on page 88, the same integration user should be defined on all UCMDB servers.

   > **Note:** After restarting the Tomcat server and then logging in to the CMS UI, a new encrypted file **credentials.bin** is created and the file **credentials.txt** is removed.

Configure the UCMDB Server URL

If UCMDB is deployed in a distributed configuration (in the case of Business Service Management users, when the Gateway and Data Processing servers are not on the same machine), the UCMDB server URL should be defined to allow correct access by direct links.

To configure the UCMDB server URL, add the following to the ucmdb_browser_config.xml file:

```
<ucmdb_ui_url>http://[ucmdb-ui-server-name]:[ucmdb-ui-port]/ucmdb-ui/</ucmdb_ui_
url>
```

where `[ucmdb-ui-server-name]` is the UCMDB server name and `[ucmdb-ui-port]` is the UCMDB-UI server port.

Configure LW-SSO

1. Configure all external applications that integrate with the CMS UI with LW-SSO settings. For details about LW-SSO authentication, see the relevant section in the *Hardening section of the UCMDB Help*.

   > **Note:** If you access CMS UI by IP address (not by FQDN), you should add the CMS UI IP address to the UCMDB's trusted hosts. You can do this from the JMX console. Under **LW-SSO Configuration Management**, locate the **addTrustedIPs** method and invoke it using the CMS UI IP address value.

2. Open the **ucmdb_browser_lwsso_config.xml** file in the **\conf** folder in an XML editor and make the following changes:
   - For the **domain** tag, enter the domain name of the CMS UI (for example, **net** or **domain-name.com**).
   - For the value of **initString**, enter the exact value of **initString** that is defined for the UCMDB server and is retrieved when performing the procedure described in the section *Retrieving Current LW-SSO Configuration in Distributed Environment* in the relevant document listed in step 1.

> **Note:**

- In the case of an embedded CMS UI, configure LW-SSO by going to **Administration > Infrastructure Settings Manager > General Settings** and configure settings that start with **LW-SSO**.
- The UCMDB server name in the **ucmdb_browser_config.xml** file (under the <host_name> tag) should be the full DNS name (for example **ucmdb-server.com**).
- When working with LW-SSO, the URL of the CMS UI should also contain the domain name (for example **http://UCMDB-SERVER.com:8088/ucmdb-browser/**).
- When upgrading from UCMDB Browser to CMS UI 2018.05 or later, open the **ucmdb_browser_lwsso_config.xml** file in the **\conf** folder, and replace the following lines:

```
<logoutURLs>
   <url>.*/logout.jsp.*</url>
</logoutURLs>
```

with:

```
<logoutURLs>
   <url>.*/logout*</url>
</logoutURLs>
```

Enable SAML Authentication on CMS UI

This topic explains how to set up SAML login and logout on standalone CMS UI. For general information about using SAML with UCMDB and to learn how to set up SAML on the UCMDB server and embedded CMS UI, see "Enabling Login to Universal CMDB with SAML".

Note:

- The SAML version used is SAML 2.0.
- This functionality has been verified with Active Directory Federation Services (AD FS) 3.0 as Identity Provider (IdP).

Prerequisites

- Active Directory Domain Services (AS DS) and a DNS Server must be installed. A new forest must be set up in AD DS, using default values where applicable.

- The IP address and DNS must be a fixed IP address.
- Active Directory Certificate Services (AD CS) must be installed with the Certification Authority, Certificate Enrollment Web Service, and Certification Authority Web Enrollment role services.

  The Certification Authority and Certification Authority Web Enrollment role services must be configured as follows:

  - The role service setup type is "Enterprise CA"
  - The role service CA type is "Root CA"
  - You must create a new private key, with a validity period of five years

  The Certificate Enrollment Web Service role service must be configured to use the same CA certificate as the Certification Authority and Certification Authority Web Enrollment role services.
- AD FS must be installed, and a Relying Party Trust must be added as follows.

  > **Important:** If you enable SAML on both UCMDB Server and standalone CMS UI, you must add a separate Relying Party Trust for both.

  - When prompted, do not specify an optional token encryption certificate
  - Select a profile that uses the SAML 2.0 protocol, and set the AD FS URL as the relying party SAML 2.0 SSO service URL
  - Set the UCMDB Server URL as the relying party trust identifier
  - Use the default access control policy settings

  When the Relying Party Trust is created, configure it as follows:

  - Add a WS-Federation Passive Endpoint that uses the UCMDB Server URL as the trusted URL and that uses POST binding
  - Add a SAML Assertion Consumer Endpoint that uses <*Domain name of the AD FS machine*>/ucmdb-browser/login?samlLogin as the trusted URL and that uses POST binding
  - Add a SAML Assertion Logout Endpoint that uses <*Domain name of the AD FS machine*>/ucmdb-browser/logout?samlLogout as the trusted URL and that uses POST binding
  - Add the following three claim rules:
    - Show user login name in Common Name attribute in SAML response
    - Show user group list in Group attribute in SAML response
    - Show user login name in NameID attribute in SAML response

  Update AD FS to use the SHA-1 secure hash algorithm.

- The AD FS server system clock must be set to a time later than that of the UCMDB Server or CMS UI server. If this is not the case, you must set a time skew to offset the time difference when you update the saml_configuration.properties file when you enable SAML authorization.

Enable SAML Login and Logout

To enable SAML login and logout on CMS UI, follow these steps:

1. Import the IdP certificate to UCMDB Server truststore.
   a. Copy the IdP certificate to the following directory:

      <*CMS UI home*>\conf

   b. Run the following command to import the certificate alias into the saml_configuration.properties file (<*CMS UI home*>/conf/saml_configuration.properties):

      <*JDK home*>\bin\jre\bin\keytool.exe -import -v -keystore <*CMS UI home*>\conf\security\server.truststore -file <*certificate*> -alias <*certificate alias*>

   c. Enter the default password ("hppass").
   d. When asked **Trust this certificate?**, press Y, and then press Enter.
   e. Make sure the output **Certificate** was added to the truststore.
2. The SAML logout request must be signed before it is sent to the IdP. Therefore, you must import your own private key into <*CMS UI home*>/conf/server.keystore, and then import the public key into the IdP (for example, in AD FS, do this in the Signature tab of Relying Party Trust in the AD FS Management tool).

   If you want to use the out of box certificate, follow these steps:

   a. Run the following command as an Administrator:

      <*JDK home*>\bin\jre\binkeytool -export -alias hpcert -keystore *CMS UI home*\conf\server.keystore -rfc -storepass hppass -file <*CMS UI home*>\conf\hpcert_public.cer

   b. Copy the <*CMS UI home*>/conf /hpcert_public.cer file to an IdP folder.
   c. Import the hpcert_public.cer file into the IdP (for example, in AD FS, do this in the Signature tab of Relying Party Trust in the AD FS Management tool).
3. Update the saml_configuration.properties file (<*CMS UI home*>/conf/saml_

configuration.properties) as described in the following table.

Property	Value	Example
mam.server.sso.saml.auth.enabled	"true"	mam.server.sso.saml.auth.enabled=true
mam.server.sso.saml.auth.idp	"https://<*ADFS url*>/adfs/ls"	mam.server.sso.saml.auth.idp=https://<*ADFS url*>/adfs/ls
mam.server.sso.saml.auth.username.claimtype	"http://schemas.xmlsoap.org/claims/CommonName"	mam.server.sso.saml.auth.username.claimtype=http://schemas.xmlsoap.org/claims/CommonName
mam.server.sso.saml.auth.customer.claimtype	Leave this property blank.	mam.server.sso.saml.auth.customer.claimtype=
mam.server.sso.saml.auth.groups.claimtype	"http://schemas.xmlsoap.org/claims/Group"	mam.server.sso.saml.auth.groups.claimtype=http://schemas.xmlsoap.org/claims/Group
mam.server.sso.saml.auth.sync.groups	"true"	mam.server.sso.saml.auth.sync.groups=true
mam.server.sso.saml.auth.default.group	A group in your UCMDB server. This group should have rights to log in to UCMDB server.	mam.server.sso.saml.auth.default.group=saml
mam.server.sso.saml.auth.certificate.alias	The certificate alias that you used in step 1.d.	mam.server.sso.saml.auth.certificate.alias=token_signing
mam.server.sso.saml.logout.certificate.alias	The alias of your own certificate, or "hpcert" if you use the default certificate.	mam.server.sso.saml.logout.certificate.alias=hpcert
mam.server.sso.saml.auth.request.issuer	The UCMDB server (for embedded) or UCMDB browser (for standalone) URL.	mam.server.sso.saml.auth.request.issuer=https://<*UCMDB host*>:8443/
mam.server.sso.saml.response.issuer	The ADFS URL.	mam.server.sso.saml.response.issuer=http://<*ADFS URL*>//adfs/services/trust
mam.server.sso.saml.time.skew	The desired time skew (in seconds) between	mam.server.sso.saml.time.skew=60

	the AD FS and UCMDB hosts.	

4. Create a group with permissions in UCMDB Server. The group must have the same name as the value of the "mam.server.sso.saml.auth.default.group" setting.

   To do this, in UCMDB Server, select **Security** > **Users and Groups**, and then create a group and assign it the desired role (for example, SuperAdmin).

   > **Note:** This step is only required if you have not already enabled SAML on UCMDB Server.

5. Create a configproperties.txt file. To do this, follow these steps:

   a. Open the <*CMS UI home*>\conf directory, delete the configproperties.bin file, and then create a configproperties.txt file.

   b. Open the configproperties.txt file, and then enter the following lines:

   ```
   truststorepassword=hppass
   keystorepassword=hppass
   ```

   c. Save the configproperties.txt file.

6. Configure LW-SSO. To do this, follow these steps:

   a. In UCMDB Server, open JMX Console and search for "retrieveLWSSOConfiguration".

   b. Select **Invoke**, and then make a note of the value of the "mam.server.sso.init.string" setting.

   c. Open the <*CMS UI home*>\conf directory, and open the ucmdb_browser_lwsso_config.xml file.

   d. Update the value of the *initString* parameter in the file with the value that you noted from the "mam.server.sso.init.string" setting, as follows:

   ```
   <lwssoValidation id="ID000001">
   <domain>ucmdb browser domain name</domain>
   <crypto cipherType="symmetricBlockCipher"
   engineName="AES" paddingModeName="CBC" keySize="256"
   encodingMode="Base64Url"
   initString="Replace this value"></crypto>
   </lwssoValidation>
   ```

7. Restart CMS UI.

Example Active Directory Installation and Configuration

The following procedure demonstrates how to install and configure the various Active Directory components in order to set up an IdP to use with SAML authentication.

1: Install AD DS and a DNS Server

1. Open Windows Server Manager, and then select the **Add roles and features** link in the main panel to start the Add Roles and Features wizard.
2. On the **Installation type** page, select the **Role-based or feature-based installation** option, and then select **Next**.
3. On the **Server Selection** page, select the **Select a server from the server pool** option, select the local machine from the list, and then select **Next**.
4. On the **Server Roles** page, select the **Active Directory Domain Services** and **DNS Server** options, and then select **Next**.
5. On the **Features** page, select **Next** to accept the default values.
6. On the **AD DS** page, select **Next** to accept the default values.
7. On the **DNS Server** page, select **Next** to accept the default values.
8. On the **Confirmation** page, select **Install**. When the wizard has installed AD DS and the DNS server, select **Close** to exit the wizard.

2: Configure AD DS

1. Open Server Manager, and then select the **Post Deployment Configuration** task notification.
2. On the **Deployment Configuration** page, select the **Add a new forest** option, enter a domain name in the **Root domain name** field, and then select **Next**.
3. On the **Domain Controller Options** page, select the functional level of the forest and domain, enter a password for Directory Services Restore Mode, and then select **Next**.
4. On the **DNS Options** page, select **Next** without selecting any options.
5. On the **Additional Options** page, select **Next** to accept the default values.
6. On the **Paths** page, select **Next** to accept the default values.

7. On the **Review Options** page, select **Next**, and then select **Install**. The wizard automatically restarts the server after installing the forest.

3: Set the IP address and DNS address

Open Network and Sharing Center, and make sure that the local machine's IP address and DNS address are both static.

4: Install Active Directory Certificate Services

1. Open Server Manager, and then select the **Add roles and features** link in the main panel to start the Add Roles and Features wizard.
2. On the **Server Roles** page, select the **Active Directory Certificate Services** option, and then select **Next**.
3. On the **Features** page, select **Next** to accept the default values.
4. On the **AD CS** page, select **Next**.
5. On the **Role Services** page, select the following options, and then select **Next**:
   - Certification Authority
   - Certificate Enrollment Web Service
   - Certification Authority Web Enrollment
6. On the **Web Server Role** page, select **Next**.
7. On the **Role Services** page, select **Next** to accept the default values.
8. On the **Confirmation** page, select **Install**. When the wizard has installed AD DS and the DNS server, select **Close** to exit the wizard.

5: Configure AD CS

1. Open the AD CS Configuration wizard.
2. On the **Credentials** page, enter **<*AD FS domain name*>administrator** in the **Credentials** field, and then select **Next**.
3. On the Role Services page, select the following options, and then select **Next**:
   - Certification Authority
   - Certification Authority Web Enrollment
4. On the **Setup Type** page, select the **Enterprise CA** option, and then select **Next**.
5. On the **CA Type** page, select the **Root CA** option, and then select **Next**.

6. On the **Private Key** page, select the **Create a new private key** option, and then select **Next**.
7. On the **Cryptography for CA** page, select **RSA#Microsoft Software Key Provider** as the cryptographic provider. Select **SHA1** as the hash algorithm, and then select **Next**.
8. On the **CA Name** page, enter a common name for the CA and a distinguished name suffix, and then select **Next**.
9. On the **Validity Period** page, select 5 years, and then select **Next**.
10. On the **Certificate database** page, enter the certificate database location and the certificate database log location, and then select **Next**.
11. On the **Confirmation** page, select **Configure**. When the wizard asks you if you want to configure additional role services, select **Yes**.
12. On the **Credentials** page, enter ***<AD FS domain name>*administrator** in the **Credentials** field, and then select **Next**.
13. On the **Role Services** page, select the Certificate Enrollment Web Service option, and then select **Next**.
14. On the **CA for CES** page, select the **CA name** option, enter the target CA (***<domain name\CA name>***), and then select **Next**.
15. On the **Authentication Type for CES** page, select the **Windows integrated authentication** option, and then select **Next**.
16. On the **Service Account for CES** page, select the **Use built-in application pool identity** option, and then select **Next**.
17. On the **Server Certificate** page, select the certificate that you created in steps 1-11, and then select **Next**.
18. On the **Confirmation** page, select **Configure**. When the wizard has configured the role service, select **Close** to exit the wizard.

6: Install AD FS

1. Open Server Manager, and then select the **Add roles and features** link in the main panel to start the Add Roles and Features wizard.
2. On the **Server Roles** page, select the **Active Directory Federation Services** option, and then select **Next**.
3. On the **Features** page, select **Next** to accept the default values.
4. On the **AD FS** page, select **Next** to accept the default values.

5. On the **Confirmation** page, select **Install**. When the wizard has installed AD FS, select **Close** to exit the wizard.

7: Configure AD FS

1. Open Server Manager, and then go to **Tools** > **Configure Active Directory Federation Services**.
2. On the **Welcome** page, select the **Create the first federation server in a federation server farm** option, and then select **Next**.
3. On the **Connect to AD DS** page, select **Next** to accept the default value.
4. On the **Specify Service Properties** page, enter a display name for the Federation Service, and then select **Next**.
5. On the **Specify Service Account** page, select the **Use an existing domain user account or group Managed Service Account** option. Enter **<*AD FS domain name*>administrator** in the **Account name** field, enter the password, and then select **Next**.
6. On the **Specify Database** page, select the **Create a database on this server using Windows Internal database** option, and then select **Next**.
7. On the **Review Options** page, select **Next**.
8. On the **Pre-requisite Checks** page, select **Configure** when the wizard has finished performing the prerequisite checks. When the wizard has configured AD FS, select **Close** to exit the wizard.

8: Add and configure a relying party trust in AD FS

> **Important:** You must add a relying party trust for both the UCMDB server and for the standalone CMS UI.

1. Open AD FS 2.0 Management Console, right-click **Trust Relationships** in the left-hand pane, and then select **Add Relying Party Trust** to start the Add Relying Party Trust wizard.
2. On the **Select data Source** page, select the **Enter data about the relying party manually** option, and then select **Next**.
3. On the **Specify Display name** page, enter a display name for the relying party trust, and then select **Next**.
4. On the **Configure Certificate** page, select **Next** without configuring an optional token encryption certificate.

5. On the **Configure URL** page, select the **Enable support for SAML 2.0 WebSSO protocol** option, set the AD FS URL as the relying party SAML 2.0 SSO service URL, and then select **Next**.
6. On the **Configure Identifiers** page, set the UCMDB server URL as the relying party trust identifier, and then select **Next**.
7. On the **Choose Access Control Policy** page, select **Next** to accept the default values, and then continue to accept the default values until the wizard has finished.
8. Right-click **Relying Party Trusts** in the left-hand pane, and then select **Properties**.
9. On the **Identifiers** tab, confirm that the relying party identifier is set to the UCMDB server URL.
10. Go to the **Endpoints** tab, and then delete any existing endpoints.
11. Select **Add WS-Federation Passive Endpoints**. Enter the UCMDB server URL in the **Trusted URL** field, and then select **OK**.
12. Select **Add SAML Assertion Consumer Endpoints**. Enter **<*Domain name of the AD FS machine*>/ucmdb-browser/login?samlLogin** in the **Trusted URL** field, select **POST** in the **Binding** drop-down list, and then select **OK**.
13. Select **Add SAML Assertion Logout Endpoints**. Enter **<*Domain name of the AD FS machine*>/ucmdb-browser/logout?samlLogout** in the **Trusted URL** field, select **POST** in the **Binding** drop-down list, and then select **OK**.
14. Select **Apply**, and then select **OK**.
15. Right-click **Relying Party Trusts** in the left-hand pane, and then select **Edit Claim Issuance Policy...**.
16. Select **Add Rule** to start the Add Transform Claim Rule Wizard.
17. On the **Choose Rule Type** page, select **Send LDAP Attributes as Claims** in the **Claim rule template** drop-down list, and then select **Next**.
18. On the **Configure Claim Rule** page, create the following three rules.

Claim rule name	Attribute store	LDAP attribute	Outgoing claim type
UserName	Active Directory	SAM-Account-Name	Common Name
Group	Active Directory	Token-Groups - Qualified by Domain Name	Group
NameID	Active Directory	SAM-Account-Name	Name ID

19. Select **Apply**, and then select **OK**.
20. Right-click **AD FS** in the left-hand pane, and then select **Edit Federation Service Properties**.
21. On the **General** tab, make sure that the value of the **Federation Service identifier** field is ***<AD FS server URL>*/services/trust**.
22. Check that the AD FS server system clock is set to a time later than that of the CMS UI server. If this is not the case, you must set a time skew in the saml_configuration.properties file when you enable SAML authorization.

You have now set up the IdP and are ready to enable SAML authentication.

Related Topics

"Troubleshoot SAML Authentication" on page 441

"Enable SAML Authentication" on page 1

Configure SSL

> **Note:** If you disable SSL support, you compromise your system's security. You will be vulnerable to data sniffing and other security attacks.

To install and configure SSL support on Tomcat:

1. Create a keystore file to store the server's private key and self-signed certificate by running one of the following commands:
   - For Windows: **%JAVA_HOME%\bin\keytool -genkey -alias tomcat -keyalg RSA**
   - For Unix: **$JAVA_HOME/bin/keytool -genkey -alias tomcat -keyalg RSA**

   For both commands, use the password value **changeit** (for all other fields in the console dialog that opens, you can use any value).
2. In the **$CATALINA_BASE/conf/server.xml** file (where **$CATALINA_BASE** is the directory in which you installed Tomcat), do the following:
   - Remove comments from the entry **SSL HTTP/1.1 Connector**.
   - Set **protocol="org.apache.coyote.http11.Http11Protocol"** instead of **protocol="HTTP/1.1"**.

This command defines a Java (JSSE) connector, regardless of whether or not the APR library is loaded.

- Change the values of `<keystore_location>` and `<keystore_pass>`. This action is relevant only if the CMS UI is installed with Preconfigured Apache Tomcat Server, and you create a new keystore file.

> **Note:**
>
> - This step is relevant only for the CMS UI installed on an existing Tomcat.
> - For a full description on how to configure **server.xml** to use SSL, see the Apache Tomcat official site: http://tomcat.apache.org/tomcat-8.5-doc/manager-howto.html

3. Restart the Tomcat server.

To use the HTTPS protocol for connection to the UCMDB server:

1. In the **ucmdb_browser_config.xml** file, assign the value **https** to the tag**<protocol>** and assign the UCMDB server HTTPS port value (8443 by default) to the tag **<port>.**
2. Download the UCMDB server public certificate to the CMS UI machine (if you use SSL on the UCMDB server, the UCMDB administrator can provide you with this certificate), and import it into the **cacerts** trust store on the JRE that is going to connect to the server by running the following command:

   "%JAVA_HOME%\bin\keytool" -import -alias ucmdb -trustcacerts -file <UCMDB-Server-certificate-file> -keystore "%JAVA_HOME%\jre\lib\security\cacerts"

   where **<UCMDB-Server-certificate-file>** is the full path to the UCMDB server public certificate file.
3. Restart the Tomcat server.

Enable SSL with a Certificate from a Certification Authority

For CMS UI standalone, in order to use a certificate issued by a Certification Authority (CA) the keystore must be in Java format. The following example explains how to format the keystore for a Windows machine.

1. **Prerequisites**

   Before starting the following procedure, if you already have a **browser.keystore** file, remove it from the ***<CMS_UI_installation_directory>*\conf** folder.

2. **Generate a Server Keystore**

   a. Generate a CA signed certificate and install it on Windows.

   b. Export the certificate into a ***.pfx** file (including private keys) using Microsoft Management Console (**mmc.exe**).

      Enter any string as the password for the **pfx** file. (You are asked for this password when converting the keystore type to a JAVA keystore.)
      The **.pfx** file now contains a public certificate and a private key and is password protected.

      Copy the **.pfx** file you created to the following folder: ***<CMS_UI_installation_directory>*\conf**.

   c. Open the command prompt and change the directory to **%JAVA_HOME%\bin**.

      Change the keystore type from **PKCS12** to a **JAVA** keystore by running the following command:

      ```
      keytool -importkeystore -srckeystore <CMS_UI_installation_directory>\conf\<pfx file name> -srcstoretype PKCS12 -destkeystore CMS_UI_installation_directory\conf\browser.keystore
      ```

      You are asked for the source (**.pfx**) keystore password. This is the password you supplied when creating the pfx file in step b.

3. **Modify the server.xml File**

   Open the **server.xml** file, located in ***<CMS_installation_directory>*\conf**. Locate the section beginning with

   ```
   Connector port="8443"
   ```

   which appears in comments. Activate the script by removing the comment character and add the following two lines:

   ```
   keystoreFile="CMS_UI_installation_directory\conf\browser.keystore"
   keystorePass="password" />
   ```

   Comment out the following line, if applicable:

   ```
   <Listener className="org.apache.catalina.core.AprLifecycleListener"
   SSLEngine="on" />
   ```

> **Note:** Check that HTTPS communication works before closing the HTTP port.

4. **Restart the Tomcat Server**

   Restart the Tomcat server.

5. **Verify the Server Security**

   To verify that the CMS UI is secure, enter the following URL in the Web browser: **https://<CMS_UI name or IP address>:8443/ucmdb-browser**.

6. In UCMDB, go to **Infrastructure Settings Manager>General Settings** and change the protocol and port in **UCMDB Browser URL**, according to the values above.

Limitation: There can be only one server certificate in **browser.keystore**.

Configure High Availability Mode

The typical configuration for a high availability environment has two or more CMS UIs that connect to the same UCMDB server, or to the same load balancer that manages a cluster of UCMDB servers. The CMS UIs are configured to work behind a load balancer, meaning that the load balancer serves as the entry point to the CMS UIs. All the CMS UIs are active at any given time and can handle requests from users. Requests are distributed to the CMS UIs in the cluster by the load balancer, and are shared evenly among all the CMS UIs.

> **Note:**
>
> - The load balancer used for high availability must have the ability to insert cookies and must be able to perform health checks ("keepalive").
> - These instructions are certified for the F5 BIG-IP version 10.x and F5 BIG-IP version 11.x load balancers.
>
> If you are using a different load balancer, the configuration should be performed by a network administrator who has broad knowledge about how to configure load balancers, and principles similar to those described here should be applied.
> - This procedure assumes that you already have at least one CMS UI installed and configured.

To set up a high availability environment:

1. Create a cluster of CMS UIs.

   Install one or more additional CMS UIs to create a cluster. For information about installing the CMS UI, see "Install" on page 34.

   > **Note:**
   >
   > - The machines used for all of the CMS UIs in the cluster should have similar hardware, including the same amount of memory, and should be running the same operating system.
   > - CMS UIs in the cluster must use the same port number for HTTP, HTTPS, and so on. You cannot configure multiple CMS UIs for high availability if they are using different ports.

2. Start the CMS UIs.

   a. If the first CMS UI is not started, start the process and wait for the startup process to complete.

   b. Start the additional CMS UIs.

3. Configure the load balancer.

   The load balancer is used to balance the load that is sent to the CMS UIs in the cluster. Configure the load balancer as follows:

   a. On the load balancer, configure a Cluster VIP address that sends requests to the entire CMS UI cluster.

   b. Configure a pool of back-end servers that represents all CMS UIs in the cluster. This pool is monitored by a health monitor, which sends requests that can be processed by any CMS UI in the cluster.

   c. Configure the health monitor by providing a keepalive address. The health monitor checks for the keepalive page of each of the CMS UIs. For the Cluster VIP address, use the following URL for the keepalive address: /ucmdb-browser/public/ping.jsp.

      Possible responses from this URL are:

Response	HTTP Response Code
Up	200 OK (desired response)
Down	503 Service unavailable

   d. Connect the health monitor to the CMS UI pool configured in step b.

   e. Configure session affinity on the load balancer:

- Configure the load balancer to insert cookies to the responses that are sent back to CMS UI clients (internet browsers).
- Using the **Insert** method, add a persistence profile cookie for the VIP address.

> **Note:**
>
> - The cookie name and value are unimportant, as long as the load balancer knows how to maintain stickiness with the cookies that it sends out.
> - F5 BIG-IP version 10.x adds a session cookie only to the first response per connection to the server. Other load balancers you might use add a session cookie to each response.

f. If the VIP is configured to accept secure connections and the load balancer forwards the requests to the CMS UIs over HTTP, you must configure redirect rewrites. In the load balancer software, enable the **Redirect Rewrite select All** option to configure the HTTP profile associated with the Cluster VIP.

Configure CAC Support

> **Note:** Common Access Card (CAC) is not supported in a multi-customer or State environment.

This section describes how to configure Common Access Card (CAC) support on the CMS UI.

1. Make sure that you have access to the keystore, truststore, and crl files. If necessary, you can create them using the following examples:
   - Import the server certificate into the keystore:

     ```
     $ keytool -importkeystore -deststorepass changeit -destkeypass changeit
     -destkeystore keystore.jks -srckeystore ../../certtest/localhost.p12
     -srcstoretype PKCS12 -alias sercer
     ```

     ```
     Enter source keystore password:
     ```

   - Import the certificate authority (CA) certificate into the truststore:

     ```
     $ keytool -import -keystore cacerts.jks -storepass changeit -alias my_ca
     -file ../../certtest/ca.crt
     ```

     ```
     Owner: EMAILADDRESS=ca@naive.sk, CN=CA Admin, OU=CA, O=Naive, L=Bratislava,
     ST=Bratislava, C=SK
     ```

     ```
     ...too long...
     ```

```
Trust this certificate? [no]:  yes
Certificate was added to keystore
```

> **Important:** After upgrading to UCMDB 10.32 or later,
>
> - the **deststorepass** is the password set at UCMDB server upgrade.
> - the **destkeystore** is the password set at UCMDB server upgrade.
> - the **storepass** is the password set at UCMDB server upgrade.

2. Load the client certificate into your Web browser.
3. Open the **server.xml** file, located in **<*CMS_UI_installation_directory*>\webapps\release\conf**. Add the following lines, if they do not exist:
   - `<Connector protocol="HTTP/1.1" port="8553" maxThreads="200"`

     This line specifies the port number. You can use any value, as long as it does not conflict with an existing port. The default value is 8443.
   - `SSLEnabled="true" scheme="https" secure="true" sslProtocol="TLS"`

     This line configures SSL for the Tomcat server.
   - `truststoreFile="C:\Program Files\Apache Software Foundation\Tomcat` 8.5.24`\certificates\server.truststore" truststorePass="hppass"`

     This line provides the path to the truststore file and the password of the truststore file.
   - `keystoreFile="C:\Program Files\Apache Software Foundation\Tomcat` 8.5.24`\certificates\server.keystore" keystorePass="hppass"`

     This line provides the path to the keystore file and the password of the keystore file.
   - `crlFile="C:\Program Files\Apache Software Foundation\Tomcat` 8.5.24`\certificates\server.crl"`

     This line provides the path to the certificate revocation list file.
   - `clientAuth="true" />`

     This line specifies that login is permitted only when the client has a valid client certificate.

     > **Important:** After upgrading to UCMDB 10.32 or later,
     >
     > - the **truststorePass** is the password set at UCMDB server upgrade.
     > - the **keystorePass** is the password set at UCMDB server upgrade.

4. Disable access to other connectors (to ensure that no user can connect to the Tomcat server with unsecured HTTP access) by commenting out or deleting other connector tags that are referenced in the file.
5. Save the **server.xml** file and restart the Tomcat server.

> **Note:** If your Web browser cannot connect to the Tomcat server after following this procedure, delete the following line from the **server.xml** file:
>
> ```
> <Listener className="org.apache.catalina.core.AprLifecycleListener"
> SSLEngine="on" />
> ```
>
> Save the **server.xml** file and restart the Tomcat server again.

Configure CAC Support with Multiple CRL Files

CMS UI can accept multiple CRL files. However, Tomcat only supports a single CRL file via the `crlFile` Connector attribute. The following procedure highlights how to work around this Tomcat limitation so that the CMS UI can use multiple CRL files:

1. Convert the CRL files from DER format to PEM format by using the following OpenSSL command (DER format is binary and PEM format is Base64-encoded text). Make sure that the CRL file name does not contain any space, because OpenSSL does not work well with spaces in file names.

   ```
   OpenSSL crl –inform DER –in <input path to CRL file> -outform PEM –out <output
   path to CRL in PEM format>
   ```

2. Concatenate the contents of all PEM-formatted files in a proper order into a new file. The content from Trust Anchor must be the first in the new file.
3. Update **server.xml** to reference the new file in the `crlFile` attribute.

The following example demonstrates how to perform the above procedure for two CRL files under the **test64** folder:

1. Convert the CRL file format by using the following commands:

   ```
   OpenSSL crl –inform DER –in c:/certs/test64/TrustAnchorCRLCP.01.01.crl -outform
   PEM –out c:/certs/test64/TrustAnchor.pem
   OpenSSL crl –inform DER –in c:/certs/test64/IntermediateCRLRL.02.01.crl -
   outform PEM –out c:/certs/test64/Intermediate.pem
   ```

2. Open **TrustAnchor.pem** and **Intermediate.pem** in a text editor.
3. Copy the entire contents of **Intermediate.pem**, and then paste the content at the bottom of **TrustAnchor.pem**, as shown below.


```
-----BEGIN X509 CRL-----
MIIBbzCB2QIBATANBgkqhkiG9w0BAQUFADBeMQswCQYDVQQGEwJVUzEYMBYGA1
UE
ChMPVS5TLiBHb3Zlcm5tZW50MQwwCgYDVQQLEwNEb0QxEDAOBgNVBAsTB1Rlc3R
p
bmcxFTATBgNVBAMTDFRydXN0IEFuY2hvchcNOTkwMTAxMTIwMTAwWhcNNDgwMT
Ax
MTIwMTAwWjAiMCACAScXDTk5MDEwMTEyMDAwMFowDDAKBgNVHRUEAwoBAaAj
MCEw
CgYDVR0UBAMCAQEwEwYDVR0jBAwwCoAIq5rr+cLnVI8wDQYJKoZIhvcNAQEFBQA
D gYEAC7lqZwejJRW7QvzH11/7cYcL3racgMxH3PSU/ufvyLk7ahR++RtHary/WeCv
RdyznLiIOA8ZBiguWtVPqsNysNn7WLofQIVa+/TD3T+lece4e1NwGQvj5Q+e2wRt
GXg+gCuTjTKUFfKRnWz7O7RyiJKKim0jtAF4RkCpLebNChY=
-----END X509 CRL-----
-----BEGIN X509 CRL-----
MIIBSzCBtQIBATANBgkqhkiG9w0BAQUFADBeMQswCQYDVQQGEwJVUzEYMBYGA1
UE
ChMPVS5TLiBHb3Zlcm5tZW50MQwwCgYDVQQLEwNEb2QxEDAOBgNVBAsTB1Rlc3R
p
bmcxFTATBgNVBAMTDENBMS1STC4wMi4wMRcNOTkwMTAxMTIwMTAwWhcNNDgw
MTAx
MTIwMTAwWqAjMCEwCgYDVR0UBAMCAQEwEwYDVR0jBAwwCoAIZdDTuqICq/YwD
QYJ KoZIhvcNAQEFBQADgYEAxrDHzKno1mkJqPTub0c9To6jC3CGTilV1E12oD0kFjkX
qL40+W251qQ2wMC+G7ZrzBIc5dRuJ93feHZ7cc03/s3TziXDvSyfNOYpHzkPwT48
HuSgBYgJ3uswwk+tDiA64NzbOJqssxxhFRok9OpwC8eQkzgpA3a6816v2I3XL9s=
-----END X509 CRL-----
```


4. Save the concatenated contents to a new file. For example, **TrustInt64.pem**.
5. Modify the **server.xml** file so that the `crlFile` attribute points to this new file:

   ```
   crlFile="C:/certs/test64/TrustInt64.pem"
   ```

6. Save the **server.xml** file, and then restart the Tomcat server.

Configure Multiple UCMDB Servers

It is possible to configure the CMS UI to work with multiple UCMDB Servers. This is done by replicating the section `<ucmdb_configuration>…</ucmdb_configuration>` in the **ucmdb_browser_config.xml** file, as shown in the following example:

```
<ucmdb_configuration name="configuration-1">
    <protocol>https</protocol>
    <host_name>ucmdb-server-1</host_name>
    <host_port>8443</host_port>
    <context_name>/</context_name>
    <customer>
        <customer_name>company_a</customer_name>
        <customer_number>1</customer_number>
    </customer>
</ucmdb_configuration>
<ucmdb_configuration name="configuration-2">
    <protocol>https</protocol>
    <host_name>ucmdb-server-2</host_name>
    <host_port>8443</host_port>
    <context_name>/</context_name>
    <customer>
        <customer_name>company_b</customer_name>
        <customer_number>6</customer_number>
    </customer>
</ucmdb_configuration>
```

There is no limit to the number of UCMDB Servers that you can add in this manner.

Note:

- The value of the **name** attribute in each configuration (for example, **configuration-1** or **configuration-2** in the example above) is optional, but if it is defined it must be a unique value.
- You can specify a default customer by name, ID, or both. If you include the `<customer>...</customer>` tag, you must provide details for it. On the login page of the CMS UI, only the customer that you defined as the default customer for a particular UCMDB server will be visible in the drop-down list.
- Configuring multiple UCMDB servers is not relevant to the embedded CMS UI since the embedded CMS UI can connect to only one server. For more information, see "Multiple Customer Support for the Embedded CMS UI" on page 90.

For each configuration section, the customers for that UCMDB server are retrieved automatically at the moment that the application server starts, and a connection for each customer is formed using the value from the **name** attribute in the **ucmdb_configuration** tag (if the name attribute is not defined, the value from the **host_name** tag is used) and the name of the customer. All these connections appear in the drop-down list in the login screen. For example, in the case of the xml example above, if **configuration-1** has two customers and **configuration-2** has three customers, then the drop-down list will contain five connections, in the form of:

- configuration-1 – CustomerName1
- configuration-1 – CustomerName2
- configuration-2 – CustomerName1
- configuration-2 – CustomerName2
- configuration-2 – CustomerName3

If the UCMDB server defined in **configuration-2** is inaccessible, then the connection for it is still visible in the drop-down list (without any customer information), even if the user cannot login using that server. In that case, the list will contain the connections:

- configuration-1 – CustomerName1
- configuration-1 – CustomerName2
- configuration-2

If only one server is available, then the server name does not appear in the connection name.

> **Caution:** If you have launched the CMS UI with a given UCMDB server, you cannot open another instance of the CMS UI with a different UCMDB server with the same web browser. You can, however, open another instance of the CMS UI with a different UCMDB Server if you use a different web browser. For example, if you opened the CMS UI with Internet Explorer with a given UCMDB server, you can open the CMS UI using Google Chrome with another UCMDB server.

> **Note:** The same LW-SSO settings from the **ucmdb_browser_lwsso_config.xml** file are used for all UCMDB configurations.

Retrieving Customer States

You can specify whether to retrieve the state(s) for each customer so that the state appears next to the customer name in the login drop-down list. Currently, the possible states are Actual and Authorized.

The default value for this setting is **false**, meaning that the customer state does not appear in the login drop-down list. If you change it to **true**, the state(s) for each customer is also retrieved, in addition to the customer name. So if the server host has two customers, **Customer-1** with an **Actual** state and an **Authorized** state, and **Customer-2** with an **Actual** state, then the connections will be **host – Customer-1 (Actual)**, **host – Customer-1 (Authorized)**, and **host – Customer 2 (Actual)**.

This setting also applies to the embedded CMS UI, as described below.

To specify whether to retrieve the state for each customer:

In UCMDB, go to **Administration > Infrastructure Settings > UCMDB Browser Settings**, and set the value for **Enable customer states**.

Multiple Customer Support for the Embedded CMS UI

The embedded CMS UI can connect to only one UCMDB server and so configuration for multiple UCMDB servers is not relevant. The information regarding the server is automatically sent by the UCMDB server into which the CMS UI is embedded. Similar to the case of login for the non-embedded CMS UI, the embedded CMS UI searches for all the customers for that server, and for each customer it creates a different connection. For example, if the host server has two customers, **customer1** and **customer2**, then the connection names **customer1** and **customer2** appear in the drop-down list on the login page.

Also, if the setting to receive customer states has been set to **true** (as described above), then the customer state appears next to the customer name in login drop-down for the embedded CMS UI.

Change the Default Port of the Tomcat Server

The default port value (8443) of the Tomcat Server may conflict with an existing application (for example, another web application already uses this port). If such a conflict exists, change the default port as follows:

1. Locate the file **server.xml** in **$CATALINA_BASE/conf/** where **$CATALINA_BASE** is the directory in which you installed Tomcat.
2. In **server.xml**, find a statement similar to the following:

```
<Connector port="8443" maxHttpHeaderSize="8192"
   maxThreads="150" minSpareThreads="25" maxSpareThreads="75"
   enableLookups="false" redirectPort="8080" acceptCount="100"
   connectionTimeout="20000" disableUploadTimeout="true" />
```

or

```
<Connector port="8443" protocol="HTTP/1.1"
   connectionTimeout="20000"
   redirectPort="8080" />
```

3. Change the Connector port=”8443″ port to any other port number.

   For example:

```
<Connector port="8181" protocol="HTTP/1.1"
   connectionTimeout="20000"
   redirectPort="8080" />
```

4. Save the **server.xml** file and restart the Tomcat server.

> **Note:** To use encrypted parameters on the Tomcat server, for example, an encrypted port number in the **server.xml** file, see "Configure to Use Encrypted Parameters on the Tomcat Server" below.

Configure to Use Encrypted Parameters on the Tomcat Server

To configure to use encrypted parameters on the Tomcat server,

1. Stop the Tomcat server.
2. Locate the file **catalina.properties** in **$CATALINA_BASE/conf/**, where **$CATALINA_BASE** is the directory in which you installed Tomcat.
   a. Open the the file **catalina.properties**.
   b. Uncomment or add the following:

```
org.apache.tomcat.util.digester.PROPERTY_SOURCE=com.hp.ucmdb_
browser.tomcat_config.CustomPropertyDecoder
```

   c. Save the file.
3. Go to the **$CATALINA_BASE/lib/** directory, check that you have the following .jar file (if not,

copy it from the CMS UI 2018.08 - Tomcat assembly)

- **tomcat-property-config.jar**

4. Go back to the **$CATALINA_BASE/conf/** directory,
   a. Create a file called **configproperties.txt**.
   b. Add values in the form of: **<key>=<value>**. For example,

```
my.port=8088
```

5. Open the **$CATALINA_BASE/conf/server.xml** file, and use those properties as follows:

   This is the HTTP connector, note the **my.port** usage:

```
<Connector port="${my.port}" protocol="HTTP/1.1"
         connectionTimeout="20000"
         redirectPort="8443" />
```

6. Restart the Tomcat server.

   Upon startup, an automatically generated **configproperties.bin** file, the encrypted version of the **configproperties.txt** file, replaces the original **configproperties.txt** file.

   The values of the parameters will be replaced on Tomcat startup, by the values defined in the encrypted file.

There is now no clear text version of these parameters, they are all encrypted.

Deploy the CMS UI with a Different Root Context

You can change the default root context name **/ucmdb-browser**. To do this, rename **ucmdb-browser.war** under **<Tomcat installation path>\webapps**.

For example, if you want to change the context name to **/nice-application,** rename **ucmdb-browser.war** to **nice-application.war**.

You can also create a multilevel context name. For example, if you want to change the context name to **/very/very/nice-application,** rename **ucmdb-browser.war** to **very#very#nice-application.war**.

Disable the Embedded CMS UI

To disable the embedded CMS UI, follow these steps:

1. Stop the UCMDB Server.
2. Delete the **ucmdb-browser.war** file, and the **ucmdb-browser** folder from the ***<UCMDB_Server_install_folder>*\deploy** folder.
3. Delete the **ucmdb-browser.war** folder from the ***<UCMDB_Server_install_folder>*\runtime\jetty-cache** folder.
4. Start the UCMDB server.

> **Note:** In a High Availability environment, repeat the above procedure for each CMS UI in the cluster.

Configure Reverse Proxy for the Apache Tomcat and IIS Servers

The client can configure reverse proxy on the CMS UI for either the Apache Tomcat or IIS servers.

Configure Reverse Proxy for the Apache Tomcat Server

1. Configure reverse proxy to append header X-Reverse-Proxy with the reverse proxy URL for Apache-server. To do this, open file **%apache-home-directory%\conf\httpd.conf** (where **%apache-home-directory%** is the Apache server home directory), and add the following lines:

   ```
   LoadModule headers_module modules/mod_headers.so
   RequestHeader set X-Reverse-Proxy http://srp-server-front-end-url
   ```

   Where `http://srp-server-front-end-url` is the entire reverse proxy's frontend URL.
2. Restart the Apache Tomcat server.

Configure Reverse Proxy for the IIS Server

Prerequisites

Install Application Request Routing (ARR) by using one of the following methods:

- Install ARR by using the Microsoft Web Platform Installer.
- Download and install ARR from the following address:

  http://www.iis.net/downloads/microsoft/application-request-routing

Configure the IIS server

1. Open IIS Manager, expand the server node, right-click **Server Farms**, and then click **Create Server Farm**. The **Create Server Farm** wizard opens.
2. Enter the name of the server farm, make sure the **Online** option is selected, and then click **Next**. The **Add Server** page is displayed.
3. Add the CMS UI server by using the following steps:
   a. Enter the IP address of the CMS UI server in the **Server address** field.
   b. Click **Advanced settings**, expand the **applicationRequestRouting** section, and then specify the port numbers for the CMS UI server.
   c. Click **Add**.
   d. Click **Finish**.
4. Click **Yes** when IIS Manager displays the following message:

   IIS Manager can create a URL rewrite rule to route all incoming requests to this server farm automatically. Do you want to create this rule now?

Configure an Environment to Use Multiple Reverse Proxies

When clients are connected to the same CMS UI instance through multiple reverse proxies, the CMS UI needs to know each client's frontend URL to build correct direct links to the Micro Focus Configuration Manager and Micro Focus Service Manager servers. For example, a client who accesses the CMS UI by reverse proxy **https://reverse-proxy-1** should get a direct link by the same **https://reverse-proxy-1**.

Therefore, a configuration based on relative URLs instead of full URLs should be implemented. When the CMS UI receives a request with a header X-Reverse Proxy, it relates to application URLs as relative URLs and concatenates part of the header with a relative URL. To use this solution the customer should:

1. Configure each reverse proxy in the environment to append header X-Reverse-Proxy with the Reverse Proxy's frontend URL.
2. Use a relative URL for all servers behind the reverse proxy in the CMS UI configuration.

To perform the actual configuration:

1. Configure reverse proxy to append header X-Reverse-Proxy with the reverse proxy URL for Apache-server. To do this, open file %apache-home-directory%\conf\httpd.conf (where %apache-home-directory% is the Apache server home directory), and add the following lines:
   - LoadModule headers_module modules/mod_headers.so
   - RequestHeader set X-Reverse-Proxy **http://srp-server-front-end-url**

   Where **http://srp-server-front-end-url** is the entire reverse proxy's frontend URL.
2. The CMS UI configuration file should use relative URLs instead of full URLs. For example, instead of **http://cm-server/cnc**, use **/cnc**. Specifically, it is very important that the value of tag **<ucmdb_ui_url>** is defined and uses a relative path.

> **Note:** To configure your environment to work properly, use the value of the **UCMDB Browser URL** setting to access CMS UI, by changing the value of the **Override the Return to CMS UI link** setting to **True**.

Configure a One-Time Authentication Token

The one-time authentication token is an additional means for the user to access CMS UI by a direct link (URL with parameters). With such a URL, the user does not need input credentials. The advantage of this method is that:

- The URL does not contain user credentials.
- The URL is for one time use only (after initial use, the URL cannot be used again).

> **Note:** You must have administrator rights in order to generate an authentication token for another user.

To configure and use the one-time authentication token:

1. Create a URL for obtaining the one time authentication token as follows:

   http://<server-name>:<port>/ucmdb-browser/generate-authentication-token.jsp?username=<your_user_name>&password=<your-encrypted_password>&server=<ucmdb-server>&logged-in-user=<logged_in_user_name>

   where the parameters **server** and **logged-in-user** are optional.

   The following is an example of a URL for obtaining one time authentication token:

   http://server-name:8088/ucmdb-browser/generate-authentication-token.jsp?username=johndoe&password=12345678&server=ucmdb-server

   To generate the encrypted password:

   a. Go to **JMX console > UCMDB-UI:name=UCMDB Integration > getEncryptedPasswordForURL**.
   b. In the **user name** field, enter the **user name**.
   c. In the **password** field, enter the user's password.
   d. Click **Invoke**.

   > **Note:**
   > - Parameter names are case sensitive and should be used exactly as they appear in this documentation.

- When an optional parameter (such as **server**) is omitted, the first server from the configuration is used.
- The server name in the **[server]** parameter should be taken from one of the **<host_name>** fields in CMS UI configuration file. If the **[server]** parameter is defined but it's value does not correspond to any of the values of the **<host_name>** field in CMS UI configuration file, the authentication token will be not generated.
- When you want to access CMS UI in a multi-customer environment, the following URL should be used:

  http://<server-name>:<port>/ucmdb-browser/generate-authentication-token.jsp?username=<your_user_name>&password=<your-encrypted_password>&server=<ucmdb-server>&customer-id=<id>&logged-in-user=<logged_in_user_name>

2. Execute the URL prepared in the previous step. After successful execution, the **Authentication-Token** field in the response http-header contains the authentication token value created for the parameters you entered in the previous step. The http field is used here for a return value to enlarge security strength.

   Note:

   - The response http-header fields can be viewed by using any external request interceptor (such as Fiddler) or tools embedded into a web browser (for example, in Chrome: **Developer Tools > Network tab**).
   - If the credentials provided in the previous step are not valid, the **authentication-token** field is empty or not present at all.

Build the URL for the CMS UI by using the parameter **authentication-token** and the token value obtained in the previous step. For example:

http://server-name:8088/ucmdb-browser/?authentication-token=<token-value>

where **token-value** is the authentication token string obtained in the previous step.

After executing the URL, you are redirected to the CMS UI without having to enter user credentials.

Important: For the one-time authentication token to work, you need to enable the LW-SSO framework. To do this, in the **ucmdb_browser_lwsso_config.xml** file, make sure that the value for **enableLWSSOFramework**, **enableCookieCreation**, and **enableAutoCookieCreation** is **True**.

```
<?xml version="1.0" encoding="UTF-8"?>
<lwsso-config
        xmlns="http://www.hp.com/astsecurity/idmenablmentfw/lwsso/2.0">
    <enableLWSSO enableLWSSOFramework="true" enableCookieCreation="true"
enableAutoCookieCreation="true" cookieCreationType="LWSSO"
enableSAML2Support="false"/>
```

Note: After restarting the server of the CMS UI, all prepared authentication tokens are no longer valid.

Configuration Mechanism

The configuration settings for CMS UI and for the UCMDB Browser module are kept on the UCMDB Server to which the CMS UI is connected. The CMS UI configuration settings on the UCMDB Server are accessible from UCMDB (in **Administration > Infrastructure Settings > UCMDB Browser Settings**). The settings appear only after initial login, which triggers a settings deployment on the UCMDB Server.

For each group of configuration settings, there is a setting called: **Enable XXX**, where XXX is the name of a CMS UI feature (for example, **Enable the Incidents Widget**, and so on). This setting can be used to enable/disable the group of settings. For example, if **Enable the Incidents Widget** is set to **false**, the Incidents Widget is not available in the UCMDB Browser module.

Note: When upgrading to UCMDB 2018.08, the CMS UI settings are not upgraded. The UCMDB administrator should set them manually in Infrastructure Settings Manager in UCMDB.

Specify the Number of Concurrent Sessions

By default, a user can open an unlimited number of sessions. You can specify the maximum number of sessions that a user may log into concurrently.

Note: This setting cannot be used for:

- CMS UI in a high availability environment.
- a standalone CMS UI that is connected to multiple UCMDB servers.
- a standalone CMS UI that is connected to a UCMDB server with multiple customers.
- the embedded CMS UI of a UCMDB that is configured with CAC.

1. In UCMDB, go to **Administration > Infrastructure Settings Manager > UCMDB Browser settings**.
2. In the Name column, choose **Maximum sessions per user**.
3. In the Value column, enter a number.
4. Click **Save** .
5. Log out from the CMS UI, and then log in again (this loads the new settings).

> **Note:** The change takes effect according to the time set in one of the following settings:
>
> - **Time for which information in the Browser cache is valid**
> - **Time for which UCMDB Settings in the Browser cache is valid**
>
> For more information, see "Settings affecting overall system operation".

Enable/Disable Timeout of a CMS UI Session

It is possible to set a timeout for a CMS UI session if the CMS UI is not used for a certain period of time. If the timeout is enabled and a user does not perform any actions in the CMS UI for the set timeout period, then when the user tries to perform an action in the CMS UI a message appears for 2 seconds stating that the session has expired and the user is redirected to the CMS UI login page.

> **Note:** The default wait period for the timeout is 30 minutes. This value can be changed in the Java **web.xml** file, located at:
>
> **%WEB_SERVER_HOME%\webapps\ucmdb-browser\WEB-INF\web.xml**

By default this timeout is disabled, but you can change this setting according to the following instructions.

1. In UCMDB, go to **Administration > Infrastructure Settings Manager > UCMDB Browser settings**.
2. In the **Name** column, choose **Enable the Session Timeout**.
3. In the **Value** column, choose True or False (depending on whether you want to enable or disable the timeout) from the drop-down list .
4. Click **Save** .
5. Log out from the CMS UI, and then log in again (this loads the new setting).

> **Note:** The change takes effect according to the time set in one of the following settings:
>
> - **Time for which information in the Browser cache is valid**
> - **Time for which UCMDB Settings in the Browser cache is valid**
>
> For more information, see "Settings affecting overall system operation".

Disable the Turn off Data URI Support Setting

When the **Turn off Data URI support** setting is not disabled, the icons are not displayed in the Internet Explorer.

> **Note:** By default the **Turn off Data URI support** setting is not disabled.

To disable the **Turn off Data URI support** setting,

1. Click **Start**, type **gpedit.msc** in the **Start Search** box, and then press **ENTER**.
2. In the navigation pane of the Local Group Policy Editor window, expand **Computer Configuration > Administrative Templates > Windows Components > Internet Explorer > Security Features.**
3. In the right pane, double-click **Turn Off Data URI support**.
4. Select **Enabled**, click **Apply**, and then click **OK**.
5. Go back to the navigation pane of the Local Group Policy Editor window, expand **User Configuration > Administrative Templates > Windows Components > Internet Explorer > Security Features.**
6. Repeat step 3 and step 4.

Authorize Access to CIs

Browser CI Access Control enables you to assign granular access to the CIs in views or CI types in UCMDB, according to a user's assigned role. A role that has global **View** or **Edit** permission can see all CIs and relationships in UCMDB. A role that has **View** or **Edit** permission for a particular view can see only the CIs and relationships in that view. In addition, permission can be granted to view or edit particular CI types.

> **Note:**

> - You must assign at least one permission for a view or CIT in order to see CIs in the UCMDB Browser module.
> - You must have **View** permission on a particular CI in order to refocus on it, even if that CI is visible in a widget because of Browser CI Access Control settings.

To authorize access to CIs:

1. In UCMDB, go to **Security > Roles Manager**.
2. Select the role to which you want to assign access.
3. Click the Browser CI Access Control tab and add available actions as required.
4. Select an available view or CI type for which you want to assign permissions.
5. When you are finished, click **Save** .

For additional details about permissions, see "User Permissions for the UCMDB Browser module" in the *Administer section of the UCMDB Help*.

> **Note:**
>
> - If a CI does not have **Edit** permission assigned through a view or CI type, the **Edit** button will not be displayed in the Properties widget and it will not be possible to change any property's attributes in the UCMDB Browser module.
> - A user will be able to see the composite CIs of permitted CIs, even he has not been granted specific permission for those composite CIs.
> - If a user has permissions on CIs of two CI types and those CIs are not composite CIs, in order to have permission on their relationship (for example, to view them in the Environment widget), the necessary triplet should be added to the calculated link. This is named **Authorized Relationship Addition (UCMDB Browser)**, and it can be found **in CI Type Manager > Calculated Relationships**.

Use Cases

Enable a user to view or edit all CIs

- Read only: Assign the global permission **View All** to all CIs for a role.
- Read/Write: Assign the global permission **Edit All** to all CIs for a role.

Enable a user to view or edit only specific CIs

- Read only:
  - Assign **View** permission to specific views.
  - Assign **View All CIs** permission to a particular CI type.

  > **Note:** By default, in the UCMDB Browser module, the Party and Location CI types are automatically assigned **View All CIs** permission.

- Read/Write:

  Do one of the following:

  - To edit all CIs that you can view, assign **Edit All CIs** permission on all views.
  - To edit CIs in a specific view, assign **Edit All CIs** permission on only that view.
  - To edit only specific CI types in relevant views, assign **Edit By CIT** permission to the views and **Edit In View** permission to a particular CI type.

    > **Note:** You can assign permissions to a group of views by selecting a node in the list of Available Views, or apply the permissions to all views by selecting the Root node.

  - To edit all CIs of a specific CI type, assign **Edit All CIs** permission to that CI type.

Enable a user to view all CIs and edit only specific CIs

- Assign the global permission **View All** to all CIs for a role.

Do one of the following:

- To edit all CIs of a specific CI type, assign **Edit All CIs** permission to that CI type.
- To edit only specific CIs:
  - To edit all CIs that you can view, assign **Edit All CIs** permission on all views.
  - To edit CIs in a specific view, assign **Edit All CIs** permission on only that view.
  - To edit only specific CI types in relevant views, assign **Edit By CIT** permission to the views and **Edit In View** permission to a particular CI type.

    > **Note:** You can assign permissions to a group of views by selecting a node in the list of Available Views, or apply the permissions to all views by selecting the Root node.

  - To edit all CIs of a specific CI type, assign **Edit All CIs** permission to that CI type.

Log User Statistics

The CMS UI can log the user's functional activities, including aspects of the CMS UI performance and error messages. No user details are logged, and no UCMDB data, such as CI attributes, are logged. The log files are stored in the same folder as the CMS UI log folder.

The log files and their data are not sent in any way and remain strictly in the customer's local environment. Micro Focus may request that customers share the data in order to learn how the CMS UI is being used. By default, this logging functionality is disabled. It is possible to turn it on by setting the **Enable user statistics** setting to **true**.

How to Set CMS UI Session to Expire

To set a CMS UI session to expire when LW-SSO is enabled,

1. In UCMDB, go to **Administration > Infrastructure Settings Manager**.
2. With all categories of infrastructure settings displayed, select **Name** for the **Filter by column** field, and enter **LW-SSO** in the field next to it to display all LW-SSO settings.
3. Check if the **LW-SSO cookie expiration period** setting value is smaller than the **LW-SSO ping interval** setting value. (Both of the settings are expressed in minutes.)

   If not, modify the values for the two settings to ensure that **LW-SSO cookie expiration period** is smaller than the **LW-SSO ping interval**.

   When **LW-SSO ping interval** is lower than **LW-SSO cookie expiration period**, this means that the session will never expire. The ping will keep the session active.
4. Click **Save** .
5. Restart UCMDB Server.

Solr Auto Commit

Starting with UCMDB version 10.31, the SOLR auto commit feature is enabled by default, this means that SOLR will automatically commit documents (indexed CI data). A commit operation makes index changes visible to new search requests. Solr uses two types of auto commit operations:

- **hard auto commit**. Writes documents to disk, but the documents are not visible for searching. The interval for hard auto commit is set to 15 seconds or 10000 documents.
- **soft auto commit**. Makes documents available for searching. The interval for soft auto commit is set to 3 minutes.

Since UCMDB can run heavy data-in operations, by setting these values the updated data is often sent to Solr, therefor the Solr's performance is improved.

However, if necessary, you can change the auto commit interval as follows:

- **Hard auto commit interval**
  a. Open the **<*Solr_home*>\configsets\ucmdb_configs\conf\solrconfig.xml** file.
  b. In the below lines replace the values of the `maxTime` and `maxDocs` parameters with the ones you desired:

```
<autoCommit>
  <maxTime>${solr.autoCommit.maxTime:15000}</maxTime>
  <maxDocs>10000</maxDocs>
  <openSearcher>false</openSearcher>
 </autoCommit>
```

  c. Restart the UCMDB server.

- **Soft auto commit interval**
  a. Open the **<*Solr_home*>\configsets\ucmdb_configs\conf\solrconfig.xml** file.
  b. In the below lines replace the value of the `maxTime` parameter with the one you desired:

```
<autoSoftCommit>
  <maxTime>${solr.autoSoftCommit.maxTime:180000}</maxTime>
</autoSoftCommit>
```

  c. Restart the UCMDB server.

Best Practices for Working with the UCMDB Browser Module

This section provides a brief list of settings that impact system performance and enable you to configure the UCMDB Browser module in a way that is faster for production, and reduces the time needed to apply particular settings.

For more information about these and other settings, see the relevant section in this book.

UCMDB Browser module URL

After each Tomcat/Jetty restart, when you first log in to the CMS UI, the **UCMDB Browser URL** setting is updated with the used URL. This URL is used to create the direct links needed in the reports/notification emails.

To prevent the URL to be overridden, go to **UCMDB > Administration > Infrastructure Settings Manager > UCMDB Browser Settings**, and change the value of the **Override UCMDB Browser URL on first login** setting to **False**.

Settings affecting overall system operation

- **Time for which information in the Browser cache is valid.** The UCMDB Browser module uses the **Time for which information in the Browser cache is valid** setting to cache the information about the CIs and dynamic widgets. The default value is 5 minutes. This results in a faster login. When you change the information about a CI or a dynamic widget, it may take the same amount of time for it to be visible. To clear this cache, go to **Administration Console > Cache Operations**, and invalidate the UCMDB Browser module cache data by clicking the **Invalidate EhCache Data** button.
- **Time for which UCMDB Settings in the Browser cache is valid**. The UCMDB Browser module uses the **Time for which UCMDB Settings in the Browser cache is valid** setting to cache all the settings that are read form UCMDB Server, and the information about the available widgets.

  By default, the values stored in cache are valid for 120 minutes. If you increase this, more users will be able to log in faster. For example, with a 150 minute value, the values in the cache are considered valid for up to 150 minutes. This means that if user1 logs in, for 150 minutes after that, all users that log in and read the same settings will use the values from the cache. This results in a faster login and a better performance.

  To change the default value, go to **UCMDB > Administration > Infrastructure Settings > UCMDB Browser Settings > Time for which UCMDB Settings in the Browser cache is valid** setting, specify a new value (in minutes), and then restart the CMS UI for the change to take effect.

  When you change a setting, it may take the same amount of time for it to be visible. To clear this cache, go to **Administration Console > Cache Operations**, and invalidate the UCMDB Browser module cache data by clicking the **Invalidate EhCache Data** button.

- **Maximum parallel calls from UCMDB Browser UI to UCMDB Browser web server**. The UCMDB Browser module can throttle its asynchronous calls from the UCMDB Browser module UI to the UCMDB Browser module web server. If you have more than 8 widgets visible, increase this setting for a faster loading UI. The default value is 10. This value should always be a few increments above number of widgets, since besides each widget that runs a call when selecting a CI's details, some other calls are also made (such as updating the most visited page).
- **Enable user statistics**. The logging of user statistics is disabled by default, for improved performance.
- **Enable notifications**. The ability to receive notifications is useful; however, this feature does put a load on the application. Notifications are enabled by default, but if you do not use them, you can improve performance by disabling them. Searching would also be faster, since notification data is not gathered for each CI returned by a search before results are displayed.

Settings affecting search

- **Search results page size**. This setting specifies the number of rows that are displayed in the results grid on a single page. The default value should be fine, but you can increase it to see more results in a single glance. A very high value will result in a slower overall performance, because many more elements must be loaded in the UI.
- **Legacy search**
  - **Show federated search results**. This setting only affects the legacy search engine and widgets. Disable it if issues occur such as the search not working, widgets failing to load, or you notice exceptions from the UCMDB Federation engine in the logs. An alternative to disabling this setting is to disable integration points (one by one, or all of them), and then enable them one at a time.
  - **Return CIs belonging to classes that have MODELING_ENABLED qualifier in legacy search engine**. This setting affects only the legacy search engine. Its value is set to **True** by default, which means the legacy search engine works in the same way it did since the first version. However, search rules that used the MODELING_ENABLED qualifier took 50% more search time. Changing the value to **False** reduces the time of the legacy search dramatically if you have MODELING_ENABLED added to many classes. You can still add custom classes to search results, using the CMS_BROWSER_SEARCH qualifier.
- **Enhanced search**

- **Search results update interval**. This setting affects the enhanced search engine, and specifies the time period (in milliseconds) after which the UCMDB Browser module asks for updates. The default setting should be fine.

Configure Browser Internal Priorities (for the Incidents and Problems Widgets)

For both the Incidents and Problems widgets, configuration of the UCMDB Browser module Internal Priorities is performed in UCMDB.

1. Go to **Administration > Infrastructure Settings Manager > UCMDB Browser settings**.
2. In the Names column, find the following settings:
   - List of statuses for an major priority incident or problem
   - List of statuses for an minor priority incident or problem
   - List of statuses for an none priority incident or problem
   - List of statuses for an open incident or problem
   - List of statuses for an urgent priority incident or problem
3. In the Value column, change the priority name for any of the settings above according to your system needs.

Brand the UCMDB Browser module

You have the ability to apply a header and footer, add custom text and an icon in the header of the UCMDB Browser module, and replace the image that appears on the landing page.

In all CMS UI installations, the ***<CMS_UI_installation_directory>*** **\webapps\ucmdb-browser\public\branding** folder contains sample icon, image, and stylesheet files. You can replace or update these files as desired, and specify their location in the settings in UCMDB, as described below.

Recommended image sizes are:

- for icons - 20 x 20 pixels
- for the landing page image - 135 x 135 pixels

Example of the CSS stylesheet:

```
.bannerClass {
      background-color: yellow;
      color: blue;
      font-weight: bold;
      font-style:italic;
 }
```

To brand the UCMDB Browser module:

1. In UCMDB, go to **Administration > Infrastructure Settings Manager**, and choose **UCMDB Browser settings**.
2. Update the following settings as required:

Name	Value
Banner stylesheet URL	The URL of the stylesheet used for the banner text.
Banner text	The text that will appear in the header and footer.
Custom masthead text	Customized text that will appear in the masthead of the UCMDB Browser module.
Custom icon for masthead	The URL of the icon that will appear in the masthead of the UCMDB Browser module.
Custom image for landing page	The URL of the image that will appear on the landing page of the UCMDB Browser module. **Note:** For the best visual effect, use a graphic with a transparent background.
Custom product name	The name of the product that will appear on the landing page of the UCMDB Browser module.

> **Note:** If you specify customized text and an icon for the masthead, they will appear in addition to the current text and image, and not as replacements.

3. Click **Save** .

How to View the Java Metrics for the UCMDB Browser module

You can use the Java Metrics to view the following information about the UCMDB Browser module:

- Database connection summary
- Discovery processing statistics
- Operations information

Performance Statistics

The UCMDB Browser module automatically captures performance metrics and saves the data statistically in .csv files under the **<CMS_UI_log_folder>\metrics** folder.

Log files are located in:

- CMS UI Standalone: **tomcat_folder\logs**
- CMS UI Embedded: **UCMDB\UCMDBServer\runtime\log**

By default, the interval at which the UCMDB Browser module gathers performance metrics is 15 minutes.

To change the default interval (measured in minutes):

- If Tomcat is started as a service:
  a. Run the **CMS-Browserw.exe** file.
  b. In the dialog box that opens, go to the **Java** tab, and add **–DmetricInterval=X** in the **Java Options** container, where **X** is a number of minutes.
- If Tomcat is started by invoking **.\ucmdbbrowser\bin\startup.bat**:
  a. Create the **setenv.bat** file (if one has not already been created).
  b. Add the **set CATALINA_OPTS=–DmetricInterval=X** line to the **setenv.bat** file, where **X** is a number of minutes.

  > **Note:** If the variable **CATALINA_OPTS** already exists, just append the **–DmetricInterval=X** value to the variable, where **X** is a number of minutes.

- If Tomcat is started by invoking **./ucmdbbrowser/bin/startup.sh**:
  a. Create the **setenv.sh** file (if one has not already been created).
  b. Add the **set CATALINA_OPTS=–DmetricInterval=X** line to the **setenv.sh** file, where **X** is a number of minutes.

> **Note:** If the variable **CATALINA_OPTS** already exists, just append **–DmetricInterval=x** to the existing value, where **X** is a number of minutes.

> **Note:** If you do not want the performance metrics to be gathered, the value of the **–DmetricInterval** parameter has to be **0**.

The following table explains each column in the .csv files.

Column	Information
t	Timestamp (epoch)
count	Number of invocations [1]
max	Max invocation duration [1]
mean	Average invocation duration [1]
min	Min invocation duration [1]
stddev	Standard Deviation of the values
p50	50% quantile [1 2]
p75	75% quantile [1 2]
p95	95% quantile [1 2]
p98	98% quantile [1 2]
p99	99% quantile [1 2]
p999	99.9% quantile [1 2]
mean_rate	Average event rate (per second)
m1_rate	Average event rate in the last minutes
m5_rate	Average event rate in the last 5 minutes
m15_rate	Average event rate in the last 15 minutes
rate_unit	Unit for the rate (for example, calls/second)
duration_unit	Unit for the durations (for example, seconds)

> **Note:**
>
> 1. All these values are collected since the last metric reset. Every 15 minutes after dumping the statistics to a CSV, the metrics (counters, durations) are reset to 0.

2. A quantile is calculated by taking the entire data set, sorting it, and taking the value in the middle (or 1% from the end, for the 99th percentile). For example, the 75% quantile shows the median of the lower 75% values. These quantiles apply to the set of durations of each invocation.

Not all the counters are reset every 15 minutes, so their values keep growing and show overall counts since the system startup.

Captured Metrics

The following tables show the captured metrics.

Login statistics

Metrics	Measurement	Note
LoginService.<Step>	Timer	A breakdown of times in the Login process
LoginService.UIConfig.<Step>	Timer	A breakdown of times in the UIConfig process during login
LoginCount	Counter	A counter that shows the number of users that have logged in
SessionCount	Counter	The number of active sessions

Export statistics

Metrics	Measurement	Note
Export.Email.<Format>	Timer	A timer over the sending of scheduled reports/notifications by email
Export.UI.<Format>	Timer	A timer over the duration of exports

Search statistics

Metrics	Measurement	Note
Search.Legacy	Timer	A timer over the duration of a search using legacy search
Search.SOLR	Timer	A timer over the duration of a search using enhanced search
SearchCount	Counter	A counter over the number of searches

RPC calls statistics

Metrics	Measurement	Note
RPCCall.<Call>	Timer	A timer over the execution of specific RPC calls

EhCache statistics

Metrics	Note
net.sf.ehcache.Cache.<ServerName>	Shows information about the state of the Cache

Initial Setup for Working with the UCMDB Browser module

In order to enable a user to use the UCMDB Browser module, you must do the following in UCMDB:

- **Enable access to the UCMDB Browser module**

  In the Roles Manager, assign UCMDB Browser access permission to the relevant role.

  For details, see "Grant Access to CMS UI" on page 65

- **Specify which widgets will be displayed for a role in the UCMDB Browser module**

  a. Go to **Security > Roles Manager**.

  b. Click the Resources tab and select **UCMDB Browser Widgets**.

  c. Select the widgets for which you want to grant View permission in the UCMDB Browser module and click .

  d. When you are finished, click **Save** .

  > **Note:** The list of available UCMDB Browser widgets will be visible in UCMDB only after launching the CMS UI for the first time.

  For details, see "Roles Manager Page" in the *Administer section of the UCMDB Help*.

- **Authorize access to CIs**

  In the Roles Manager, specify the specific access levels to CIs that you want to assign to the role.

  For details, see "Authorize Access to CIs" on page 100

  > **Note:** Browser CI Access Control is not supported for in multi-tenant installations. To enable

> CIs to be viewed in multi-tenant installations, select the View CIs action on the General Actions tab in the Roles Manager.

Enable the Start Assisted Modeling link in the UCMDB Browser module for specific users

In some cases, you may wish to grant users access to the Service Modeling module in the UCMDB Browser module, but not to Assisted Modeling. To enable this functionality, a new **AssistedModelingVisible** infrastructure setting control is introduced. This allows you to grant or revoke access to Assisted Modeling to different user roles, which will enable or disable the Start Assisted Modeling link in the Service Modeling module.

If you are upgrading to this version of UCMDB, you must manually grant access to Assisted Modeling to each user role. To do this, follow these steps:

1. Go to **UCMDB UI > Administration > Infrastructure Settings Manager**, locate the **AssistedModelingVisible** setting, and set its value to **true**.
2. Log in to the UCMDB JMX console. in the *Administer section of the UCMDB Help*
3. In the UCMDB JMX Quick Search box, enter **listResourceTypes**.
4. Enter your Customer ID. (**Default: 1**)
5. Click **Invoke** to display the **URM Services** mbean.
6. Select **Auth_ROLE** to display the list of roles.
7. Click the Resource ID that corresponds to the user role to which you want to grant permission to access Assisted Modeling, and then add the following lines of code to the resource XML:

   ```
   <xmlGlobalPermittedAction>ASSISTED_MODELING</xmlGlobalPermittedAction>

   <xmlGlobalPermittedAction>EXPORT_REPORT</xmlGlobalPermittedAction>
   ```

8. Click **Save resource** to apply your changes.

Use

This section contains information about how to use the modules in CMS UI.

CMS Modules 114

CMS Modules

> **Note:** Only the modules for which you have the required permissions will be visible in the CMS Modules menu.

This section provides information about the new web-based CMS UI modules and the existing modules of UCMDB Browser.

With improved user experience and ease-of-use, new modules in the CMS UI simplifies administrative and integration management, and provide capabilities that were previously available through the UCMDB admin UI.

From the **CMS Modules** menu icon (), you can easily access the administrative and integration management features through the out-of-the-box modules:

Module	Description
Home	Opens the CMS UI landing page, which allows you to view the out-of-the-box content, and add different types of widgets to the landing page.
Configuration Item Search	Based on the existing Search module from the UCMDB Browser, the search capability is enhanced and extended.
Integration Studio	Opens the new Integration Studio module, which enables you to manage your UCMDB integration points and connect and share information with external repositories, such as other UCMDB, IT Performance Suite products, or third-party products.
LDAP Manager	Opens the LDAP Manager module, which enables you to associate Universal CMDB groups with LDAP groups.
Package Manager	Opens the Package Manager module, which enables you to easily manage the capabilities of your system based on the packages you deploy.
Probe Dashboard	Opens the Probe Dashboard module. It retrieves and displays real-time information about data flow probes and workflow/discovery jobs in a centralized view, allowing you to easily view all probes and jobs, and also drill down to probe and job details.

Module	Description
Reports	The existing Reports module from the UCMDB Browser.
Resource Manager	Opens the new unified Resource Manager module, which enables you to quickly search and consume various UCMDB resources in one place.
Service Modeling	The existing Service Modeling module from the UCMDB Browser.
Smart Software Analytics	The Smart Software Analytics module relies on data analytics to analyze large amount of scan files and suggest new software signatures, that can be used to recognize installed software. It automatically teaches unrecognized software by intelligently using Natural Language Processing (NLP) and machine learning technology. Smart Software Analytics provides you with an enhanced software recognition ratio that requires less manual effort.
UCMDB Browser	Allows you to access UCMDB Browser in the legacy style.

Home

The **Home** module in the CMS Modules navigation pane opens the CMS UI landing page, which allows you to add different types of widgets to the Home page

This section contains the following:

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Home Page User Interface 119

Home Page Overview

The Home module is the landing page for the CMS UI. When you access CMS UI, you are on the Home page. This module allows you to customize your experience with the product by quickly adding different types of widgets (such as reports) or a selection of UCMDB Browser widgets to the Home page.

> **Note:** A role that has **View** permission for a particular view can see only that view in the CMS UI.

You can quickly locate different types of resources using the Search functionality. The following options are available:

- **Configuration Item**. Allows you to search for a CI. The search results are opened directly in the Configuration Item Search module.
- **Queries and Models**. Allows you to search for queries and models. The search results are opened directly in the Resource Manager module.
- **Views and Reports**. Allows you to search for views and reports. The search results are opened in the Resource Manager module or in the Topology Map.
- **Reconciliation**. Allows you to search for a CI and to view all its changes. Also, you can view the reason why the CI was changed. This includes a list of identification candidates, and the reasons for matching the searched CI with them.

The content from the Home page is organized in tiles. Each tile offers a preview of the resource it points to.

Every widget on the Home page can be opened with a simple click. For example:

- When you click a UCMDB Browser widget, the embedded widget opens in the Widget Details mode. To return to the Home page, click **X**.
- When you click a report widget, the report opens in the Text mode.

You can remove any content from the Home page, rearrange or resize the existing widgets, or add new widgets. Your changes are saved every time you perform one of the following actions:

- Access one of the available modules.
- Remove a widget from the Home page.
- Add a widget to the Home page.
- Log out from CMS UI.

Out-of-the-box content

> **Note:** To view the out-of the-box content you must have one of the following:
>
> - **Data Consumer** role
> - **Viewer** role
> - **View** permission for the **Resource Groups > Views > OOTB_Reports_UCMDB_Home** resource

By default, when you access CMS UI for the first time, you can view the following out-of-the-box report widgets:

Report name	Description
Workstations by OS	Displays the computers that are not servers (node role does not contain "server"), grouped by the **DisocoveredOsName** attribute.
Servers by OS	Displays the computers that are servers (node role contains "server"), grouped by the **DisocoveredOsName** attribute.
Databases by Type	Displays all the Databases grouped by child CI Type.
Services	Displays the Services grouped by child CI Type.
Running Software	Displays all the Running Software grouped by child CI.
Installed Software	Displays all the Installed Software grouped by Display Label on InstalledSoftware.
Network Structure	Displays the Network Entities grouped by child CI.
All Integration Jobs	Displays the current status of all integration jobs in all integration points.
Network Devices	Displays the network devices grouped by the device type.
Storage Devices	Displays the storage devices grouped by the device type.
AWS CLOUD	Displays the AWS ec2 instances.

Note: If you see a "There is no data available for this report" message displayed for individual default report widgets (such as Installed Software) on CMS UI, either it is true that there is no data available for the report, or the reports are querying over a large amount of data from the UCMDB server which exceeds the maximum number of elements allowed in view (you may find "server view query over limit" error in log).

In case of the second scenario, to resolve the display issue, go to **UCMDB UI > Administration > Infrastructure Settings Manager**, locate the **Maximum number of elements (nodes) in TQL result for view** setting (default value: 30000) and increase its value to meet your need.

Delete the out-of-the-box content

To delete the out-of-the box content from the CMS Home page, follow these steps:

1. In CMS UI, click the **Menu** icon ( ) to expand the CMS Modules pane, and then click **Home**.
2. Click the **Settings** icon ( ) to expand the Home Settings pane.
3. Click **Delete**.

> **Note:** Once you have deleted the out-of-the-box widgets, you can manually add them back one by one, using the Add a New Widget ( ) option. For more information, see "Add a report widget to the Home page " on page 127

Specify the maximum number of widgets that can be added to the Home page

> **Note:** Only users who have Server Administrator Privileges can perform the following procedure.

By default, the number of widgets that can be added to the Home page is limited to 100. To modify the value, follow these steps:

1. Go to **JMX Console > UCMDB:service=Settings Services > setGlobalSettingValue**.
2. In the **name** field, enter **ucmdb.newui.dashboard.size**.
3. In the **value** field, enter the value of the maximum number of widgets that you want to be added to the Home page.
4. Click **Invoke**.

Home Page User Interface

You can remove any content from the Home page, rearrange or resize the existing widgets, or add new widgets.

> **Important:** CMS UI2018.08 requires UCMDB server 2018.08.

The following table describes the user interface elements on the Home page.

UI Element (A-Z)	Description
CMS	You can open the Home page from anywhere else in the CMS UI simply by clicking the CMS icon in the upper left corner of the CMS UI window.
	CMS Modules. Opens the CMS Modules pane, and allows you to navigate through the available web-based CMS modules. For detailed information about the available modules, see "CMS Modules" on page 114.
<Top Search Bar>	**Search.** Allows you to search within the following categories: • **Configuration Item**. Allows you to search for a CI. The search results are opened directly in the Configuration Item Search module. • **Queries and Models**. Allows you to search for queries and models. The search results are opened directly in the Resource Manager module. • **Views and Reports**. Allows you to search for views and reports. The search results are opened in the Resource Manager module or in the Topology Map. • **Reconciliation**. Allows you to search for a CI and to view all its changes. Also, you can view the reason why the CI was changed. This includes a list of identification candidates, and the reasons for matching the searched CI with them. For detailed information about Reconciliation Analyzer, see "Working with the Reconciliation Analyzer" on page 133 For more information, see "Search Functionality" on page 125.
<username>	***<username>*.** Displays the user that is currently logged in to CMS UI. Clicking it allows you to log out from CMS UI.
	Help. Opens the Help menu, which contains the following menu options: • **Help.** Opens the CMS UI Help page. • **REST API Reference.** Opens the new interactive REST API Reference documentation. ◦ The REST API Reference documentation now contains information

UI Element (A-Z)	Description
	about all REST APIs available with UCMDB. ○ The **Try it out** button for each REST API call in the interactive REST API Reference documentation allows you to try executing the REST API code examples and to view returned responses. • **Online Help for CMS UI.** Opens the online help for the current CMS UI version available on the Micro Focus Software Information Portal. • **Online Help for UCMDB Server.** Opens the online help for the current UCMDB Server version available on the Micro Focus Software Information Portal. • **Online Help for Content Pack.** Opens the online help for the current Content Pack version available on the Micro Focus Software Information Portal. • **About.** Opens the About dialog box. The **ABOUT** tab provides version, patch (if available), copyright, and third-party notice information. For more information, see "About Window" on page 122. The **LICENSE** tab provides license information, including license status, license summary, and a license status link. Clicking the license status link opens the license summary report, which contains license consumption summary and available licenses, and a link that allows you to export a detailed license consumption report. For more information about licenses, see "Universal Discovery Licensing Overview" on page 422. Clicking **OK** exits the About window.
	Walk-throughs. Opens a list of predefined workflow scenarios. Click one of the available workflows to open a set of step-by-step-instructions. This allows you to complete an end-to-end workflow by yourself. The following walk-throughs are available: • How to Search for a CI For more information, see "Run a Walk-through " on page 128
	Add New Widget. Enables you to add different types of widgets to the Home page. Opens the Add a New Widget layer. The following types of widgets are available: • UCMDB Browser Widgets (History, Get Related, and Impact Simulation). For more information, see "Add a UCMDB Browser widget to the Home page " on page 126 • Reports. For more information, see "Add a report widget to the Home page " on page 127

UI Element (A-Z)	Description
	Settings. Enables you to delete the out-of-the-box content. For more information, see "Delete the out-of-the-box content" in the "Home Page Overview" on page 115 section.

The following table describes the user interface elements on each tile on the Home page.

UI Element (A-Z)	Description
	Delete <*tile name*>. Removes the widget from the Home page.
	Map mode. Opens the topology map for a view associated with a widget.
	Widget Settings. Allows you to customize the widget title, and to view some of the widget properties. To customize the title of a widget, follow these steps: 1. In the Home page, hover the mouse over a widget, and then click the **Settings** icon ( ) in the top-right corner of the widget. 2. In the Widget Settings pane, replace the existing title with a new one, and then click **Save**.
<tile content>	Displays a preview of the widget. For the report widgets, the CIs displayed in the preview are grouped by CI Type, or by attribute, according to the type of grouping you have defined for the report. • If the report has no grouping by attribute defined, then the CIs displayed in the preview are grouped by CI Type. • If the report has a grouping by attribute defined, then the CIs displayed in the preview are grouped by attribute. • If the report has more than one grouping by attribute defined, then the CIs displayed in the preview are grouped by the first attribute from the top. **Important:** Only the first nine groups are displayed in the preview. The preview contains a graph and a legend. • **<Graph>**. Displays the number of grouped CIs (maximum nine groups). • **<Legend>**. Displays the legend for the graph. In the following situations, the legend displays a new category called **Other CIs**: ○ When the total number of CIs is larger than the number of CIs grouped by attribute. In this case, the **Other CIs** category includes all the CIs that are not grouped by attribute. (**Other CIs** = The total number of CIs -

UI Element (A-Z)	Description
	The CIs grouped by attribute). ◦ When the CIs are grouped by attribute, and there are more than nine groups. In this case, the **Other CIs** category includes all the remaining CIs (grouped by attribute and also the ones that are not grouped by attribute). (**Other CIs** = The total number of CIs - The number of CIs from the nine groups displayed in the legend).
	Re-size widget. Changes the size of the widget. To do this, click the icon and then drag the mouse.

About Window

From CMS UI, clicking **Help** **> About** opens the About window, which contains two tabs:

- **ABOUT** - Provides CMS version, copyright, and third-party notice information.

  You can click ▷ to expand the Version section to display more specific component information for CMS UI, UCMDB Server, and Content Pack. The component version information is displayed in the **xx.x.xx** format, where **xx.x** is the internal reference number, the last **xx** is the build number. To collapse the Component Information section, click ▽.

- **LICENSE** - Provides license summary and related information.
  - **License Status** - Is license status compliant, noncompliant, or expiring in a number of days.

    Clicking the link after **License Status** opens the License Summary Report page. For details, see "License Summary Report" below.
  - **Total Units** - Provides data about units of licenses consumed and units available, as well as the units consumption rate.
  - **Is UCMDB Foundation** – Indicates whether you have Foundation license or not.
  - The Managed Data Repository (MDR) usage is displayed according to the **Available 3rd Party Integrations** you have in UCMDB.
  - **OSs managed by CM** usage displays the number of OSIs belonging to the results of the managed in CM views.

License Summary Report

The License Summary Report displays the following information:

- Only **Instant-On license** is listed even though you have had some licenses installed when you worked with the previous version. The license issued for version 10.33 (and earlier) are not compatible with UCMDB 2018.08 and they are not visible.
- The **Advanced UD** license usage is not yet displayed even if there are discovered OSIs in your UCMDB.
- **OSs managed by CM** usage displays the number of OSIs belonging to the results of the managed in CM views.
- The Managed Data Repository (MDR) usage is displayed according to the **Available 3rd Party Integrations** you have in UCMDB.
- **Total Units** usage provides data about units consumed and units available, as well as the units consumption rate.
- In the **Available Licenses** section, you can click to select whether you want to display **All** licenses or licenses of **Active** or **Expired** status. You can also click to select columns you want to display. By default all columns are displayed.
- You can click **Export License Consumption Details Report** in the upper right corner of the page, then select one of the following options to export the detailed report in Excel format:
  - **Unit Consumption Details**
  - **MDR Consumption Details**

  You can open the exported Excel report and review the details, for example, the device name that is identified.

  The table below describes each column in the exported Unit Consumption Details report:

Column	Description
instance_type	Instance type of the resource. Valid values include server, workstation, network, docker, and so on.
Units	Units consumed.
CI_type	CI type attribute value of the resource.
global_id	Global ID attribute value of the resource.
name	Name attribute value of the resource
node_role	Whether the resource is of node type, but not of network or storage device, and what node type the resource is: server or workstation. Value example: **[server, virtualized_system]** or **[virtualized_system]** for a server resource; **[desktop, virtualized_system]** for a workstation

Column	Description
	resource.
os_family	OS family of the resource: Windows, Linux, MacOS, or others.
discovered_os_ version	The discovered OS version of the resource (if applicable).
create_time	Time the record for the resource is created.
created_by	Indcates who created the record of the resource. Value example: **UCMDBDiscovery: Host Connection by Shell** indicates that the record is created by the Universal Discovery Host Connection by Shell job.
last_modified_time	Time the record of the resource was last updated.
data_updated_by	Indicates the discovery job that last updated the record of the resource. Value example: **UCMDBDiscovery: Host Connection by Shell**
root_ iscandidatefordeletion	Is the CI candidate for deletion or not. Default: FALSE

The table below describes each column in the exported MDR Consumption Details report:

Column	Description
Integration name	Name of the integration point.
Adapter name	Name of the adapter used in the integration point.
Is Free	Is the integration available free of charge or not.
Used MDR license:	Number of MDR licenses used.

Work with Home

Search Functionality

You can quickly locate different types of resources using the Search functionality. The following options are available:

- **Configuration Item**. Allows you to search for a CI. The search results are opened directly in the Configuration Item Search module.
- **Queries and Models**. Allows you to search for queries and models. The search results are opened directly in the Resource Manager module.
- **Views and Reports**. Allows you to search for views and reports. The search results are opened in the Resource Manager module or in the Topology Map.
- **Reconciliation**. Allows you to search for a CI and to view all its changes. Also, you can view the reason why the CI was changed. This includes a list of identification candidates, and the reasons for matching the searched CI with them. For detailed information about Reconciliation Analyzer, see "Working with the Reconciliation Analyzer" on page 133

How to search for a Configuration Item

You can search for a CI directly from the CMS UI. This operation opens the Configuration Item Search module with the search results page displayed.

To search for a CI, follow these steps:

1. In the Top Search Bar, select **Configuration Item** from the drop-down list of available options.
2. Type a text string in the search field, and then select the required CI from the suggestions list or press **Enter**.

   > **Note:** The suggestions list is limited to 10 items.

The Configuration item Search module opens and the search results page is displayed.

How to open a resource in the Resource Manager module directly

You can search for a resource directly from the CMS UI. This operation opens your search results in the Resource Manager module. The following types of resources are available:

- Queries
- Views
- Models

To search for a resource and to open it in the Resource Manager module directly, follow these steps:

1. In the Top Search Bar, select **Queries & Models** or **Views & Reports** from the drop-down list of available options.
2. Type a text string in the search field, and then select the desired resource from the suggestions list or press **Enter**.

> **Note:** The suggestions list is limited to 10 items.

The Resource Manager module opens and the search results are displayed. For detailed information about Resource Manager, see the *Resource Manager*.

How to open a report or a view in the topology map directly

To quickly open a report or a view in topology map directly using the search functionality, follow these steps:

1. In the Top Search Bar, select **Views & Reports** from the drop-down list of available options.
2. Type a text string in the search field.
3. Hover the mouse over an auto suggestion string, and then click the quick open icon ( ).

> **Note:** The suggestions list is limited to 10 items.

The selected resource opens in the Topology Map directly. For detailed information about topology map, see "Working with the Topology Map" on page 128

Add a UCMDB Browser widget to the Home page

To add a UCMDB Browser widget to the Home page, follow these steps:

1. In CMS UI, click the **Menu** icon ( ) to expand the CMS Modules pane, and then click **Home**.
2. Click the **Add New Widget** icon ( ) to display the Add a New Widget pane.

3. Select **UCMDB Browser Widget** from the drop-down list of available widget types.
4. Click the **Search** icon ( ), enter your search terms in the **Search** box, select a CI from the suggestions list, and then press Enter.
5. Choose a CI from the list of search results.
6. Select the desired UCMDB Browser widget from the drop-down list of available UCMDB Browser widgets.
7. (Impact Simulation widget only) Select a severity level.
8. Select the UCMDB Groups for which you want to make this widget visible from the drop-down list of UCMDB Groups.

   > **Note:** This step can be performed only by the users with Administrative privileges.

9. Click the **Save** button to add the UCMDB Browser widget to the Home page.

> **Note:** To remove a widget from the Home page, click the **X** button.

Add a report widget to the Home page

To add a report widget to the Home page, follow these steps:

1. In CMS UI, click the **Menu** icon ( ) to expand the CMS Modules pane, and then click **Home**.
2. Click the **Add New Widget** icon ( ) to display the Add a New Widget pane.
3. Select **Report** from the drop-down list of available widget types.
4. Click the **Search** icon ( ), enter your search terms in the **Search** box, and then select a report from the suggestions list.
5. Select the UCMDB Groups for which you want to make the report widget visible from the drop-down list of UCMDB Groups.

   > **Note:** This step can be performed only by the users with Administrative privileges.

6. Click the **Save** button to add the report widget to the Home page.

> **Note:** To remove a widget from the Home page, click the **X** button.

Run a Walk-through

Walk-throughs provide step-by-step instructions that enable you to complete an end-to-end use case by yourself. To launch a walk-through, click the button on the Home page, select one of the available walk-throughs, and then follow the step-by-step instructions.

The following table describes the walk-through user interface elements.

UI Element (A-Z)	Description
Next 2/6	**Next.** Proceed to the next step. The **Next** button displays your progress through the walk-through (for example, 2/6 means that two steps are completed from a total of six steps). **Important:** After completing an action described in a step, you have to click the **Next** button.
Back	**Back.** Go back to the previous step.
Last	**Last.** Ends a walk-through.
Skip	**Skip.** Allows you to close the walk-through, and gives you the possibility to continue your current activity.
	Beacon. Appears when a step is incorrectly performed, when you press Enter, or when you click the **X** button on a tooltip. Hovering your mouse over the button opens a tooltip that displays the current step that has to be performed, and allows you to continue the walk-through.

Working with the Topology Map

The Topology Map provides a graphical display of a view. All the CIs in a given layer of the view are represented by icons together with connecting links that represent relationships between CIs. If there is more than one relationship between the same two CIs, only one connecting link is displayed. The connecting link is thicker, with no direction. To view all the existing relationships between the same two CIs, click the connecting link, and then click the **Configuration Item Details** button ( ) to display

the CI Links pane. In the CI Links pane, you can view the number of relationships between the two CIs, relationships types and directions.

The topology map is automatically updated dynamically with changes in the IT Universe data, such as new CIs discovered by the Data Flow Management process.

The Topology Map can display up to 200 objects in Internet Explorer and 2000 objects in other browsers. Layers in views that contain more than this number of items, are split into chunks of 200 (in Internet Explorer) or 2000 (in other browsers) CIs. If an object on the Topology Map has an additional CI layer beneath it, a count indicator above the CI icon displays the total number of CIs in all the sublayers under it.

Display the Topology Map for a view

To display the Topology Map for a view, hover the mouse over the view's widget, and then click the **Map mode** icon ( ) in the top-right corner of the widget.

> **Tip:**
>
> - To switch between displaying the view in map mode and text mode, click the **Map/Text** toggle button (Map Text).
> - To open a report in the Text mode directly, click the report widget in the Home page.

Navigate the Topology Map

The toolbar at the lower left of the Topology Map enable you to change the magnification level of the Topology Map, quickly navigate around a large Topology Map, and configure the Topology Map.

- Click the **Fit to Screen** icon ( ) to expand or shrink the Topology Map so that all CIs fit in the pane.
- Click the **Zoom Out** ( ) or **Zoom In** ( ) icons to zoom out or zoom in the Topology Map.
- Click the **Original Size** icon ( ) to return the Topology Map to its original zoom level.
- Click the **Overview** icon ( ) to display the quick navigation map. The quick navigation map overlays a selected area (which represents the currently displayed area of the Topology Map) over a

representation of the whole Topology Map. You can drag and resize the selected area in the quick navigation map to zoom in or out and to jump directly to a particular part of the Topology Map.

Configure the Topology Map

Change the layout of the Topology Map

To change the layout of the Topology Map, click the **Layout Settings** icon ( ) in the toolbar. Then, select one of the following options from the **Layout** drop-down list:

- Hierarchical layout.
- Orthogonal layout.
- Radial layout.
- Circular layout.
- Tree layout.
- Organic layout.
- Balloon layout.
- Swimlanes layout.

Change the grouping of the Topology Map

To change the grouping of CIs in the Topology Map, click the **Layout Settings** icon ( ) in the toolbar. Then, select one of the following options from the **Grouping** drop-down list:

- None.
- CI Type.

> **Note:** When you group the CIs by CI Type, the default layout of the Topology Map is Organic, and you cannot change it. The **Change Layout** option is not visible.
>
> When you change the grouping to **None**, the **Change Layout** option is available, and the Organic layout is selected.

Work with CIs on the Topology Map

Search for CIs

To search for a specific CI or for all CIs of a single type in a Topology Map, follow these steps:

1. Click the **More** icon ( ) to expand the **More** menu, click the **Locate CI** icon ( ), and then click the **Locate CI** search box.
2. To view all CIs of a certain CI Type, select the CI Type from the drop-down list under the search box.

   To search for a specific CI, enter its Global ID in the search box, and then select the CI from the drop-down list under the search box. Or, enter the CI label in the search box, and then select the desired CI from the drop-down list.

View CI details

To view detailed information about a CI, follow these steps:

1. Search for or drill down to the relevant CI (to drill down to the CI, double-click on the relevant nodes in the Topology Map until the correct layer is displayed).
2. Click the CI to display the **Configuration Item Details** button ( ), and then click the button to display the CI details pane.

Add layers of CIs

To add a layer of CIs to a Topology Map, click the **More** icon ( ) to expand the **More** menu, click the **Add layers** icon ( ), and then select a layer from the list. If the layer that you want to add is not included in the list, click **More Layers** to view the complete list.

> **Note:** The Topology Map supports up to 10 layers.

Get related CIs

To identify the CIs that are related to a specific CI, follow these steps:

1. Search for or drill down to the relevant CI (to drill down to the CI, double-click on the relevant nodes in the Topology Map until the correct layer is displayed), and then click the CI.

   > **Note:** The related CIs functionality does not work if you select more than one CI.

2. Click the **More** icon ( ) to expand the **More** menu, and then click the **Get Related** icon ( ).

3. Click on a CI Type to display all the related CIs of that CI Type, and then select the CIs that you want to view in the Topology Map.

   > **Tip:** You can also search for specific CIs by typing the CI label in the **Filter** search box.

4. When you have selected all the related CIs that you want to view in the Topology Map, click **APPLY**. CIs that are added to the Topology Map (that is, related CIs that are not in the currently displayed View) are displayed in purple.

> **Note:**
>
> - If you click the **Get Related** icon after you have added some related CIs to a Topology Map, the related CIs that you added are no longer selected. However, they will remain on the Topology Map until you click **CLEAR ALL**.
> - If you add some related CIs to a Topology Map that already displays some related CIs, both sets of related CIs are displayed together. To clear the Topology Map of the existing related CIs, click **CLEAR ALL** before you add the new set of related CIs.

View the CI Types of the CIs

To view the CI Types of the CIs, Zoom Out the Topology Map.

View the Core Properties of a CI

To view the Core Properties of a CI, search for or drill down to the relevant CI, and then Zoom In the Topology Map.

The following information is available for each CI:

- CI icon
- CI name

- CI Type
- UCMDB ID
- Maximum three Core Properties

  A maximum of three Core Properties are displayed for the each CI, according to the following priorities:

  - The properties that are specific for the CI Type have the highest priority.
  - Special or calculated attributes, according to the CI Type:
    - For Node CI Type: Memory Size, Discovered Model, Discovered OS Name
    - For Running Software CI Type: Application Category, Discovered Product Name
    - For Business Element CI Type: Last Modified Time, Business Criticality

  > **Note:** The order in which the Core Properties are presented is the one listed above and cannot be configured.

  The following Core Properties are not displayed for a CI:

  - Name
  - Display Label
  - Attributes with empty values
  - Attributes that are not visible

Configure the Core Properties to be displayed for a CI

To configure the Core Properties to be displayed for a CI in the Topology Map, follow these steps:

1. In UCMDB, go to **Modeling > Modeling Studio**.
2. In the editing pane, right-click the required query node and select **Query Node Properties**.
3. Click the **Element Layout** tab.
4. Select the attributes you want to include in the query result, and then click **OK**.

Working with the Reconciliation Analyzer

> **Note:**

> - Reconciliation Analyzer is available only for users with **Server Administrator Privileges**, or for users with **Discovery and Integrations Admin** role.
> - The amount of memory (RAM) necessary for Reconciliation Analyzer to work properly is as follows:
> - Minimum: 16 GB
> - Recommended: 24 GB

Reconciliation is the process of identifying and matching entities from different data repositories (for example, UCMDB Universal Discovery, ticketing, or BSM). This process is designed to avoid duplicate CIs in UCMDB. For detailed information about the reconciliation process, see "Reconciliation" in the *Data Flow Management* section in the UCMDB Help.

The Reconciliation Analyzer helps you understand how the reconciliation process works. By using this option, you can find what happened with a CI that may have merged with another CI. You can view the following information:

- All the changes made to the searched CI (create, update, or remove CI)
- The reasons why the CI was changed. This includes a list of identification candidates, and the reasons for matching the searched CI with them

The changes are listed in chronological order, grouped by reconciliation Operations. The most recent operation is displayed on top of the page. You can view the following information for each reconciliation operation:

- The type of operation performed: created, modified, or removed
- The date and time when the operation was performed
- A list of changed attributes. For each changed attribute you can view the attribute name, the previous value of the CI attribute (before the change), and its new value.

> **Note:** Reconciliation Analyzer displays only the changes that are performed after the **Reconciliation** option is enabled. For detailed information about how to enable the **Reconciliation** option, see " Enable the Reconciliation option" on the next page.

If some reconciliation operations are performed and the CI is not changed, then those operations will not be displayed the Reconciliation Analyzer module.

Enable the Reconciliation option

The **Reconciliation** option is hidden by default. To enable or to disable the **Reconciliation** option, follow these steps:

From JMX Console:

1. On UCMDB server, go to **JMX Console > UCMDB:service=Settings Services > setGlobalSettingValue**.
2. In the **name** field, enter **cmdb.recon.analyzer.enabled**.
3. In the **value** field, enter:
   - **true**: if you want to enable the **Reconciliation** option
   - **false**: if you want to disable the **Reconciliation** option
4. Click **Invoke**.
5. Restart the UCMDB server.

From UCMDB UI:

1. On UCMDB UI, go to **Administration > Infrastructure Settings Manager**.
2. Locate the **Reconciliation Analyzer** setting.
3. Set the value to **True** to enable Reconciliation Analyzer, **False** to disable Reconciliation Analyzer.
4. Save the change.
5. Restart the UCMDB server.

View the list of operations that were applied to a CI

To view the list of operations that were applied to a CI, follow these steps:

1. In the Top Search Bar, select **Reconciliation** from the drop-down list of available options.
2. Type a text string in the search field, and then select the desired CI from the suggestions list.

   > **Note:**
   > - The search can be performed only by Name or UCMDB ID.
   > - The suggestions list is limited to 10 items.

The Reconciliation Analyzer module opens, and all the changes made to the CI are displayed.

Display more information about a reconciliation operation

To view more information about a certain operation that was done for a CI, follow these steps:

1. In the Top Search Bar, select **Reconciliation** from the drop-down list of available options.
2. Type a text string in the search field, and then select the desired CI from the suggestions list.
3. Click the desired operation to display more information about it. The following details are displayed:
   - **Changer**. The source of the incoming data
   - **Operation ID**.The operation ID. This can be used further to investigate the logs for more details.
   - **Customer ID**. The customer ID
   - **Details**. Allows you to view the list of identification candidates, and the reasons for matching the searched CI with them

View the list of identification candidates, and the reasons for matching the searched CI with them

To view the list of identification candidates, and the reasons for matching the searched CI with them, follow these steps:

1. In the Top Search Bar, select **Reconciliation** from the drop-down list of available options.
2. Type a text string in the search field, and then select the desired CI from the suggestions list.
3. Click the desired operation, and then click the **Details** button.
4. Click a CI in the **Identification candidates** column. More details about the CI are displayed, and in the **Match reason** column you can view why the CIs were matched.

> **Tip:** To go back to the list of operation, use the web browser's back button.

Remove old data of CIs from SOLR

Once you have enabled Reconciliation Analyzer, the scheduled job **Clear Recon Analyzer index** runs every 15 days by default to remove the old data of CIs from Solr. To reschedule the job, you can go to **UCMDB UI > Administration > Scheduler**, locate the job and reschedule it.

You can also configure how many days the documents from the Reconciliation Analyzer are kept. To do so, do either of the following:

From UCMDB UI:

1. Go to **Administration > Infrastructure Settings Manager**.
2. Locate the **Remove old documents from Reconciliation Analyzer** setting.
3. In the Value field, type the desired days.
4. Save the change.

   The change takes effect immediately.

From JMX Console:

1. On UCMDB server, go to **JMX Console > UCMDB:service=Settings Services > setGlobalSettingValue**.
2. In the **name** field, enter **cmdb.recon.analyzer.keep.index.days**.
3. In the **value** field, enter the desired days. (Default: 15)
4. Click **Invoke**.

Configuration Item Search

The **Configuration Item Search** option in the CMS Modules navigation pane opens the Configuration Item Search module, which is based on the Search module from the previous UCMDB Browser, with enhanced and extended search capability.

This section contains the following:

Search and Search Engine 138

Search and Search Engine

Search

To access the Search module, use one of the following methods:

- In CMS UI, click the **Menu** icon ( ) to expand the CMS Modules pane, and then click **Configuration Item Search**.
- In CMS UI, click the **Menu** icon ( ) to expand the CMS Modules pane, and then click **UCMDB Browser**.

  The Search module is automatically displayed when you access the UCMDB Browser module.

Enter a text string to perform a search in the database for any CI.

Opening the Search module from anywhere else in the UCMDB Browser module displays the results of your most recent search. To perform a new search, click the **<product name>** section in the upper left corner of the UCMDB Browser module window, then enter a text string in the **Search** field and press **Enter**.

> **Note:** Results are displayed in thumbnail view by default. To switch to grid view, click . To return to thumbnail view, click .

The first page of search results is presented once the search mechanism has returned at least the number of results defined for page display or if the search has been completed. If the first page has been displayed but the search is still in progress, the progress icon on the right of the filter combo-box indicates that the search has not yet completed.

Each thumbnail includes:

- the CI's name, icon, and type
- the CI's color category

  > **Note:** You can change the CI's color category simply by clicking the upper right corner of the CI's thumbnail, and selecting a category.

- the CI's discovery indicator, if one exists for the CI. For more information, see "Discovery Indicators" on page 417.
- the CI's classification

While searching, you can specify a main CI type and a related CI type (as well as attribute conditions for these CI types), and then save these results as a basic report for future use. For more information, see "Reports" on page 229.

Hovering your mouse over a CI, allows you to access the following:

1. The **Context Menu** .

   Clicking the **Context Menu** button allows you to select one of the following:

   > **Note:** Only the widgets that you have permission to view will be displayed.

Overview	Displays CI Overview mode for all of the widgets that contains information about the selected CI.
Properties	Displays the Properties widget for the selected CI. For more information, see "Properties Widget" on page 367.
Environment	Displays the Environment widget. For more information, see "Environment Widget" on page 349.
History	Displays the History widget. For more information, see "History Widget" on page 353.
Impact Simulation	Displays the Impact Simulation widget. For more information, see "Impact Simulation Widget" on page 358.
Policy	Displays the Policy widget. For more information, see "Policy Widget" on page 363.
Change Request	Displays the Change Request widget. For more information, see "Change Requests Widget" on page 333.
Incidents	Displays the Incidents widget. For more information, see "Incidents Widget" on page 360.
Problems	Displays the Problems widget. For more information, see "Problems Widget" on page 364.
Monitoring	Displays the Monitoring widget. For more information, see "Monitoring Widget" on page 363.

Stakeholder	Displays the Stakeholder widget. For more information, see "Stakeholder Widget" on page 370.
Dependent Services	Displays the Dependent Services widget. For more information, see "Dependent Services Widget" on page 338.
Security	Displays the Security widget. For more information, see "Security Widget" on page 368.
Defects	Displays the Defects widget. For more information, see"Defects Widget" on page 336.
Business Topology	Displays the Business Topology widget. For more information, see "Business Topology Widget" on page 331.
Storage Data	Displays the Storage Data widget. For more information, see "Storage Data Widget" on page 371.
Dynamic (by name)	Displays dynamic widgets that contain the selected CI. For more information, see "Dynamic Widgets" on page 346.
Discovery Progress	Displays the Discovery Progress widget. For more information, see "Discovery Progress Widget" on page 339.
Get Related	Displays the Get Related widget. For more information, see "Get Related Widget" on page 351.

2. The **Settings** menu .

   Clicking the **Settings** icon allows you to access the following:

   - **Assisted Modeling.** See Assisted Modeling.
   - **Notifications.** See "Notifications" on page 418.
   - **Choose Category**. See "Assign Color Categories" on page 407.
   - **Create Service Model**. See "Model a Business Service Starting from a Specific Entry Point" on page 260.

Advanced Search

1. On the main search page, click **Advanced Search**, or hover the mouse over the **Search** module and click **Advanced Search**.
2. Select the main CI Type, and then click **Next**.

To quickly locate a CI type, you can filter the list of CITs by entering a text string, or click one of the favorite CI types above the list.

> **Note:** You can add a custom favorite CI Type, by assigning the **CMS_BROWSER_SEARCH** qualifier to the CI Type. For details on how to add a qualifier to a CI Type, see " Qualifiers Page" in the *Modeling section of the UCMDB Help*.

3. (Optional) Select an attribute condition for the main CIT (including an operator and value). To add additional attributes, click **[+] Add attributes**. Click **Next** to select a related CI type.

   > **Note:**
   >
   > - When you use the **Contains** operator, the different values added to an attribute should be separated by comma, and listed in one field. This is because the **Contains** operator supports only one value in the UCMDB, and in the UCMDB Browser module the different values that are added to an attribute are split into multiple conditions.
   > - When you use the **In** operator, the different values added to a string attribute should be separated by comma, and listed in one field.

4. (Optional) Select a related CI type from the tree, and then click **Next**.

   To quickly locate a CI type, you can filter the list of CITs by entering a text string, or click one of the favorite CI types above the list.

   To clear this field completely, click **Deselect**.

5. (Optional) Select attributes for the related CI type (including an operator and value). To add additional attributes, click **[+] Add attributes**.

   > **Note:**
   >
   > - When you use the **Contains** operator, the different values added to an attribute should be separated by comma, and listed in one field. This is because the **Contains** operator supports only one value in the UCMDB, and in the UCMDB Browser module the different values that are added to an attribute are split into multiple conditions.
   > - When you use the **In** operator, the different values added to a string attribute should be separated by comma, and listed in one field.

6. Click **Search**.

> **Note:**
>
> The following enhancements are supported on UCMDB 10.21 CUP1 or later versions:

> - The favorite CI Types that do not have instances are grayed out.
> - Only the CI Types that have instances are displayed in the tree. The CI Type's count information is displayed in parentheses.
> - Only the CI Types that have valid links for a selected CI Type are displayed in the **Related CI Type** tree.

Most Visited

The Most Visited screen is accessed by hovering your mouse over the Search tab and selecting **Most Visited**. This screen displays the eight most often visited CIs. A visited CI is one whose details are fetched from the server, regardless of how it was accessed, for the current logged-in user and state. Each thumbnail includes:

- the CI's name, icon, and type
- the last date that the CI was selected
- the CI's classification
- the CI's color category

> **Note:** You can change the CI's color category simply by clicking the upper right corner of the CI's thumbnail, and selecting a category.

Clicking a thumbnail opens the selected CI in the UCMDB Browser module.

Most Searched

The Most Searched screen is accessed by hovering your mouse over the Search tab and selecting **Most Searched**. This screen displays the eight most frequently used search terms, for the current logged-in user and state. A thumbnail is displayed for each item, containing information that is accurate to the last time the search was performed (which may not reflect the current state). Each thumbnail includes:

- the search term
- the last date that the search was performed
- the total number of CIs found as the result of the search
- up to three CI classification groupings

Clicking a thumbnail executes the search on the specified term.

> **Note:** The Most Visited and Most Searched screens will only preserve the correct data if a user enters a username with the same case that has been defined in the LDAP settings. To force a user to log in with the correct case, set **Is case-sensitivity enforced when authenticating with LDAP=True** in the LDAP General category in the Infrastructure Settings Manager in UCMDB.

When you are viewing the details of a CI in the context of any widget, by default you are viewing the details in Overview mode. You can switch to the Navigation Context mode to see:

- the search results, if the CI was selected from the Search Results list
- the most visited CIs, if the CI was selected from the Most Visited screen
- all CIs in the map, if the CI was selected from the Service Modeling map.

Configure the Enhanced Search Engine

The Enhanced CI search engine translates free text queries to TQL queries, with much better performance and accuracy than the legacy search engine and flexible searching language. The syntax of the search queries is based on the class model.

> **Note:** The Enhanced CI search engine does not support any of the class model configurations used by the legacy search engine.

The search engine can be configured in the following three areas:

- **Indexing.** Configure what is indexed, which CI types are "searchable", which attributes are "searchable", and what are types of the attributes. This configuration is performed with the **Search_Indexer_Configuration_XML** and **Search_Ranking_Configuration_XML** files.

  This configuration file includes a list of class types that are indexed and a list of attributes for each one of the class types. This configuration influences the manner in which the search by property condition is performed.

- **Parsing.** Configure class model synonyms. Synonyms translate the user input string query into a graph structure, TQL. This configuration is performed with the **Search_Parser_Configuration_XML** file.

  This configuration file includes a set of class synonyms, attribute synonyms, date synonyms, relation synonyms, and a set of redundant words.

  > **Note:** The list of redundant words must contain only single words, with no spaces (no phrases are permitted).

- **Ranking.** Configure which CI types are presented and the order of presentation. Prioritization is according to class model. This configuration is performed with the **Search_Ranking_ Configuration_XML** file.

  This configuration file contains a list of attributes that are associated with five data fields, called data0, data1, data2, data3, and data4. These fields are prioritized, where data4 has the highest priority and data0 has the lowest priority.

  This configuration influences the order of CIs in the search results.

The CMS UI can be used out-of-the-box without initial configuration of the search engine. However, if an attribute is not in the Indexer or Ranking lists, it does not appear in the search results.

Modify the currently indexed list

Enable/Disable the Enhanced Search Engine

1. Go to **JMX Console > UCMDB:service=Topology Search Services**.
2. Choose one or more of the following operations:
   - **editIndexerConfiguration** – displays and enables editing of the **Search_Indexer_ Configuration_XML** file.
   - **editParserConfiguration** – displays and enables editing of the **Search_Parser_ Configuration_XML** file.
   - **editRankingConfiguration** – displays and enables editing of the **Search_Ranking_ Configuration_XML** file.
3. For each operation, enter the relevant customer ID and click **Invoke**.

For the enhanced search engine to work, it must be enabled in UCMDB. By default, it is enabled (unless it was disabled during UCMDB installation).

To change the enable/disable setting:

1. Go to **JMX Console > UCMDB:service=Settings Services > setGlobalSettingValue**.
2. In the **name** field enter **cmdb.search.enabled**.
3. In the **value** field enter:

   true: If you want the search enabled.

   false: If you want the search disabled.

4. Click **Invoke**.
5. Restart the UCMDB server.

> **Note:** If you disable the Enhanced Search Engine, the UCMDB Browser module automatically reverts to the legacy search engine.

Enable/Disable Searching for Federated Data

The enhanced search engine can be configured to perform searches on federated data. By default, it is disabled. To enable searching for federated data, you must set the "federated search enable" flag to **True** in the JMX Console and in the UCMDB Infrastructure Settings Manager.

Enable or disable searching for federated data (Enhanced Search Engine)

You can enable or disable searching for federated data when the Enhanced Search Engine is enabled, in the JMX Console or in the UCMDB Infrastructure Settings Manager.

Enable or disable searching for federated data in the JMX console:

1. Go to **JMX Console > UCMDB:service=Settings Services > setSettingValue**.
2. In the name field enter **cmdb.federation.search.enabled**.
3. In the value field enter:

   true: If you want to enable searching federated data.

   false: If you want to disable searching federated data.
4. Click **Invoke**.
5. Restart the UCMDB server.

Enable or disable searching for federated data in the UCMDB Infrastructure Settings Manager:

1. In UCMDB, go to **Administration > Infrastructure Settings Manager**, and choose **General Settings**.
2. In the Name column, choose **Federation in Search Engine Enabled**.
3. In the Value column, choose **True** or **False** from the drop-down list.
4. Click **Save** .

Enable or disable searching for federated data in the UCMDB Infrastructure Settings Manager (Legacy Search Engine and widgets)

Follow the instructions in the section "Specify Data stores Used for Data Loading" in the *Administer section of the UCMDB Help*.

Enable searching of federated CIs by CI display name

To search for a federated CI by the CI display name (or sub-string of the display name), the CI type must be assigned the qualifier **CMS_BROWSER_SEARCH** in the CI Type Manager.

Specific Configuration Options

Configure Search by Data

In the **Search_Ranking_Configuration_XML** file, you can associate attributes of a CI to a data field according to the data field priority. This enables a search of the values of those CI attributes and affects the order of CIs returned in the search results.

Configure Search by Topology

In the **Search_Parser_Configuration_XML** file, you can configure relationship synonyms that associate phrases with class types. For example, in the example below, the phrase "owned by" is associated with the class type "person".

```
<relationship>
   <synonym>owned by</synonym>
   <className>person</className>
</relationship>
```

As a result of the above configuration, if the user enters the search query "all windows owned by John", the search engine looks for all windows CIs that are connected to a CI of type 'person' with the name 'John'.

Configure Search by Path

In the **Search_Parser_Configuration_XML** file, you can define compound classes by inserting a list of class types. In the example below, all the class types in the `<string>` tag make up the compound class, which triggers the search by path. If this list is empty, no search by path is initiated.

You can change the number of linked paths through which you want to search, starting from the original search term. To do this, go to the Infrastructure Settings Manager in UCMDB and change the Search

Engine Compound Depth setting to the value you want. For details, see "Infrastructure Settings Manager" in the *Administer section of the UCMDB Help*.

```
<compoundClasses>
   <string>msdomain</string>
   <string>person</string>
   <string>osuser</string>
   <string>location</string>
   <string>business_element</string>
   <string>cluster</string>
   <string>party</string>
</compoundClasses>
```

Configure Search by Cardinality Condition

In the **Search_Parser_Configuration_XML** file, you can define a set of cardinality synonyms that associate phrases with cardinality types. For example, if you define

```
<cardinalitySynonym cardinalityType="MIN" cardinalityPhrase="with at least"/>
```

and then a user enters the search query "all NT with at least 2 CPUs", the search engine looks for all CIs with class type 'NT' that have two or more CIs of type CPU related to them.

The out-of-the-box cardinality synonyms are as follows:

```
<cardinalitySynonyms>
   <cardinalitySynonym cardinalityType="MIN" cardinalityPhrase="min"/>
   <cardinalitySynonym cardinalityType="MIN" cardinalityPhrase="with minimum"/>
   <cardinalitySynonym cardinalityType="EQUAL" cardinalityPhrase="with"/>
   <cardinalitySynonym cardinalityType="MAX" cardinalityPhrase="max"/>
   <cardinalitySynonym cardinalityType="MAX" cardinalityPhrase="with maximum"/>
   <cardinalitySynonym cardinalityType="MIN" cardinalityPhrase="minimum"/>
   <cardinalitySynonym cardinalityType="MAX" cardinalityPhrase="before"/>
   <cardinalitySynonym cardinalityType="MAX_EXCLUDED" cardinalityPhrase="with
less than"/>
   <cardinalitySynonym cardinalityType="EQUAL" cardinalityPhrase="with
exactly"/>
   <cardinalitySynonym cardinalityType="MIN" cardinalityPhrase="with at least"/>
   <cardinalitySynonym cardinalityType="MIN_EXCLUDED" cardinalityPhrase="with
more then"/>
   <cardinalitySynonym cardinalityType="MIN" cardinalityPhrase="since"/>
   <cardinalitySynonym cardinalityType="MIN" cardinalityPhrase="from"/>
   <cardinalitySynonym cardinalityType="MIN" cardinalityPhrase="at least"/>
   <cardinalitySynonym cardinalityType="MAX" cardinalityPhrase="till"/>
   <cardinalitySynonym cardinalityType="NOT" cardinalityPhrase="without"/>
   <cardinalitySynonym cardinalityType="MIN_EXCLUDED" cardinalityPhrase="with
more than"/>
```

```
   <cardinalitySynonym cardinalityType="MIN" cardinalityPhrase="after"/>
   <cardinalitySynonym cardinalityType="MAX" cardinalityPhrase="with at most"/>
   <cardinalitySynonym cardinalityType="MAX" cardinalityPhrase="maximum"/>
   <cardinalitySynonym cardinalityType="MAX_EXCLUDED" cardinalityPhrase="with
less then"/>
   <cardinalitySynonym cardinalityType="MAX" cardinalityPhrase="at most"/>
</cardinalitySynonyms>
```

Configure Search by Property Condition

This search is based on attribute synonyms. In the **Search_Parser_Configuration_XML** file, you can define synonyms for the CI attribute names that are defined in UCMDB. In the following example, the CI attribute **display_label** has four different synonyms defined for it:

```
<attributeSynonym>
   <synonym>name</synonym>
   <attributes>
      <attributeName>display_label</attributeName>
   </attributes>
</attributeSynonym>
<attributeSynonym>
   <synonym>display label</synonym>
   <attributes>
      <attributeName>display_label</attributeName>
   </attributes>
</attributeSynonym>
<attributeSynonym>
   <synonym>display</synonym>
   <attributes>
      <attributeName>display_label</attributeName>
   </attributes>
</attributeSynonym>
<attributeSynonym>
   <synonym>label</synonym>
   <attributes>
      <attributeName>display_label</attributeName>
   </attributes>
</attributeSynonym>
```

Another type of search by property condition occurs when a cardinality synonym is followed by a number, which can also include a unit. For example, if the user enters the search input text **windows with at least 4GB memory**, since **memory** is a synonym for the attribute types **memory_size** and **nt_physical_memory** as shown in the code example below, this triggers a search by property condition.

```
<attributeSynonym>
```

```
   <synonym>memory</synonym>
   <attributes>
      <attributeName>memory_size</attributeName>
      <attributeName>nt_physicalmemory</attributeName>
   </attributes>
</attributeSynonym>
.
.
.
<unit>
   <multiplyBy>1073741824</multiplyBy>
   <synonym>gigabytes</synonym>
   <synonym>g</synonym>
   <synonym>giga</synonym>
   <synonym>gb</synonym>
</unit>
```

You can add additional synonyms for cardinality phrases, synonyms for attribute names, and synonyms for unit types in order to refine this type of search. In the example above, the memory size attribute is stored in bytes, and in order to search by gigabytes, the search engine uses the conversion defined in the `<multiplyBy>` tag (this definition is provided out-of-the-box). In addition to the conversion for gigabytes, out-of-the-box conversions are also provided for megabytes and kilobytes.

> **Note:** Units and numbers are rounded according to the range definitions defined by the **Use Update Value Policy** qualifier. For more information on setting range definitions, see "The Use Update Value Policy Qualifier" in the *Modeling section of the UCMDB Help*.

Configure Search by Category

In the **Search_Parser_Configuration_XML** file, you can specify labels to be used when searching for CIs. In the following example, the labels "category" and "color" enable you to search for the strings “all windows color green” and “all servers category editable”.

```
<categoryLabelSynonyms>
    <categoryLabelSynonym>category</categoryLabelSynonym>
</categoryLabelSynonyms>
<categoryColorSynonyms>
    <categoryColorSynonym>color</categoryColorSynonym>
</categoryColorSynonyms>
```

Configure Class Name Conditions

In the **Search_Parser_Configuration_XML** file, you can create synonyms for class names. In the following example, the synonym "windows" was created for the class name "nt".

```
<classSynonym>
   <synonym>windows</synonym>
   <className>nt</className>
</classSynonym>
```

Configure String Replacement

In the **Search_Parser_Configuration_XML** file, you can configure string replacements. The code example below enables the search engine to retrieve all nodes that have the attribute **Host is virtual** set to **True**. The CI property 'host_isvirtual' is a boolean property, and is true if the node is virtual, but the user does not need to know this and this string replacement converts his search query without the user knowing these details.

```
<replace>
   <from>virtual node</from>
   <to>node host_isvirtual true</to>
</replace>
```

String replacement can be implemented using the '%' wildcard character. With the following code example, if the user enters the search query "linux nodes" or "linux machine", the search engine converts this to "nodes version linux" and “machine version linux”, respectively.

```
<replace>
   <from>linux %1</from>
   <to>%1 version linux</to>
</replace>
```

Configure Enriching Capability

The enriching mechanism executes enriching queries over the search results. Enriching queries are defined in two ways, one is user-defined and the other is based on existing folding rules.

The enriching mechanism reviews the CIs in the search results and extends the results by applying each one of the enriching queries as a perspective over the CI. The enriching process is executed repeatedly, where after each execution search results are received and then enriched again by the enriching TQLs, which in turn produces more search results. By default, this process is repeated 3 times, but this can be changed by means of the **cmdb.search.enriching.depth** parameter. For instructions on configuring this parameter, see "Configure Repetition of the Enriching Mechanism" on page 152.

User-Defined Enriching Queries

To create user-defined enriching queries:

1. In UCMDB, go to **Modeling > Modeling Studio** and click **New** .
2. From the drop-down list, select **Query**. The Query Definition editor opens.
3. Click **Query Definition Properties** . The Query Definition Properties dialog box opens.
4. In the Type field, select **Perspective** from the drop-down list.
5. In the Bundles field, click **Select Bundles** .
6. From the Bundles list, select **search_result_enriching_tqls** and click **OK**.
7. Define the query according to your system needs.
8. Define one of the nodes of the query as **Set as Contact Query Node**. The query definition is similar to the perspective definition and therefore should include at least one contact node, where the contact node is the CI that should be enriched.

There are also two out-of-the-box enriching queries provided in the Modeling Studio. You can view and edit them as follows:

1. Go to **Modeling > Modeling Studio**, and select the **Resources** tab.
2. From the **Resources Type** drop-down list, select **Queries**.
3. In the list of queries, go to **Search Engine > Enriching TQLs**.
4. Under Enriching TQLs, choose one of the enriching queries. You can view it and edit it according to you system needs.

Enriching Queries Based on Existing Folding Rules

As mentioned above, in addition to the user-defined enriching queries, there is an existing set of predefined enriching queries based on folding rules.

To view, add, or edit enriching queries based on folding rules:

1. Go to **Modeling > CI Type Manager**.
2. From the **CI Types** drop-down list, choose **Calculated Relationships**.
3. In the list of Calculated Links, select **Folding Rules (Configuration Manager)**.
4. Select the **Triplets** tab on the upper right. The list of Triplets appears.

   From each one of the listed triplets there is an automatic mechanism that creates at run-time an enriching query. It enriches the Target CI type by the Source CI type. In this case, the Target CI type is the contact node of the query.

5. To add a new triplet, click **Add** . If you select the forward relationship direction (from Source to Target), the Target CI type is enriched by the Source CI type. If you select the backward relationship direction (from Target to Source), the Source CI type is enriched by the Target CI type.
6. To edit a triplet, select the triplet in the list and click .

> **Note:** To disable the use of folding rules, change the **Specify whether Search Engine Enriching should use folding rules** setting in the Infrastructure Settings Manager to False.

Configure Repetition of the Enriching Mechanism

To configure the number of times that enriching is performed on search results:

1. Go to **JMX Console > UCMDB:service=Settings Services > setSettingValue**.
2. In the name field enter **cmdb.search.enriching.depth**.
3. In the value field enter the number of times that you want enriching to be repeated on search results.
4. Click **Invoke**.
5. Restart the UCMDB server.

> **Note:** Changing the **cmdb.search.enriching.depth** parameter value to a higher value can introduce performance issues due to generating a large search result.
>
> Version 10.31 added fuse **cmdb.search.max.query.max.results** to protect against performance issues when the enriching process is done during CMS UI Search. The number of results retrieved during enriching is limited by the value specified for the **cmdb.search.max.query.max.results** parameter. In case this setting is not present, the default is 1000.
>
> When the max number of records retrieved through enriching (**cmdb.search.max.query.max.results** value) is reached, the value of **cmdb.search.enriching.depth** is no longer taken into consideration and the enriching process is stopped.

Configure Redundant Words

There is a set of words that the search engine ignores when parsing the search query. To configure this list, go to the **Search_Parser_Configuration_XML** file and go to the `<blacklist>` section. Add to or edit the list as needed.

The current list of redundant words is a follows:

```
<blacklist>
   <blacklistItem>to</blacklistItem>
   <blacklistItem>such as</blacklistItem>
   <blacklistItem>with</blacklistItem>
   <blacklistItem>for</blacklistItem>
   <blacklistItem>or</blacklistItem>
   <blacklistItem>a</blacklistItem>
   <blacklistItem>the</blacklistItem>
   <blacklistItem>like</blacklistItem>
   <blacklistItem>in</blacklistItem>
   <blacklistItem>and</blacklistItem>
   <blacklistItem>of</blacklistItem>
   <blacklistItem>if</blacklistItem>
   <blacklistItem>an</blacklistItem>
   <blacklistItem>on</blacklistItem>
   <blacklistItem>linked</blacklistItem>
   <blacklistItem>all</blacklistItem>
</blacklist>
```

Configure Search of CIs Changed in a Specific Time Period

In the **Search_Parser_Configuration_XML** file, there are a sets of words defined as month-name synonyms and day-name synonyms. For example:

```
<monthSynonym>
    <monthName>january</monthName>
    <monthNumber>0</monthNumber>
</monthSynonym>
<monthSynonym>
    <monthName>jan</monthName>
    <monthNumber>0</monthNumber>
</monthSynonym>
.
.
.
<daySynonym>
    <dayName>sunday</dayName>
    <dayNumber>1</dayNumber>
</daySynonym>
<daySynonym>
    <dayName>sun</dayName>
    <dayNumber>1</dayNumber>
</daySynonym>
```

Values in the tags `<monthNumber>` and `<dayNumber>` should not be modified. These configurations allow support of search queries like “all windows created last Sunday” and “all nodes changes between August 8th 1980 and 25/5/2011”.

Configure Date Format

The search engine supports two dates formats: day-month-year (DMY) and month-day-year (MDY), which can be configured as follows:

1. Go to **JMX Console > UCMDB:service=Settings Services > setSettingValue.**
2. In the **name** field enter: **cmdb.search.date.format**.
3. In the **value** field enter the desired date format: **DMY**, **MDY**, or **both**.
4. Click **Invoke**.
5. Restart the UCMDB server.

Configure Autocompletion

In the **Search_Autocompletion_Configuration_XML** file, you can expand the CMS UI's search capabilities by configuring the UCMDB server to suggest matches for substrings of words in a search, including CI attribute values.

1. Go to **JMX Console > UCMDB:service=URM Services > listResourceTypes** and click **Invoke**.
2. Click **Topology_AUTOCOMPLETION_CONFIGURATION**.
3. Click **Search_Autocompletion_Configuration_XML**.
4. Enter the fields of classes that you want to index for autocompletion. Since the class name supports inheritance, you can enter the following:

```
<supportedAutocompletionFields>
    <autocompletionField>
        <className>managed_object</className>
        <attributeName>display_label</attributeName>
    </autocompletionField>
</supportedAutocompletionFields>
```

or, for example:

```
<supportedAutocompletionFields>
    <autocompletionField>
        <className>nt</className>
        <attributeName>display_label</attributeName>
    </autocompletionField>
    <autocompletionField>
        <className>unix</className>
```

```
        <attributeName>display_label</attributeName>
    </autocompletionField>
</supportedAutocompletionFields>
```

5. Click **Save resource**.

Configure Query Search Filter

By default, the search algorithm filters out the queries that are too general. If you wish to turn off the filter, follow these steps:

1. Go to **JMX Console** > **UCMDB:service=Settings Services** > **setSettingValue**.
2. In the **name** field, enter **cmdb.search.filter.queries**.
3. In the **value** field, enter **false**.

   > **Note:** Enter **true** if you want to turn on the filter.

4. Click **Invoke**.

Perform a Full Reindex of All CIs

Use either of the following approaches to perform a full reindex of all CIs available for search in the CMS UI:

- Go to **JMX Console > UCMDB:service=Topology Search Services** and invoke the **reindex()** method.

  This method removes all CIs information stored inside the SOLR index files without removing any internal SOLR files.

  > **Note:** You can also invoke the **reindexCiType()** method to re-index all the CIs of a given CI type from the CMDB model database. For more information, refer to the *JMX Reference section of the UCMDB Help*.

- Stop the UCMDB server, delete the ***<UCMDB_Server_Home>*/search** folder, and then start the UCMDB server.

  The deletion of the folder forces a full reindex for all UCMDB customers and reverts the SOLR configuration to the out of the box values. This process removes all internal SOLR files and hence takes longer time than the previous one.

> **Note:** In a High Availability environment, a full reindex can be performed only for embedded Solr.

> When the Solr is standalone, only the writer can alter the index.

Troubleshooting - Configure the Enhanced Search Engine

UCMDB doesn't start because of the search subsystem manager. What do I do?

Stop UCMDB, delete the folder **<UCMDB installation folder>/search**, then restart UCMDB.

If the search still does not start, disable it, as explained in "Enable/Disable the Enhanced Search Engine" on page 144 and revert to the legacy search engine.

The search doesn't return any results.

In the Topology Search JMX, invoke the following methods:

- **restoreFactoryDefaults:** This restores factory configuration for the search.
- **reindex:** This recreates a search index for CIs in the UCMDB model. Note, this can take up to several hours for large databases (approx 1M CIs/hour).

  You can also invoke the **reindexCiType** method to re-index all the CIs of a given CI type from the CMDB model database.

The search doesn't find CI types that I want.

There are several different possible causes for this. Check the following:

- Check that the attribute and CI type are indexable according to the indexing configuration. If they are not, add the class attributes configuration item as explained "Modify the currently indexed list" on page 144.
- Check that you have correct synonyms defined for the class in Class synonyms.
- Check that **rating** and **pageItemCount** for this CI are non-zero. Check for **rating** in the Attribute ranking and for **pageItemCount** in Presentable CI types.

Cardinality conditions don't work or return incorrect results.

In addition to checking attribute synonyms, check that the attribute type is defined as numeric in Indexing Configuration and that units configuration matches attribute units in **Search_Parser_Configuration_XML**.

The search presents too many unwanted results.

- Check if you are you using queries with natural language. This can limit results of the "best guess" of what the user intended.
- If you need to be 100% certain that your query returns results only of one specific CI type, use type: **ci-type** filter in the query.
- If the two suggestions above don't help, contact the R&D team with your use case and status report from JMX.

Problem with configuration - restore factory defaults

To restore the default configuration XML files from the factory content, go to **JMX Console > UCMDB:service=Topology Search Services** and invoke the **restoreFactoryDefaults()** method.

> **Caution:** This method overwrites the current configuration. You should back up the configuration files before invoking it.

Logs and debugging info

Logs

search.log logs everything related to searches. Default log level is INFO, only statistics are printed. The log level and number of logs are configured with the **search.loglevel** variable in **conf/log/cmdb.properties**.

Status Report

The topology search JMX status report displays all current configuration tables and statistics for the search engine component. It is useful to include it when reporting issues to R&D.

Content of Solr Database

By default, the Solr search engine is embedded inside UCMDB server. To query it directly, go to **JMX Console > UCMDB:service=Topology Search Services** and invoke the **debugSolrQuery()** method.

Example queries:

- empty query returns all CIs
- "id:a6693cd46cfd1b4fab0c3551bac9289e" returns a CI with cmdbId a6693cd46cfd1b4fab0c3551bac9289e. This uses Solr/Lucene syntax.

Using the Enhanced Search Engine

The UCMDB's powerful enhanced search engine analyzes the input search text to retrieve CI data from UCMDB. Based on the input search text, the search engine performs various types of searches simultaneously to provide optimum and comprehensive results to the user. The search engine makes extensive use of synonyms so you do not need to enter the precise name or data of the items you are looking for.

> **Note:** Starting from UCMDB version 10.31, the SOLR auto commit feature is enabled by default. The soft auto commit interval is set at 3 minutes, this means that the CIs' changes are visible after 3 minutes. For more details, see the *Administer section of the UCMDB Help*.

To enhance your ability to obtain better search results, examples and explanations of the available types of searches are provided here.

> **Note:**
>
> - The search engine is provided ready to use out-of-the box. However, it is highly configurable and the various types of searches described here can be modified by the UCMDB Administrator to meet your system needs. For more information on configuring the enhanced search engine, see "Specific Configuration Options" on page 146.
> - The enhanced search engine is not case sensitive.
> - The free text search in the enhanced search engine can only be performed in English, other languages are currently not supported. However, CI names, attributes, and values in other languages can be found by the enhanced search engine.
> - When the enhanced search engine is enabled and you perform a search in the CMS UI, the maximum number of search results that are displayed and can be exported is 1200.
> - When the enhanced search engine is enabled and a full reindex is in progress, the CMS UI automatically uses the legacy search engine. In this case, when you perform a search in the CMS UI, legacy search results are retrieved, and a notification message is displayed.
>
> When the reindexing process has completed, the CMS UI switches back to the enhanced search engine.
>
> Note that the legacy search results and features are different from the enhanced search results.

Simple Search

The simple search is the most basic type of search. The search engine searches for CIs according to CI data and synonyms for CI data. CI data can include class names and attributes.

Simple Search Examples

- If you enter **all Unix** or **all business application**, this triggers a search by class name, since **Unix** and **business application** are class names. The search results include all Unix machines in the system (when searching for **all Unix**), or all business applications in the system (when searching for **all business application**).
- If you enter **all Windows**, since windows is a class name synonym for **NT**, a search by class type is triggered for all Windows PCs in the system.

  For information on how to configure class name synonyms, see "Configure Class Name Conditions" on page 149.
- If you enter **Windows version 2008**, since **version** is a synonym of the property **discovered_os_name**, this triggers a search for all Windows PCs where the property **discovered_os_name** = 2008.
- If you enter **Windows with more than 4GB of memory**, since **memory** is a synonym of the property **memory_size**, this triggers a search by property condition for all Windows PCs with the attribute **memory_size** > 4GB.

  > **Note:** Searches can be performed with any type of pre-defined unit, as explained in "Configure Search by Property Condition" on page 148. Out-of-the-box definitions are provided for kilobyte, megabyte, and gigabyte.

  For more information on how to configure attribute synonyms, see "Configure Search by Property Condition" on page 148.
- If you enter **all nodes changed last week**, **all Unix machines created today**, or **all Windows changed since Aug 21st 2013**, the search engine can interpret this correctly to yield appropriate results.

  For information on how to configure this search, see "Configure Search of CIs Changed in a Specific Time Period" on page 153. For information on configuring date formats, see "Configure Date Format" on page 154.

Search According to CMDB Structure

Searches Based on CI Relationships

If you enter **Windows 2008**, the search engine looks for CIs with the class name or property **Windows** that have a related CI with a property value **2008**. This could include, for example, a Windows server connected to SQL server 2008.

For information on how to configure searching based on CI relationships, see "Configure Search by Topology" on page 146.

Search by Path

- If you enter **Windows London**, this triggers a search that yields results of all Windows PCs in the system that are connected directly or indirectly to the London CI.

  For more information on how to configure this type of search, see "Configure Search by Path" on page 146.

- If you enter **all Windows owned by John**, the search engine returns all Windows PCs owned by the user called John.
- If you enter **Oracle 16.55.158**, the search engine yields search results with all Oracle servers in the 16.55.158.* IP address range.

Search by Cardinality Condition

Certain words or phrases trigger a cardinality search, such as **with more than** or **with less than**. If you enter **Windows with more than 5 CPUs**, this triggers a search that yields results of all Windows PCs with at least 5 CIs of type CPU connected to them. The term that follows the cardinality phrase must be a class name or class synonym. In the example here, CPU is a class synonym.

For information on how to configure the search by cardinality, see "Configure Search by Cardinality Condition" on page 147.

> **Note:** The example above triggers a search based on CI relationships, since in the UCMDB CPUs are modeled separately from servers (with direct relationship between them) and this information may be transparent to the user.

Different Types of Search Results Based on the Same Input Text

As mentioned above, based on the input search text, the search engine can perform various types of searches simultaneously. For example, if you enter **Windows 2008**, the search engine returns the

following results:

- CIs with the class name or property **Windows** that have a related CI with a property value **2008** (search based on CI relationships, as described above).
- All CIs that have both a property called **Windows** and a property called **2008**.
- All CIs with the class name **Windows** and a property called **2008**.

Special Support

Phrase Replacement

If you enter **Linux machine**, this triggers a search of all Unix machines with **version** = Linux.

For information on how to configure this search, see "Configure String Replacement" on page 150.

Search with Keywords

The search engine supports a set of pre-defined keywords that allow you to perform special searches. The keywords are **type**, **view**, and **query**.

Search with type Keyword

You can use the **type:** keyword to filter search results. To do this, use the syntax: **term1 type:term2**. For example, **John type:windows** return all Windows owned by John.

Search with view Keyword

You can search for CIs in a view by using the keyword **view:** followed by the view name. For example, **view:myView** returns all CIs in the **myView** view result.

> **Note:** The view name is case sensitive (in the UCMDB the user can define two views **myView** and **MyVIEW**). Also, if the view name contains more than one word (separated with spaces) the view name should be surrounded with quotation marks, for example **view:"My view"**.

Search with query Keyword

You can also search for CIs in query results. This is similar to searching for CIs in view results, but for the active query defined in UCMDB. For example, **query:myQuery** returns all CIs in the **myQuery** result.

Searches Based on Logical Operators

You can use a combination of conditions separated by logical operators. The search engine parses the search input string from left to right without regards to the prioritization of logical operators, and not according to the standard rules of logical operator prioritization. For example, **A or B and C** is treated as **(A or B) and C**, and not as **A or (B and C)**.

Examples

- If you enter **Nodes owned by John or Jim**, this triggers a search that yields results of all nodes in the system with an owner John and all nodes in the system with an owner Jim.
- If you enter **All Windows with more than 4 CPUs and with at least 4 GB memory**, the search engine yields results of all Windows PCs in the system that have both more than 4 CPUs and at least 4 GB memory.
- If you enter **All Windows versions not 2008**, the search engine yields results of all Windows PCs in the system that are not version 2008.

Enriching Search Results

Explanation and Examples

Since the user is not always aware of how IT entities are modeled in UCMDB, he may enter search input text for one thing while his real intention was something else. The search engine has been designed with an enriching mechanism that can "guess" the user's real intention. For example, if the user searches for the IP address 16.59.188.16, he may be actually interested in the IP's connected node, and so the enriching mechanism looks for all nodes connected to the IP address.

It is possible that the user enters **London**, but what he really wants to know are the nodes at this location. The enriching mechanism has been designed to look for all nodes connected to a location CI, so in this example the search engine would return all nodes connected to the London CI.

For information on how to configure the search engine's enriching capability, see "Configure Enriching Capability" on page 150.

Federated Search

Explanation and Examples

All the types of searches described above are not performed on federated data. However, the search engine contains some predefined hard-coded topological queries for performing searches on federated

data. For example, if you enter **myServer name** and the server name is a federated CI, there is a federated query that tries to retrieve the CI by its name. This TQL is executed for the CI types **node**, **business element**, and **CI collection**, that have attributes of **string** type, and are marked with the **CMS_SEARCHABLE_ATTRIBUTE** qualifier.

> **Note:**
>
> - The search on federated data (legacy search and widgets) can only be performed if the **Show federated search results** setting is enabled. By default, the **Show federated search results** setting is disabled.
> - The search for federated CIs according to their display names (or sub-string of their display names) is performed if the CI type has been configured for this.
>
> For instructions on enabling/disabling the search on federated data and enabling a search of a federated CI by the CI display name, see "Enable/Disable Searching for Federated Data" on page 145.

> **Note:** The search on federated data (legacy search and widgets) can only be performed if the **Show federated search results** setting is enabled. By default, the **Show federated search results** setting is disabled.

The user can also retrieve data on relationships between federated CIs. For example, the user can retrieve CIs by their IP address. If you enter **16.1.100.45** and this is the IP address of a federated CI, the search engine returns the actual node connected to this IP address.

Auto-Completion Search Entry Capability

Auto-completion capability is added to the search field and supports the following language entries:

- CI Type names and synonyms (for example: Windows=NT)
- Attribute names and synonyms (for example: version=DiscoveredOsName)
- Relationship names and synonyms (for example: **linked to** and **located in**)
- Cardinality phrases (for example **with more than** and **at least**)

Legacy CI Search Engine

The search is performed in the most intuitive way possible using natural language, in the same manner as modern search engines. The UCMDB Browser module currently supports searches for CIs according to the following attributes:

- ID
- Display Label
- Location
- IP Address
- Party (that is, owner)
- Any attribute marked with the **CMS_SEARCHABLE_ATTRIBUTE** qualifier. For details on how to add this qualifier to an attribute, see "Adding the Search Qualifier to an Attribute" on page 166.

> **Note:** By default, CIs with the MODELING_ENABLED qualifier are included in the search results. To improve performance, you can exclude these CIs by setting **Return CIs with MODELING_ENABLED qualifier (legacy search engine)** in the Infrastructure Settings Manager to False. The **CMS_SEARCHABLE_ATTRIBUTE** qualifier on an attribute overrides this setting.

- If searching for a term that matches a CI Type Display Label, all the instances of the matching CI Type are displayed along with the results of the normal search.

The following are some search examples:

- Searching for **John Doe**, who is a project manager, yields all Business Elements and Nodes whose owner is John Doe
- Searching for **172.16**, which is the most significant part of an IP address, yields all Nodes with an IP-address starting with “172.16” (that reside in that subnet)
- Searching for **Ohio** yields all Nodes residing in data centers located in the state of Ohio, USA
- Searching for **Oracle** yields all nodes and relevant running software related to the Oracle DB
- If the **DiscoveredOsName** attribute is marked with the **CMS_SEARCHABLE_ATTRIBUTE** qualifier, searching for Windows 2008 Server yields all Nodes with the **DiscoveredOsName** attribute equal to Windows 2008 Server.

Search Results: Search results (in the current version – CIs) are the heart of the UCMDB Browser module. Users get results of their search criteria, view relevant information at a glance, and, if required, zoom into the results for a more detailed view. Search results include only Star CI types, which are the most important CI types. Star CI types receive special treatment from all (or most) widgets, thus allowing users to receive more comprehensive and relevant information regarding them.

The following is a list of all Star CI types:

- Business Elements Related
- CI Collection
- Node
- Running Software (excluding Agent, Inventory Scanner)
- All CI types with the Modeling Enabled or **CMS_BROWSER_SEARCH** qualifier

Composite Search: A Composite Search allows searching for any CI Type (not just Star CI types). The search terms must be in the form: X + Y (two search terms, separated by the "+" character). Any of the search terms can be a possible CI Type display label (for example, "Windows + server_partial_name" is equivalent to "server_partial_name + Windows").

> **Note:** The Composite Search can only be performed if the Enhanced search engine is disabled.

Performing a Composite Search greatly increases the number of CIs that can be found in the UCMDB Browser module. Searching is performed on the CI Type represented by one of the search terms. The other search term is considered as input for the normal search algorithm (described above). Federated data is also searched, if federation is enabled from the configuration file. For details, see "Specify Data Stores Used for Data Loading (legacy search engine)" on page 167.

The matching algorithm attempts to find an exact match on the first term. If nothing is found, it attempts to find a partial match on the first term (for example, entering "dows" matches the "Windows" CI Type, entering "nix" matches "Unix" CI Type). If no results are found, the algorithm attempts to find an exact match on the second term, and if nothing is found, it attempts to find a partial match on the second term. If no results are found on the second term, the algorithm performs a search on both terms together including the '+' character.

The Composite Search is not case sensitive. If there are multiple CI Type matches, only the first one will be returned. If there are more than two terms (for example, a+b+c), the search is performed on the entire expression, including the '+' character.

Search by Global ID: The user can perform a search for a CI according to its Global ID. This is useful in the case of federated CIs, where the Global ID and the CMDB ID differ. For example, if a CI has a Global ID with a value of **daily%0Ant%0A1%0ACMDB_ADAPTER_ID%3DSTRING%3Df37a5e73a861db7f417ba1ee4192544b%0A%03%03%03rmiron1%0Ant%0A1%0ACMDB_ADAPTER_ID**, you can use the Global ID value as search input in the UCMDB Browser module.

CI Refocus: Each CI presented in the UCMDB Browser module, either as a search result or as part of a specific widget, can be refocused by simply selecting it. Refocusing a CI presents its data using the information widgets.

> **Note:** When you refocus a CI, the visualization mode in the preview panel automatically changes from Overview to Navigation Context. You can switch back to the Overview mode to see the CI's details.

Adding the Search Qualifier to an Attribute

The **CMS_SEARCHABLE_ATTRIBUTE** qualifier can be added to a CI attribute, thus enabling that CI to appear in search results performed in the UCMDB Browser module.

> **Note:** This qualifier should not be added to an attribute that does not support the LIKE_IGNORE_CASE operator (for example integer attributes). This qualifier should only be used with attributes that support LIKE_IGNORE_CASE operator, such as string attributes.

To add the CMS_SEARCHABLE_ATTRIBUTE qualifier to an attribute:

1. In UCMDB, go **Modeling > CI Type Manager**.
2. Select the class in which you want to change an attribute.
3. Select the **Export to XML** button in the upper right of the CI Types tree.
4. Save the XML file containing the exported class on a local drive.
5. Open the XML file for editing.
6. Find the section corresponding to the attribute to which you want to add the **CMS_SEARCHABLE_ATTRIBUTE** qualifier.

   An attribute section appears like this:

   ```
   <Attribute name="attr_name" type="type">
       <Attribute-Qualifiers>
           <Attribute-Qualifier name="ATTRIBUTE_QUALIFIER1"/>
           <Attribute-Qualifier name="ATTRIBUTE_QUALIFIER2"/>
         ….
       </Attribute-Qualifiers>
   </Attribute>
   ```

   > **Note:** If the attribute you want to edit does not have the **<Attribute-Qualifiers>** section, add it as specified above.

7. In the **<Attribute-Qualifiers>** section, add the new <Attribute-Qualifier> tag as follows:

   ```
   <Attribute-Qualifier name=”CMS_SEARCHABLE_ATTRIBUTE”/>
   ```

8. Save the XML file.
9. Go back to the CI Type Manager.

10. Select the class that you previously exported.
11. Select the **Import from XML** button in the upper right of the tree.
12. Select the XML file that you previously modified.
13. Wait for the import to complete. You will see a success notification message if the import process is successful, or a failure message with errors if the process fails.

Specify Data Stores Used for Data Loading (legacy search engine)

The flag **federated_search_enabled** is used to enable or disable the use of federation regarding several operations in the UCMDB Browser module. If this flag is set to **False** (this is the default value), the legacy search engine, and the widgets use only the local data store for gathering data. If this flag is set to **True**, all data stores are used when running a search in the legacy search engine and the widgets.

This flag is set on the UCMDB server.

Set the **federated_search_enabled** flag

1. In UCMDB, go to **Administration > Infrastructure Settings Manager**, and choose **UCMDB Browser settings**.
2. In the Name column, choose **Show federated search results**.
3. In the Value column, choose **True** or **False** from the drop-down list.
4. Click **Save** .

Limitations on Using Federated Data

The use of federated data has the following limitations:

- The Environment widget cannot load data from a completely remote CI (that is, a CI that exists only in a remote data store and does not exist in the local data store).
- For completely remote CIs, the Properties widget does not display properties calculated from related CIs.

Specify CI Types Returned in Search Results (legacy search engine)

In the legacy search engine, this Boolean configuration allows the user to control which CI types are returned in search results.

In UCMDB, configuring the CI Types to be returned in Search Results is done through the **Show only results with CI Types with CMS_BROWSER_SEARCH class qualifier** setting. This Boolean determines the CI candidates for search. The default option (**false**) searches for Star CIs and also CIs with the **CMS_BROWSER_SEARCH** qualifier. When this Boolean is **true** the search is conducted on CIs with the **CMS_BROWSER_SEARCH** qualifier only.

Export Search Results

You can perform a search and export the search results to a CSV or Excel file.

To specify the attributes to be exported:

1. In UCMDB, go to **Administration > Infrastructure Settings Manager > UCMDB Browser settings**.
2. Do the following:
   - In the Name column, choose **Minimal export of search results** and choose **True** if you want to export only the display label, class name, CI ID, and Global ID attributes for each CI. Choose **False** if you want to export all attributes that are displayed in the Properties Widget.

     Additional attributes can be excluded if they are marked in the CI Type Manager in UCMDB. For details, see the description of the **Hide in Export Search Results** qualifier in the *Modeling section of the UCMDB Help*.
   - In the Name column, choose **Remove logical attributes (owner, location) from export of search results** and choose **True** to remove the owner and location attributes from the exported search results.

To export search results to a file:

1. Click **Export results** in the search results toolbar. The following options are available:
   - Current page > XLS, XLSX, or CSV
   - All pages > XLS, XLSX, or CSV
2. Click **Open**, **Save**, or **Cancel**.

The created file is named with the date and time that the export was performed.

> **Note:** In the exported file, the **'** character is added in front of any CI attribute name that begins with one of the following characters: **@ + - =**.

How to Configure Custom CI Types or CI Attributes for Enhanced Search

After adding a custom CI Type or a CI attribute, in order to successfully search for the custom CI Type or attribute with the Enhanced Search feature, you need to perform some necessary steps to make CMS UIUCMDB Browser and the Solr search engine aware of the new CI Type or CI attribute.

To achieve this, edit configuration files by using the following JMX methods:

- **editIndexerConfiguration** – This determines what gets indexed by the Solr search engine, if you do not have the new CIT or attribute defined, then it will never be indexed in the first place.
- **editParserConfiguration** - This controls what synonyms you want to declare, so you can translate custom words to TQL useful variables.
- **editRankingConfiguration** – This controls what is the order (ranking) in the data displayed in the CMS UIUCMDB Browser module.

Let us use a custom CIT **ts_ex** as an example. **ts_ex** is not a child of any particular CIT, and has important attributes like **ts_id**, **ts_name** and **ts_version**.

1. Add the custom CIT and its attributes to the indexer configuration by using the **editIndexerConfiguration** JMX method.
   a. On the server, launch the Web browser and enter the following address: **https://localhost:8443/jmx-console**.
   b. Enter the JMX console authentication credentials (Login name = **sysadmin**).

c. Locate the **editIndexerConfiguration** operation in the **UCMDB:service=Topology Search Services** category.

d. Provide Customer ID (default: 1) and click **Invoke**.

In the returned result page, the Resource XML window lists all CI types and the attributes that are indexed.

e. Scroll down to the bottom and add the custom CIT and attributes by following the out-of-the-box (OOTB) structure below:

```
<classAttributes>
    <className><CIT></className>
    <index>true</index>
    <attribute><CI Attribute 1></attribute>
    <attribute><CI Attribute 2></attribute>
</classAttributes>
```

In this case, add the following:

```
<classAttributes>
    <className>ts_ex</className>
    <index>true</index>
    <attribute>ts_version</attribute>
    <attribute>ts_id</attribute>
    <attribute>ts_name</attribute>
</classAttributes>
```

> **Tip:** It is recommended to always add your customizations to the end of the XML file and to keep the XML formatting, so that you will always save a valid and usable resource.

f. Save the change.

2. Add the custom CIT to the parser configuration by using the **editParserConfiguration** JMX method.

> **Note:** UCMDB is designed to parse a simple text string as a search request for the **display_label** attribute on **managed_object** and its child CITs. If you want to search for a custom attribute like **ts_id**, then we need to teach the parser that we are interested in this particular attribute. This can translate to:
>
> ```
> <attributeSynonym>
>  <synonym>tsid</synonym>
>  <attributes>
>  <attributeName>ts_id</attributeName>
> ```

```
    </attributes>
</attributeSynonym>
```

To search such an attribute in CMS UIUCMDB Browser, we need to enter in the search box the string `tsid <my_ID_value>`. This is interpreted by the parser that you are requesting a search only on the custom attribute **ts_id** with the search string **`<my_ID_value>`**.

a. In UCMDB server JMX console, locate the **editParserConfiguration** operation in the **UCMDB:service=Topology Search Services** category.

b. Provide Customer ID (default: 1) and click **Invoke**.

   In the returned result page, the Resource XML window lists all CITs that are parsed.

c. Scroll down to the bottom and add the custom CIT by following the out-of-the-box (OOTB) structure below:

```
<classSynonym>
    <synonym><synonym></synonym>
    <className><CIT></className>
</classSynonym>
```

   In this example, add the following:

```
<classSynonym>
    <synonym><Technical service></synonym>
    <className>ts_ex</className>
</classSynonym>
```

d. Save the change.

   This tells the parser that when you search the keywords **Technical service**, you are actually interested in CIs from the CIT **ts_ex**.

> **Note:** It is also recommended to familiarize yourself with the entire OOTB list in order to be able to perform better and more useful CMS UIUCMDB Browser searches.

3. Add rankings of the custom CIT and its attributes by using the **editRankingConfiguration** JMX method

   a. In UCMDB server JMX console, locate the **editRankingConfiguration** operation in the **UCMDB:service=Topology Search Services** category.

   b. Provide Customer ID (default: 1) and click **Invoke**.

      In the returned result page, the Resource XML window lists ranking of all CITs and their attributes.

The XML file is split into several categories, but the first 2 categories are the most relevant and important ones: **classesByPriority** and **attributesByPriority**.

c. In the **classesByPriority** section, add the name of your custom CIT (as illustrated below), either for priority 2 or 3 depending on your business needs, but not both of them.

```
<classesByPriority>
        <priorityList>
            <priority>2</priority>
            <name>running_software</name>
            <name>ci_collection</name>
        </priorityList>
        <priorityList>
            <priority>3</priority>
            <name>node</name>
            <name>location</name>
            <name>party</name>
            <name>business_element</name>
            <name>configuration_document</name>
            <name>ts_ex</name>
         </priorityList>
    </classesByPriority>
```

d. In the **attributesByPriority** section, add the names of your custom CI attributes to the target priority level section.

You might have already noticed the priorities for attributes are 0,1,3 and 4. Based on your preferred usage for the custom CIT, make sure you add each of three example attributes into one of the priority categories.

> **Note:** Each attribute should be added only once. The higher the priority number is, the better chance to have that search result listed on the first result page.

For example,

```
    <attributesByPriority>
        <priorityList>
            <priority>0</priority>
            <name>creation_time</name>
            ...
        </priorityList>
        ...
        <priorityList>
            <priority>3</priority>
            <name>cluster_network_address</name>
```

```
            <name>ts_version</name>
            <name>ts_id</name>
            <name>ts_name</name>
        </priorityList>
        ...
```

e. Save the change.

4. Index the custom CIT and attributes by invoking the **reindexCiType** JMX method.

   a. In UCMDB server JMX console, locate the **editRankingConfiguration** operation in the **UCMDB:service=Topology Search Services** category.

   b. Provide Customer ID (default: 1) and the CIT name in the value field for **ciType**.

   c. Click **Invoke**.

Related Topics

- "How to Configure the Enhanced Search Engine" on page 1

Integration Studio

The **Integration Studio** option in the CMS Modules navigation pane opens the new Integration Studio module, which enables you to manage your UCMDB integration points and connect and share information with external repositories, such as other UCMDB, IT Performance Suite products, or third-party products.

This section contains the following:

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Integration Studio Overview

> **Note:** The Integration Studio module is available for users with the **Data Acquisition** permission.

Integration Studio is where you manage your UCMDB integration points and connect and share information with external repositories, such as other UCMDB, IT Performance Suite products, or third-

party products. Integration with other products is performed over secure communication channels through Data Flow Probes.

Alternatively, if your remotely-managed data repositories are accessible from UCMDB server machine, non-Jython-based integrations can be performed using UCMDB Integration Service, enabling the Data Flow Probe resources to be used for other discovery tasks.

> **Note:** UCMDB Integration Service is supported only in standalone UCMDB environments.

Integration points in UCMDB are based on adapters, which are entities that are capable of communicating with external data repositories. A basic set of adapters is provided with UCMDB; however, you can also create additional adapters.

Integration points can be of one of the following types.

Population

Population type integrations copy data from an external data repository into UCMDB, so that UCMDB now controls the data.

You use population integrations in the following scenarios:

- You need to track changes made by UCMDB at the CI level.
- A remote repository is not reliable in terms of response time. For example, a network delay prohibits you from setting up run-time federation with the repository.
- A remote repository does not support federation capabilities (that is, no appropriate adapter exists).

Data Push

Data Push type integrations copy data from UCMDB to an external data repository, so that UCMDB no longer retains control over this data.

You use data push integrations to feed important data from UCMDB into an external system to facilitate your necessary business processes. For example, pushing data discovered by DFM to Micro Focus Service Manager, where tickets may be opened that are connected to the actual CIs in your IT infrastructure.

Integration Reports

You can configure Integration Studio to send you the following reports:

- Integration Summary Report (contains basic information about all activated integration points and their related jobs)
- Integration Job Report (contains basic information about the integration jobs and every related query)

For more information about integration reports and how to enable Integration Summary Report, see the "Use > Integration Reports" section of the UCMDB Help.

For details about how to enable the Integration Job Report in CMS UI, see Working with integration jobs.

Working with integration points

Create a new integration point

To create a new integration point, follow these steps:

1. In CMS UI, click the **Menu** icon ( ) to expand the CMS Modules pane, and then click **Integration Studio**.
2. Click the **New integration point** icon ( ) to display the New Integration Point pane.
3. Enter a name and description for the integration point.
4. Select the appropriate integration adapter. The Adapter Properties section is populated with the relevant adapter properties.
5. Enter the adapter properties.
6. If the adapter protocol requires credentials, click the **Credentials** text box to open the Choose Credentials pane, select a credential from the list, and then click **OK**.

   If the required credential is not displayed, click the **Add** icon ( ) in the Choose Credentials pane, enter the credential information, click **Save,** and then click **OK**.
7. Click **OK** to create the new integration point.
8. Add integration jobs to the integration point. For more information about how to do this, see "Working with integration jobs".

> **Note:** Only the following protocols can be created in CMS UI. To use other protocols, create them first in UCMDB, and then select them in CMS UI.
>
> - Asset Manager Protocol
> - BSM Kpi Adapter HTTPS Protocol
> - CA CMDB Protocol
> - Generic Protocol
> - Generic DB Protocol (SQL)
> - HP Network Automation Java Protocol
> - HP SIM Protocol
> - HTTP Protocol
> - NNM Protocol
> - Remedy protocol
> - Salesforce Rest Protocol
> - SANscreen Protocol
> - ServiceNow Protocol

Import or export an integration point

To import or export an integration point, follow these steps:

1. In CMS UI, click the **Menu** icon ( ) to expand the CMS Modules pane, and then click **Integration Studio**.
2. Click the **Import/Export** icon ( ), and then select **Import** or **Export** to open the Import & Export pane.
3. To import an integration point, click the **Add** icon ( ), select the desired integration point .xml file, and then click **IMPORT**.

   To export an integration point, select the desired integration point from the drop-down list, and then click **EXPORT**.

Search for an integration point

To search for an integration point, follow these steps:

1. In CMS UI, click the **Menu** icon ( ) to expand the CMS Modules pane, and then click **Integration Studio**.
2. Click the **Search** icon ( ), enter your search terms in the **Search** box, and then press Enter.

   > **Note:** To display all available integration points again once that you have performed a search, click the **Search** icon, clear the **Search** box, and then press Enter.

Activate or deactivate integration points

To activate or deactivate an integration point, follow these steps:

1. In CMS UI, click the **Menu** icon ( ) to expand the CMS Modules pane, and then click **Integration Studio**.
2. Locate the integration point that you want to activate or deactivate, and then switch the toggle button ( ) next to the adapter name to the desired position.

   > **Note:** When an integration point is deactivated, the toggle button appears dimmed, and the status is displayed as a question mark icon. When you activate an integration point, the connection is tested, and the status is displayed as a tick icon if the test is successful.

   To deactivate all integration points, click the **Deactivate All** icon ( ), and then click **Deactivate** to confirm the action. A pop-up progress bar displays the number of integration points that have been disabled.

Change the grouping of the displayed integration points

When you view integration points in Integration Studio, the displayed integration points are grouped by adapter or by status. To change which type of grouping is used, follow these steps:

1. In CMS UI, click the **Menu** icon ( ) to expand the CMS Modules pane, and then click **Integration Studio**.
2. Click the **Filter** icon ( ), and then select the desired grouping.

View the details and overview of an integration point

To view the details and overview of an integration point, follow these steps:

1. In CMS UI, click the **Menu** icon ( ) to expand the CMS Modules pane, and then click **Integration Studio**.
2. Click the name of the desired integration point to display details of the associated integration jobs.
3. Click the **Overview** icon ( ) to display an overview of the integration point, including the associated integration jobs and a graphical representation of the job status.

Edit or delete an integration point

To edit or delete an integration point, follow these steps:

1. In CMS UI, click the **Menu** icon ( ) to expand the CMS Modules pane, and then click **Integration Studio**.
2. Point the mouse to the integration point that you want to edit or delete. The **Edit** ( ), **Delete** ( ), and **Pin** ( ) icons are displayed.
3. To edit an integration point, click the **Edit** icon to display the Edit Integration Point pane, make the required changes, and then click **OK**.

   To delete an integration point, click the **Delete** icon, and then click **Yes** to confirm the deletion.

Refresh the integration points

To refresh an integration point so that current status information is displayed, follow these steps:

1. In CMS UI, click the **Menu** icon ( ) to expand the CMS Modules pane, and then click **Integration Studio**.
2. Click the **Refresh** icon ( ) to refresh the integration points.

Pin an integration point to the Home Page

To pin an integration point to the Home Page, follow these steps:

1. In CMS UI, click the **Menu** icon ( ) to expand the CMS Modules pane, and then click **Integration Studio**.
2. Point the mouse to the integration point that you want to edit or delete. The **Edit** ( ), **Delete** ( ), and **Pin** ( ) icons are displayed.
3. Click the **Pin** icon to display the integration point widget on the CMS UI Landing Page.

   To unpin the widget from the Home page, click the **Unpin from Dashboard** icon ( ) or remove it directly from the Home page.

   > **Note:** From the integration point widget on the Home Page, you can activate or deactivate the integration point by using the toggle button, and you can click the integration point name to view the list of integration jobs for the integration point. You cannot edit or delete an integration point from its widget on the Home Page.

Working with integration jobs

Create a new integration job

To create a new push or population integration job, follow these steps:

1. In CMS UI, click the **Menu** icon ( ) to expand the CMS Modules pane, and then click **Integration Studio**.
2. Click the name of the integration point to which you want to add a new integration job.
3. Click the **Add integration job** icon ( ), and then select the type of integration job that you want to add. Depending on your choice, the Population Job or Push Job pane opens.
4. Enter a name for the integration job.
5. Click the **Add** icon ( ) to add an available integration query to the job definition. If the integration job has multiple queries, click the **Up Arrow** ( ) and **Down Arrow** icons ( ) to change the order in which the queries are run. To remove a query, click the **Delete** icon ( ).
6. (Non-Jython-based population jobs only) Select the **Allow integration job to delete removed data** option to enable the deletion of CIs or relationships from the local CMDB. When this option is selected, any CIs or relationships that are removed from the remote source are also deleted from

the local CMDB when you next perform a full synchronization.

7. (Data push jobs only) Select the **Enable live job** option if you want the integration job to automatically perform delta synchronization when its TQL query result changes.

   > **Note:** If you enable this option, the job's scheduler will be disabled.

8. (Data push jobs only) Select **DELTA SYNCHRONIZATION** if you want the integration job to synchronize only the data has changed since the job last ran, or select **FULL SYNCHRONIZATION** if you want the integration job to synchronize all data every time that it runs.

9. Select **Email Notification Enabled** if you want to enable the Integration Job Report that is sent immediately through emails when an integration job is finished.

   - In the **Job Status** drop-down list, select one of the following options:
     - **Failed**. Sends email notifications when the integration job status is **On Failure**.
     - **All.** Always sends email notifications regardless of the job status.
   - In the **Synchronization Type** drop-down list, select one of the following options:
     - **Full Sync.** Sends email notifications when the integration job runs full synchronizations.
     - **Full Sync / Delta Sync.** Always sends email notifications regardless of whether the integration job runs full or delta synchronizations.
   - In the **Recipients** field, enter the public recipient's email address.
     - Click + to add more recipients.
     - Click − to remove the recipient.

     > **Note:** The maximum number of recipients is 30.

     Before you fill in this field, you must configure the following settings in the **Infrastructure Settings Manager** pane in UCMDB:

     i. Go to **Administration > Infrastructure Settings Manager > Mail Settings**.

     ii. Configure the following Mail Settings:

     - **Activate TLS/SSL connection.** Set the value to **True** if SMTP server requires the secure connection via TLS/SSL and UCMDB was configured with SMTP server certificate. Set the value to **False** if SMTP server accepts non-secure connection.
     - **Email sender.** Enter the name to appear in reports that Universal CMDB sends.

- **SMTP server.** Enter the address of the SMTP server.
- **SMTP server port.** Edit the SMTP server port. The default value is **25**.

iii. In the **Filter by column** field, select **Name** and then enter **Scheduled Reports trusted email domains for UCMDB Browser**.

iv. In the **Value** field of **Scheduled Reports trusted email domains for UCMDB Browser**, enter the email domain that you want. For example, **microfocus.com**. Separate email domains with semicolons (;).

10. Select the **Scheduler Enabled** option to choose scheduling options for the integration job.
    - In the **Repeat** drop-down list, select how often you want the integration job to run. You can also select to schedule the integration job by using a Cron expression.
    - Provide the information that corresponds to the **Repeat** option that you selected. For example, select the days of the week if you selected "Weekly", or enter a valid Cron expression if you selected "Cron Expression".
    - In the **Time Zone** drop-down list, select the time zone to which the schedule applies.
    - In the **Starts** field, click the **Clock** icon ( ) to select the date and time when the integration job will start to run.
    - In the **Ends** field, click the **Calendar** icon ( ) to select the date when the integration job will stop running. If you want the integration job to run indefinitely, select the **Never** option.
11. Click **OK** to create the integration job.

Search for an integration point

To search for an integration job, follow these steps:

1. In CMS UI, click the **Menu** icon ( ) to expand the CMS Modules pane, and then click **Integration Studio**.
2. Click the **Job List** icon ( ) to display the list of integration jobs.
3. Click the **Search** icon ( ), enter your search terms in the **Search** box, and then press Enter.

> **Note:** To display all available integration jobs again once that you have performed a search, click the **Search** icon, clear the **Search** box, and then press Enter.

View the integration jobs

To view the details and statuses of integration jobs, follow these steps:

1. In CMS UI, click the **Menu** icon ( ) to expand the CMS Modules pane, and then click **Integration Studio**.
2. Click the **Job List** icon ( ) to display the list of integration jobs.

Sort and filter the displayed integration jobs

To sort and filter the displayed integration jobs, follow these steps:

1. In CMS UI, click the **Menu** icon ( ) to expand the CMS Modules pane, and then click **Integration Studio**.
2. Click the **Job List** icon ( ) to display the list of integration jobs.
3. Click the **Filter** icon ( ) to display the filter pane.
   - You can sort integration jobs by job name or by integration name. Click the **Up Arrow** ( ) or **Down Arrow** icons ( ) to change the sort order.
   - You can filter integration jobs by job category (push or population) or by job status.

Synchronize an integration job

To synchronize an integration job, follow these steps:

1. In CMS UI, click the **Menu** icon ( ) to expand the CMS Modules pane, and then click **Integration Studio**.
2. Click the name of the integration point which contains the integration job that you want to synchronize.
3. Select the job that you want to synchronize, click the **Synchronize integration job** icon ( ), and then select **Full Sync** or **Delta Sync**.

A full Synchronization synchronizes all data, whereas a delta synchronization synchronizes only the data that changed since the job last ran .

Delete integration jobs

To delete one or more integration jobs, follow these steps:

1. In CMS UI, click the **Menu** icon ( ) to expand the CMS Modules pane, and then click **Integration Studio**.
2. Click the name of the integration point from which you want to delete integration jobs.
3. Select the check-box beside the integration job or jobs that you want to delete, click the **Delete** icon ( ), and then click **DELETE** in the confirmation window.

Edit an integration job

To edit an integration job, follow these steps:

1. In CMS UI, click the **Menu** icon ( ) to expand the CMS Modules pane, and then click **Integration Studio**.
2. Click the name of the integration point that contains the integration job that you want to edit.
3. Select the integration job that you want to edit to open the job details pane.
4. Select **DEFINITION**, and then edit the integration job as required.
5. Click **OK** to save your changes.

View integration job information and statistics

To view integration job information and statistics, follow these steps:

1. In CMS UI, click the **Menu** icon ( ) to expand the CMS Modules pane, and then click **Integration Studio**.
2. Click the name of the integration point that contains the integration job that you want to view.
3. Select the integration job that you want to view to open the job details pane.

Select **DEFINITION** to view the integration job details.

Select **STATISTICS** to view the statistics for each query in the integration job. If a warning or error icon is displayed beside a query, you can click the icon to display more detailed information about the issue.

> **Note:** In population jobs only, you can click the **Filter** icon ( ) to define a time range for the displayed statistics.

Pin the integration jobs to the Home Page

To pin a widget that displays the status of all integration jobs to the Home Page, follow these steps:

1. In CMS UI, click the **Menu** icon ( ) to expand the CMS Modules pane, and then click **Integration Studio**.
2. Click the **Job List** icon ( ) to display the list of integration jobs.
3. Click the **Pin to Dashboard** icon ( ) to display the integration job widget on the Home page.

   To unpin the widget from the Home Page, click the **Unpin from Dashboard** icon ( ) or remove it directly from the Home Page.

   > **Note:** The integration job widget is displayed on the Home Page by default. When you click on each integration job status on the widget, the integration job list in Integration Studio opens and displays the integration jobs that currently have that status.

LDAP Manager

The **LDAP Manager** option in the CMMS Modules navigation pane opens the LDAP Manager module, which enables you to associate Universal CMDB groups with LDAP groups.

This section contains the following:

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LDAP Manager User Interface 186
LDAP Manager Page 186
LDAP Resources Page 188
Number of users requested from the LDAP server 189
Existing Mappings Page 192

LDAP Manager Overview

> **Note:** The LDAP Manager module is available for users with the following permissions:
>
> - Administration
> - LDAP Mapping

When using an LDAP server to authorize users, it is necessary to map user groups on the LDAP server to user groups in Universal CMDB.

You can associate Universal CMDB groups with LDAP groups or LDAP users using the LDAP Manager module.

For detailed information about how to configure LDAP authentication, see the section on enabling LDAP authentication in the *Hardening section of the UCMDB Help*.

> **Note:**
>
> - You must configure LDAP mapping for both the actual and authorized states.
> - UCMDB can be configured to work with every LDAP server which implements the standard LDAP protocol.
> - It is recommended to set the **Passwords must use default policy** infrastructure setting to **False** when LDAP authentication is enabled.
>
> LDAP security policies should be used if LDAP is enabled.

LDAP Manager User Interface

This section includes:

LDAP Manager Page

This page allows you to associate Universal CMDB groups with LDAP groups or LDAP users.

To access the LDAP Manager page, go to CMS UI, click the menu icon ( ) on the upper left corner to expand the CMS Modules pane, and then click **LDAP Manager**.

> **Important:** The LDAP Manager module requires CMS UI 2018.08 or later, and UCMDB server 2018.08 or later.

The following table describes the user interface elements on the LDAP Manage page:

UI Element (A-Z)	Description
	CMS Modules. Opens the CMS Modules pane, and allows you to navigate through the available web-based CMS modules. For detailed information about the available modules, see the *Universal CMDB Home Help*.
<username>	***<username>.*** Displays the user that is currently logged in to CMS UI. Clicking it allows you to log out from CMS UI.
	Help. Opens the Help menu: • **Help.** Opens the LDAP Manager Help page. • **Online Help for CMS UI.** Opens the online help for the current CMS UI version available on the Micro Focus Software Information Portal. • **Online Help for UCMDB Server.** Opens the online help for the current UCMDB Server version available on the Micro Focus Software Information Portal. • **Online Help for Content Pack.** Opens the online help for the current Content Pack version available on the Micro Focus Software Information Portal. • **About.** Opens the About dialog box.

UI Element (A-Z)	Description
	The **ABOUT** tab provides version, patch (if available), copyright, and third-party notice information. For more information, see "About Window" on page 122. The **LICENSE** tab provides license information, including license status, license summary, and a license status link. Clicking the license status link opens the license summary report, which contains license consumption summary and available licenses, and a link that allows you to export a detailed license consumption report. For more information about licenses, see "Universal Discovery Licensing Overview" on page 422. Clicking **OK** exits the About window.
	Walk-throughs. Opens a list of predefined workflow scenarios. Click one of the available workflows to open a set of step-by-step-instructions. This allows you to complete an end-to-end workflow by yourself. The following walk-throughs are available: • How to Delete Existing Mappings Grouped by LDAP. • How to Delete Existing Mappings Grouped by UCMDB. For more information, see "How to Run a Walk-through " on page 200
myd-vm04030.hpswlabs.a	**Select an LDAP Server.** Enables you to select an LDAP server from the drop-down list of available LDAP servers.
EDIT SERVER	**Edit LDAP Server.** Enables you to edit the configuration of an existing LDAP server. Opens the **Edit LDAP Server** menu. For more information, see "Edit an LDAP Server configuration" on page 196.
+ ADD SERVER	**Add Sever.** Enables you to add a new LDAP server. Opens the **Add LDAP Server** menu. For more information, see "Configure a new LDAP server" on page 194.
Existing Mappings	Displays a list of existing mappings, grouped by LDAP or UCMDB.
LDAP Resources	Displays a list of LDAP resources.

LDAP Resources Page

This page allows you to select LDAP resources (LDAP groups, or LDAP users), and then map them to existing UCMDB groups.

To access the LDAP Resources page, click the **LDAP Resources** tab on the LDAP Manager page.

The following table describes the user interface elements on the LDAP Resources page:

UI Element (A-Z)	Description
	Search. Enables you to search for an LDAP resource by its name. Type a keyword in this field to search within the list. All the LDAP resources with the name that matches the keyword are displayed below.
2	**Add Mappings.** Enables you to add mappings for the selected groups or users. Opens the **Add Mappings** menu. For more information, see "Add new mappings" on page 199.
	Clear Selections. Allows you to clear the selections you have made.
Filter by	**Filter by.** Allows you to filter the LDAP resources by group or by user. • **None.** Displays a list of all LDAP resources. • **Group.** Displays a list of LDAP groups. • **User.** Displays a list of LDAP users. When this filter is applied, you can search for an LDAP user within the list. In this case, the search is performed by Display name. > **Note:** The search performed by Display name is based on a partial match. (All the users that have the entered value in their Display name are returned). • **UID.** Displays a list of LDAP users. When this filter is applied, you can search for an LDAP user within the list. In this case, the search is performed by user unique ID (UID). > **Note:** The search preformed by UID is based on a perfect match. (Only the users that have the UID identical to the entered value are returned).

Number of users requested from the LDAP server

Sometimes, when you access the LDAP Manager module or the LDAP Resources page, or you perform a search in the LDAP Resources page, the following error message is displayed: “The number of users requested from the LDAP server exceeds the size limit”. This happens because the LDAP server has a size limit configured for the search results. In this case, only a certain number of entries can be returned. If the number of users requested from the LDAP server exceeds the number of maximum results (size limit) defined for the LDAP server, the application is not able to get all of them.

To help you reduce the number of LDAP entries returned so that you do not reach the defined limit, and to minimize the calls to the LDAP Server, the following LDAP server settings are added to the **configureLDAPServer** JMX method.

- **nrOfUsersRetrievedAtOnce**: Allows you to specify the number of users that may be retrieved at once from the LDAP server. The default value is 0.
  - **0:** the LDAP Server does not restrict the number of users retrieved at search (unlimited search)
  - **Greater than 0 (between 1 and 400):** the LDAP Server restricts the number of users retrieved at search (limited search)
- **distinguishedNameAttr**: Allows you to specify the Distinguished Name Attribute as it is defined on the current LDAP Server. By default, this field is empty.
  - when this is empty (default), the users are retrieved one by one

    > **Note:** The search process takes a while when the users are retrieved one by one.

  - when the Distinguished Name Attribute as it is defined on the current LDAP Server is provided, multiple users are retrieved at once.

  > **Caution:** Make sure you enter the exact value of the distinguished name attribute. If you do not the know the LDAP Server’s distinguished name attribute, leave this setting empty.

  The **distinguishedNameAttr** setting is relevant only in combination with the **nrOfUsersRetrievedAtOnce** setting.

How to configure the number of users that may be retrieved at once from the LDAP server

To configure the number of users that may be retrieved at once from the LDAP server, follow these steps:

1. On the UCMDB server machine, launch your Web browser and enter the following address: **https://localhost:8443/jmx-console**.

   You may need to log in with a user name and password.

2. Locate the **configureLDAPServer** method in the **UCMDB:service=LDAP Services** category.
3. Provide values for the following fields:

   nrOfUsersRetrievedAtOnce: A number smaller than the size limit configured for the LDAP server

   distinguishedNameAttr: The Distinguished Name Attribute as it is defined on the current LDAP Server.

4. Click **Invoke**.

Example: How to properly configure the number of users that may be retrieved at once from the LDAP server

This is just an example to help you understand how to use the newly added settings (**nrOfUsersRetrievedAtOnce**, and **distinguishedNameAttr**).

In this example, the following values will be used:

- Group 1 – with 10 users
- Group 2 – with 15 users
- Group 3 – with 48 users
- LDAP server size limit: 20 (this means that the LDAP server has limited the search results to 20 users)
- Distinguished Name Attribute: LDAPattr

The following scenarios show what happens when different values are used for the **nrOfUsersRetrievedAtOnce** and **distinguishedNameAttr** settings.

Scenario 1

Input

- **nrOfUsersRetrievedAtOnce**: **0**
- **distinguishedNameAttr**: (empty)

Output

When performing a search in the LDAP Resources page, the following error message is displayed: “The number of users requested from the LDAP server exceeds the size limit”.

This error happens because the LDAP server is limited to 20 users, and the number of users requested from the LDAP server is 73 (Group 1 + Group 2 + Group 3).

Scenario 2.1

Input

- **nrOfUsersRetrievedAtOnce**: **40**
- **distinguishedNameAttr**: (empty)

Output

When performing a search in the LDAP Resources page, all the three groups (73 users) are retrieved. Since the **distinguishedNameAttr** setting has no value added, the users are retrieved one by one, and the LDAP server size limit is not reached.

The search process takes a while when the users are retrieved one by one.

Scenario 2.2

Input

- **nrOfUsersRetrievedAtOnce**: **40**
- **distinguishedNameAttr**: **LDAPattr**

Output

In this scenario, the search functionality works for Group 1 and Group 2 (since the number of users is smaller than the LDAP server size limit), and it fails for Group 3 with the following error message: "The number of users requested from the LDAP server exceeds the size limit." The error appears because the chunk we want to retrieve is of 40 users, and the LDAP server size limit is 20.

Scenario 3.1

Input

- **nrOfUsersRetrievedAtOnce**: **19**
- **distinguishedNameAttr**: (empty)

Output

When performing a search in the LDAP Resources page, all the three groups (73 users) are retrieved. Since the **distinguishedNameAttr** setting has no value added, the users are retrieved one by one, and the LDAP server size limit is not reached. The search process takes a while when the users are retrieved one by one.

Scenario 3.2

Input

- **nrOfUsersRetrievedAtOnce**: **19**
- **distinguishedNameAttr**: **LDAPattr**

Output

When performing a search in the LDAP Resources page, all the three groups (73 users) are retrieved. This is because the users are retrieved in chunks of 19 users at once. The search process takes less time than it does in the scenario 3.1.

Scenario 4

Input

- **nrOfUsersRetrievedAtOnce**: **0**
- **distinguishedNameAttr**: **LDAPattr**

Output

When performing the search in the LDAP Resources page, the following error message is displayed: “The number of users requested from the LDAP server exceeds the size limit”.

This error happens because the LDAP server is limited to 20 users, and the number of users requested from the LDAP server is 73.

Existing Mappings Page

This page allows you to view the existing mappings grouped by LDAP or UCMDB groups. Also, you can select either LDAP groups or LDAP users to create new mappings.

To access the Existing Mappings page, click the **Existing Mappings** tab on the LDAP Manager page.

The following table describes the user interface elements on the Existing Mappings page:

UI Element (A-Z)	Description
	Search. Enables you to search for an existing mapping by its name. Type a keyword in this field to search within the list. All the existing mappings with the name that matches the keyword are displayed below.
	Add Mappings. Enables you to add mappings for the selected resources. Opens the **Add Mappings** menu. For more details, see "Add new mappings" on page 199.
	Clear Selections. Allows you to clear the selections you have made.
	Delete. Allows you to delete an existing mapping.
	Allows you to select all the LDAP groups that are already mapped to the UCMDB groups. The selection is added in the **Add Mappings** menu.
	Allows you to manually expand a group and view its mappings.
Collapse All	Collapses the entire structure, leaving only the root groups.
Expand All	Expands the entire structure, displaying all the available mappings.
Grouped by:	**Grouped by.** Enables you to group the existing mappings by LDAP or UCMDB groups. • **LDAP.** Displays a list of existing mappings grouped by LDAP. • **UCMDB.** Displays a list of existing mappings grouped by UCMDB.

Work with LDAP Manager

Configure a new LDAP server

To configure a new LDAP server, follow these steps:

1. In CMS UI, click the **Menu** icon ( ) to expand the CMS Modules pane, and then click **LDAP Manager**.
2. Click the + ADD SERVER button to display the Add LDAP Sever pane.
3. Enter the values for all the settings.
4. Click the **Save** button.

Note:

- If you have an exported file containing the LDAP server configuration saved on your computer, you can choose to import the LDAP server values, which are automatically entered in the right fields. For more information, see "Export or import an LDAP Server configuration " on page 197
- You can also configure LDAP authentication settings using the JMX console. For details, see "How to Define LDAP Servers and Enable LDAP Authentication Method" in the *Hardening section of the UCMDB Help*.
- For an example of LDAP authentication settings, see "LDAP Authentication Settings - Example" on the next page.
- Every LDAP user has a first name, last name, and email address saved in the local repository. If the value of any of these parameters that is stored on the LDAP server differs from the value in the local repository, the LDAP server values will overwrite the local values at each login.
- The value of the **userUID** setting must be unique across all LDAP servers.
- You can specify the order in which the LDAP servers are presented in the drop-down list of available LDAP servers by entering a value in the **Priority** field. If two or more LDAP Servers have the same priority, the order in which they are presented is alphabetical.
- If you want to view the group information of LDAP users, enable the **Display Users Group** toggle button.

LDAP Authentication Settings - Example

The following table contains an example of setting values for LDAP authentication:

Connection

Setting	Value
URL	ldap://myldap.example.com:389/OU=Users,OU=Dept,OU=US,DC=example,DC=com??sub
Search user	Full user name, for example, John Smith
Search user password	LDAP Search User Password
Distinguished Name (DN) Resolution	true

Group. Use bottom up algorithm: enabled

Group search

Setting	Value
Base	OU=AMRND,OU=Security Groups,DC=example,DC=com
Filter	(objectclass=group)
Scope	sub

Root group search

Setting	Value
Base	OU=Users,OU=Security Groups,DC=example,DC=com
Filter	(objectCategory=group)
Scope	sub

Static Group

Setting	Value
Group class	group

Static Group, continued

Setting	Value
Name attribute	cn
Description attribute	description
Display name attribute	cn
Member attribute	member

User

Setting	Value
User class	user
Display name attribute	cn
Unique ID attribute	sAMAccountName
User filter	(&(sAMAccountName=*)(objectclass=user))
Display Users' Group	enabled

Integration

Setting	Value
Priority	2
Default Group	AdminsGroup

Dynamic group. Enabled

Edit an LDAP Server configuration

To edit an existing LDAP server configuration, follow these steps:

1. In CMS UI, click the **Menu** icon ( ) to expand the CMS Modules pane, and then click **LDAP Manager**.
2. Click the EDIT SERVER button to display the Edit LDAP Server pane.
3. Modify the values for the relevant settings.

4. Enter the password in the **Search user password** field.
5. Click the **Save** button. A message that indicates whether the LDAP authentication settings were updated successfully appears on the LDAP Manager page.

Important:

- If you do not enter a new value for a setting, the setting retains its current value.
- You have to provide the password each time you edit the LDAP server configuration.
- You can choose to export an LDAP server configuration and use the exported file when configuring a new LDAP server. For more information, see "Export or import an LDAP Server configuration " below

Export or import an LDAP Server configuration

You can export and import an LDAP server configuration. In this way you can easily configure a new LDAP server, by using the configuration of an existing LDAP server.

To export the LDAP server configuration:

1. In CMS UI, click the **Menu** icon ( ) to expand the CMS Modules pane, and then click **LDAP Manager**.
2. Select an LDAP Server from the drop-down list of available LDAP servers.
3. Click the EDIT SERVER button, and then click **Export Configuration**.
4. Save the file on your local machine.

   Note: For security reasons, the password is not saved in the exported file.

To import the LDAP server configuration:

1. In CMS UI, click the **Menu** icon ( ) to expand the CMS Modules pane, and then click **LDAP Manager**.
2. Click the + ADD SERVER button, and then click **Import Configuration**.
3. Go to the folder where you saved the exported file, select the required file, and then click **Open**. The LDAP server values are automatically entered in the right fields.

4. Enter the password in the **Search user password** field.
5. Click the **Save** button.

Delete an LDAP server

To delete an LDAP server, follow these steps:

1. In CMS UI, click the **Menu** icon ( ) to expand the CMS Modules pane, and then click **LDAP Manager**.
2. Select the LDAP server from the drop-down list of available servers.
3. Click the EDIT SERVER button to display the Edit LDAP Server pane.
4. Click the **Delete** button. A confirmation message is displayed. This allows you to choose whether to delete the selected server, or to cancel the action.

Add new mappings

To map an LDAP group or an LDAP user to a UCMDB group, follow these steps:

1. In CMS UI, click the **Menu** icon ( ) to expand the CMS Modules pane, and then click **LDAP Manager**.
2. Select an LDAP server from the drop-down list of available LDAP servers.
3. Select the **LDAP Resources** tab on the LDAP Manager page.
4. Select the LDAP groups or LDAP users you want to map.
5. Click the **Add Mappings** icon ( ) to open the Add Mappings pane.
6. In the **Add Mappings** pane > **UCMDB Groups** drop-down list, select the UCMDB groups you want to be mapped to the selected LDAP resources.
7. Click the APPLY CHANGES button.

   Your changes are added in the existing mappings list. You can view the existing mappings grouped by UCMDB or LDAP groups.

Delete an existing mapping

To delete an existing mapping, follow these steps:

1. In CMS UI, click the **Menu** icon ( ) to expand the CMS Modules pane, and then click **LDAP Manager**.
2. Select an LDAP server from the drop-down list of available LDAP servers.
3. Select the **Existing Mappings** tab on the LDAP Manager page, and from the **Grouped by** drop-down list filter the existing mapping by **LDAP**.
4. Expand the required LDAP group, and then click the **Delete** icon ( ) to delete a mapped UCMDB group.

How to Run a Walk-through

Walk-throughs provide step-by-step instructions that enable you to complete an end-to-end use case by yourself. To launch a walk-through, click the button on the LDAP Manager page, select one of the available walk-throughs, and then follow the step-by-step instructions.

The following table describes the walk-through user interface elements.

UI Element (A-Z)	Description
Next 2/6	**Next.** Proceed to the next step. The **Next** button displays your progress through the walk-through (for example, 2/6 means that two steps are completed from a total of six steps). **Important:** After completing an action described in a step, you have to click the **Next** button.
Back	**Back.** Go back to the previous step.
Last	**Last.** Ends a walk-through.
Skip	**Skip.** Allows you to close the walk-through, and gives you the possibility to continue your current activity.
	Beacon. Appears when a step is incorrectly performed, when you press Enter, or when you click the **X** button on a tooltip. Hovering your mouse over the button opens a tooltip that displays the current step that has to be performed, and allows you to continue the walk-through.

Package Manager

The **Package Manager** option in the CMS Modules navigation pane opens the Package Manager module, which enables you to easily manage the capabilities of your system based on the packages you deploy.

This section contains the following:

Package Administration 201
Package Manager User Interface 212
Work with Package Manager 219

Package Administration

Package Administration Overview

> **Note:** The Package Manager module is available for users with the following permissions:
>
> - Administration
> - Deploy Packages
> - Run Discovery and Integrations
> - Package Manager

A package contains resources that are grouped together by defined criteria. For a list of the default resource types, see "Resource Types" on page 205.

Package Manager fulfills several functions:

- Enables the discovery of specific IT infrastructure assets. For example, deploys the SQL_Server package to discover Microsoft SQL servers.
- Enables you to define the CI Type model through the CI types that are included in the packages. For example, some of the CI types included in the Host_Resources_Basic package are File System, CPU, Process, and Print Queue.

- Enables you to move groups of resources from one system to another, for example, from a test to a production environment.

There are two types of packages:

- **Factory package**. Contains resources that are deployed with the installation and are used to initialize .

  By default, factory packages are located in the **<UCMDB_installation_folder>\content\basic_packages** folder.

- **Custom package**. A package that is user created. You may want to create a custom package if the factory packages do not contain the resources needed for the tool you are developing, or if you want to export resources from system to system. For details, see "How to Create a Custom Package" on page 219.

  > **Caution:** If you create custom packages for the resources or tools you develop, do not place them in the **<UCMDB_installation_folder>\content\basic_packages** folder. This folder is only for factory packages.

Export and deployment of packages from system to system is performed through the Package Manager interface.

You can:

- Export some or all of a package's resources to your local directory. For details, see "How to Export a Package" on page 222.
- Deploy some or all of a package's resources to the from your local directory. For details, see "How to Deploy a Package" on page 220.

Package Locations

There are three pre-defined folders with out-of-the-box, automatically deployed packages under **<UCMDB_installation_folder>\content**:

- basic_packages
  Internal packages
- adapters
  Adapter packages
- CPx.zip
  Content Pack packages

Package Manager User Interface

Each package in the Package Manager User Interface includes the following:

- A **Package Name** representing the name of the .zip file (optional)
- The **Category** as allocated in the descriptor.xml file (optional)
- A **Readme** file that corresponds to the package (optional)
- The **Version** number
- The **Build** number
- **Factory** identifying the package as factory or custom. A check mark represents the factory packages.
- A **Description** that corresponds to the description located in the descriptor.xml file

Package Resources

This section contains a list of the resources a package can contain. For a list of the available resource types and their descriptions, see "Resource Types" on page 205.

- **acl**. The definition of a role such as Administrator or Guest. For details, see "Roles Manager" in the *Administer section of the UCMDB Help*.
- **adapter**. Contains a description and the capabilities of the deployed federated adapter.
- **adapterCode.** Contains compiled classes (normally a jar), based-on *.jar files, and configuration files needed for federated adapters. Place these files in the **adapterCode\<adapter ID>** folder in the zip package. For details, see "Add an Adapter for a New External Data Source" in the *Developer Reference section of the UCMDB Help*.
- **calculatedlinks**. Contains the calculated super class for each of the calculated links defined.
- **calculatedlinkstriplets**. Contains the calculated relationships and their triplets as defined in the CI Type Manager.
- **categories**. Contains the State definitions used by Impact Analysis. For details on States, see "State Manager" in the *Administer section of the UCMDB Help* For details on Impact Analysis, see "Impact Analysis Manager" in the *Modeling section of the UCMDB Help*.
- **class.** CI type descriptions, such as host, file, switch, and so on. For details, see "CI Type Manager" in the *Modeling section of the UCMDB Help*.

- **cmdbview**. Contains the hierarchy rules defined for the base TQL query of each view. For details, see "Modeling Studio" in the *Modeling section of the UCMDB Help*.
- **correlation**. Impact rule definitions. For details, see "Impact Analysis Manager" in the *Modeling section of the UCMDB Help*.
- **datamodel.** Used to import CI instances into the system. If the CI does not exist in the , an instance of the CI is created. If a CI already exists in the , the values of the CI from the package resource overwrites the values of the CI in the .
- **datamodelcreateonly**. Used to import CI instances into the system. If the CI does not exist in the , an instance of the CI is created. If a CI already exists in the , the values of the CI from the package resource does not overwrite the values of the CI in the .
- **datamodelgenerateids**. Used to import CI instances into the system for CITs that require the ID to be calculated dynamically upon deployment (such as CITs with no key attributes).
- **dataStore**. Contains the integration point defintion.
- **discoveryConfigFiles**. Configuration files include properties and parameters that are needed to discover components on the system. For details, see "Adapter Configuration" in the *Data Flow Management section of the UCMDB Help*.
- **discoveryJobs**. A Data Flow Management (DFM) job includes configuration data, scheduling information, and TQL assignments needed to activate discovery of components. For details, see "Introduction to Universal Discovery" in the *Data Flow Management section of the UCMDB Help*.
- **discoveryModules**. A DFM module includes all the jobs needed to discover a specific component in the system. For details, see "Introduction to Universal Discovery" in the *Data Flow Management section of the UCMDB Help*.
- **discoveryPatterns**. DFM adapters define which code to run and in which order, declare the input and output CI Types and parameters to be configurable on the DFM jobs related to them. The adapater can be used as an integration adapter or a Discovery adapter. For details, see "Adapter Configuration" in the *Data Flow Management section of the UCMDB Help*.
- **discoveryResources**. External resources include all external resources that are needed in DFM, for example, a Visual Basic file, an additional jars file, and so on. For details, see "Adapter Configuration" in the *Data Flow Management section of the UCMDB Help*.
- **discoveryScripts**. DFM Jython scripts populates the with data, either by performing Discovery on a network component or during integration with an external data repository. For details, see "Adapter Configuration" in the *Data Flow Management section of the UCMDB Help*.
- **discoveryWizard**. Used to define the Discovery Activity dialog box contents. For details, see the

section on discovery activities in the *Universal CMDB Discovery and Integrations Content Help*.

- **enrichment**. Enrichment rule definitions. For details, see "Enrichment Manager" in the *Modeling section of the UCMDB Help*.
- **identification**. Contains the identification defintion of a specific CI type.
- **integrationUsers**. Used to define a user of type integration.
- **modelnotification**. Contains filter definitions for model notifications. The data model notification system gives notification of changes that occurred in the . For example, items in the that have been removed, updated, or added.
- **report**. Report rule definitions, as described in "Topology Reports Overview" in the *Modeling section of the UCMDB Help*.
- **schedulerJob.** Tasks that have been defined to run in the Scheduler. For details, see "Scheduler" in the *Administer section of the UCMDB Help*.
- **singletqlref**. Contains TQL template and perspective instances. For details, see "Modeling Studio" in the *Modeling section of the UCMDB Help*.
- **tql**. TQL query definitions. For details, see "Topology Query Language (TQL) Overview" in the *Modeling section of the UCMDB Help*.
- **typedef**. Predefined Enumeration definitions that relate to attributes of type Enumeration, such as severity levels, admin states, and so on. For details, see "System Type Manager" in the *Modeling section of the UCMDB Help*.
- **users.** The definition of a user and the user's role. For details, see "Users and Groups" in the *Administer section of the UCMDB Help*.
- **validlinks.** All predefined, valid connections (relationships) between CITs.

Resource Types

This section contains a list of the available resource types and their descriptions. For a list of the resources a package can contain, see "Package Resources" on page 203.

Administration

- **Users.** The users defined in the Users and Groups module. For details, see "Users and Groups" in the *Administer section of the UCMDB Help*.
- **User Groups.** The user groups defined in the Users and Groups module. For details, see "Users

and Groups" in the *Administer section of the UCMDB Help*.

- **Resource Groups.** The resource groups defined in the Resource Groups module. For details, see "Resource Groups" in the *Administer section of the UCMDB Help*.
- **Roles.** The roles defined in the Roles Manager module to assign permissions to users. For details, see "Roles Manager" in the *Administer section of the UCMDB Help*.
- **Role Assignments.** The role assignments to users defined in the Users and Groups module. For details, see "Users and Groups" in the *Administer section of the UCMDB Help*.

Settings

- **Type Definitions**. Predefined Enumeration definitions that relate to attributes of enumeration type, such as severity levels, admin states, and so on. For details, see "System Type Manager" in the *Modeling section of the UCMDB Help*.
- **Job Scheduler**. Tasks that have been defined to run in the Scheduler. For details, see "Scheduler" in the *Administer section of the UCMDB Help*.
- **State Categories**. The states defined in the State Manager. For details, see "State Manager" in the *Administer section of the UCMDB Help*.

Model

- **Configuration Item Types**. The CITs defined in the CI Type Manager. For details, see "CI Types Overview" in the *Modeling section of the UCMDB Help*.
- **Identifications**. The configuration files containing the identification rules for CIs. For details, see "Identification Service" in the *Data Flow Management section of the UCMDB Help*.
- **Relationships**. The relationships defined in the CI Type Manager. For details, see "CI Type Relationships" in the *Modeling section of the UCMDB Help*.
- **Calculated Relationships**. Contains the calculated relationships and their triplets as defined in the CI Type Manager.
- **Valid Links**. All possible predefined valid connections (relationships) between the CITs that are defined in the CIT folder.
- **Service Models**. The pattern-based models defined in the Modeling Studio that were not defined over an existing model. For details, see "Pattern-based Models" in the *Modeling section of the UCMDB Help*.

Discovery

- **Adapters**. DFM adapters define which scripts need to be run and in which order, declare the input and output CI Types and the parameters to be configurable on the Discovery jobs related to them. For details, see "Adapter Configuration" in the *Data Flow Management section of the UCMDB Help*.
- **Discovery Documents.** A Discovery document is a customized document describing the usage and functionality of a specific package. For details, see "How to Attach Discovery Documentation to a Discovery Package" in the *Data Flow Management section of the UCMDB Help*.
- **Discovery Modules**. A Discovery module includes all the jobs needed to discover a specific component on the system. For details, see "Discovery Modules/Jobs - Discovery Modules Pane" in the *Data Flow Management section of the UCMDB Help*.
- **Discovery Jobs**. A Discovery job includes configuration data, scheduling information, and TQL assignments needed to activate discovery of components. For details, see "Introduction to Universal Discovery" in the *Data Flow Management section of the UCMDB Help*.
- **Discovery Configuration Files**. Configuration files include properties and parameters that are needed to discover components on the system. For details, see "How to Define Discovery Rules" in the *Data Flow Management section of the UCMDB Help*.
- **Discovery Jython Script**. Discovery Jython Scripts are Jython scripts used by the discovery process to discover and map the various network entities.
- **Discovery External Resource**. Includes resources not used by the Data Flow Probe directly, but rather indirectly by the DFM scripts. It can contain binary executable files or DLLs, XML configuration files, or any other essential resource needed for the discovery to function properly. For details, see "Adapter Configuration" in the *Data Flow Management section of the UCMDB Help*.
- **Discovery Wizard Resource**. Used to define the Discovery Activity dialog box contents. For details, see the section on discovery activities in the *Universal CMDB Discovery and Integrations Content Help*.
- **Software Application Library**. Contains software application and version descriptions that are used to identify files that are discovered during the inventory discovery process. For details, see the Software Application Index section in the *Universal CMDB Discovery and Integrations Content Help*.
- **Inventory Scanner Configuration**. Configuration settings that control how inventory is collected, which information is gathered, and the level of detail to be included. For details, see the section on the Scanner Generator in the *Universal CMDB Discovery and Integrations Content Help*.

- **Scanner Package for Scanner Generator**. The base file used by the Scanner Generator to build a manually-deployed executable scanner file. For details, see the section on the Scanner Generator in the *Universal CMDB Discovery and Integrations Content Help*.
- **Service Discovery Activity Type.** Defines jobs used by service discovery and their trigger TQL queries as well as default job parameters. For details, see the section on "Service Discovery " in the *Data Flow Management section of the UCMDB Help*, and also the section on "Service Modeling" in the *Universal CMDB Browser Online Help*.
- **Service Discovery Activity Template.** Specifies parameter overrides for selected jobs of the Service Discovery activity. For details, see the section on "Service Discovery " in the *Data Flow Management section of the UCMDB Help*.

Query

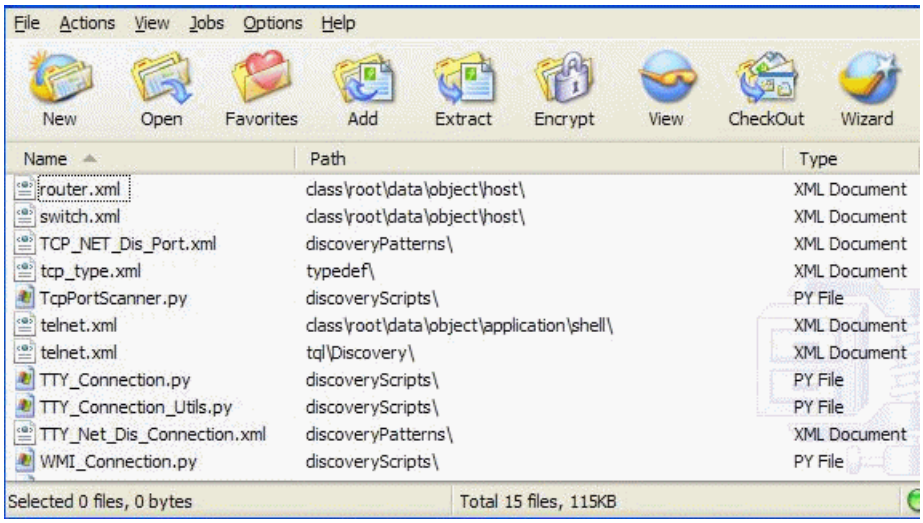
- **Queries**. The TQL queries defined in the TQL Editor in the Modeling Studio. For details, see "Topology Query Language" in the *Modeling section of the UCMDB Help*.
- **Views**. The views defined in the View Editor in the Modeling Studio. For details, see "View Formats" in the *Modeling section of the UCMDB Help*.
- **Enrichments**. The Enrichment rules defined in the Enrichment Manager. For details, see "Enrichment Manager" in the *Modeling section of the UCMDB Help*.
- **Impact Rules**. The Impact Analysis rules. For details, see "Impact Analysis Manager" in the *Modeling section of the UCMDB Help*.
- **Policies.** The policies used in Universal CMDB Configuration Manager. For details, see "Policies" in the *Configuration Manager section of the UCMDB Online Help*.

Package Zip File Contents and Format

The package's resources are stored in the . To export a package from system to system, you use the Package Manager interface (for details, see "Package Manager Page" on page 213). Package Manager creates a zip file containing the resources to enable the export of the resources.

When you export resources from the Package Manager to your local directory, the resource definitions are stored in various formats, for example, XML format.

In the sample **Network.zip** below, the **router.xml** file contains a Router CIT definition and the **Switch.xml** file contains a Switch CIT definition.



Packages for Integration Adapters

You deploy Integration adapters by creating a package and placing them in the appropriate folder. For details, see "Add an Adapter for a New External Data Source" in the *Developer Reference section of the UCMDB Help*.

How to Use the JMX Console to Perform Package Manager Tasks

This section describes the Package Manager tasks you can perform using the JMX console.

> **Note:**
>
> - It is recommended that you use the Package Manager to perform these tasks instead of the JMX console.
> - View Package Deployment History cannot be performed by the Package Manager.

This section includes the following tasks:

- "Deploy a Package" on the next page
- "View Package Deployment History" on the next page
- "Undeploy a Package" on page 211
- "Display Currently Deployed Packages" on page 211

- "Export Packages" on the next page
- "Package Name Rules" on page 212

Deploy a Package

Follow these steps to deploy a package using the JMX console.

1. Launch your Web browser and enter the following address: **https://<server_name>:/jmx-console**, where **<server_name>** is the name of the machine on which is installed.
2. Under **UCMDB**, click **UCMDB:service=Packaging Services** to open the JMX MBEAN View page.
3. Locate **deployPackages**.
4. In the **Value** box for the parameter **customerID**, enter the <customer id>.
5. In the **Value** box for the parameter **dir**, enter the name of the folder that contains the package's zip file. Ensure that you include the full path to the folder.

   > **Note:** To deploy the package from the **basic_packages** directory, leave this box empty.

6. In the **Value** box for the parameter **packagesNames**, enter the name of the packages.
7. Select **True** to override job configurations changed in Universal Discovery.
8. Click **Invoke** to deploy the package.

View Package Deployment History

Each time you deploy packages, a report is created displaying the deployment status of those packages. Use the JMX console to view the deployment status report.

1. Launch the Web browser and navigate to: **http://<server_name>:/jmx-console**, where **<server_name>** is the name of the machine on which is installed.
2. Under **UCMDB**, click **UCMDB:service=Packaging Services** to open the JMX MBEAN View page.
3. Locate **displayResourcesDeploymentHistory.**
4. In the **Value** box for the parameter **customerID**, enter the <customer id>.
5. In the **Value** box for the parameter **reportNum**, enter the number of the report you want to view.
6. Click **Invoke** to view the deployment status report of the packages.

Undeploy a Package

Follow these steps to undeploy a package using the JMX console.

1. Launch the Web browser and navigate to: **https://<server_name>:/jmx-console**, where **<server_name>** is the name of the machine on which is installed.
2. Under **UCMDB**, click **UCMDB:service=Packaging Services** to open the JMX MBEAN View page.
3. Locate **undeployPackages**.
4. In the **Value** box for the parameter **customerID**, enter the <customer id>.
5. In the **Value** box for the parameter **packagesNames**, enter the name of the package you want to remove.
6. Click **Invoke** to undeploy the package.

Display Currently Deployed Packages

Follow these steps to display currently deployed packages using the JMX console.

1. Launch the Web browser and navigate to: **https://<server_name>:/jmx-console**, where **<server_name>** is the name of the machine on which is installed.
2. Under **UCMDB**, click **UCMDB:service=Packaging Services** to open the JMX MBEAN View page.
3. Locate **displayDeployedPackages.**
4. In the **Value** box for the parameter **customerID**, enter the <customer id>.
5. In the **Value** box for the parameter **packagesNames**, specify the names of the packages you want to display.
6. Click **Invoke** to display the packages that are currently deployed.

Export Packages

Follow these steps to export resources from the to the server on which is installed using the JMX console.

1. Launch the Web browser and navigate to: **https://<server_name>:/jmx-console**, where **<server_name>** is the name of the machine on which is installed.

2. Under **UCMDB**, click **UCMDB:service=Packaging Services** to open the JMX MBEAN View page.
3. Locate **exportPackages**.
4. In the **Value** box for the parameter **customerID**, enter the <customer id>.
5. In the **Value** box for the parameter **packagesName**, enter the name of the package you want to export.
6. In the **Value** box for the parameter **outputDir**, enter the name of the folder on the server to which you want to export the package's zip file. Ensure that you include the full path to the folder.
7. In the **Value** box for the parameter **userOnly**, select one of the following:
   - **True**. Export only the custom packages.
   - **False**. Export both custom and factory packages.
8. Click **Invoke** to export the package.

Package Name Rules

The rules for entering a package name are as follows:

- Wildcard characters (*) are not supported.
- The package name is case sensitive.
- The package name must have a **.zip** extension.
- When deploying more than one package, separate the packages names by commas.

Package Manager User Interface

This section includes (in alphabetical order):

Content Overview

This page allows you to view the main information of a package.

To access the Content Overview page, open a package, and you can view its content overview.

The following table describes the user interface elements on the Content Overview page:

UI Element (A-Z)	Description
Build Number	The build number of the package.
Category	The category of the package.
Description	The description of the package.
Last modified	The time and date on which the package was last modified.
Version	The version of the package.

Filter Menu

This option allows you to display only specific packages on the Package Manager page.

To access the Filter menu, click the **Filter** button on the Package Manager page.

The following table describes the user interface elements on the Filter Menu page:

UI Element (A-Z)	Description
+ ADD TO LIST	Click the **Add To List** button, to save the filter condition.
APPLY	Click **Apply** to filter the task list according to your selections.
CANCEL	Click **Cancel** to cancel your selections.
Condition	Click the drop-down list and select the required operator. For details, see "Attribute Operator Definitions" in the *Modeling section of the UCMDB Help*.
Field	Filter the task list according to any of the visible columns.
Value	Click inside the box and enter the required value.
Filter List	Displays the filter conditions that were selected. **Note:** To remove a filter condition added to the list, click .

Package Manager Page

This page allows you to create a package out of existing resources or edit an existing package to suit your IT management needs.

To access the Package Manager page, go to CMS UI, click the menu icon ( ) on the upper left corner to expand the CMS Modules pane, and then click **Package Manager**.

> **Important:** The Package Manager module requires CMS UI2018.08 or later, and UCMDB server 2018.08 or later.

The following table describes the user interface elements on the Package Manager page:

UI Element (A-Z)	Description
	CMS Modules. Opens the CMS Modules panes, and allows you to navigate through the available web-based CMS modules. For details on available modules, see the *Universal CMDB Home Help*.
<username>	**<username>.** Displays the current user that logs in to CMS UI. Clicking it allows you to log out of the CMS UI.
	Help. Opens the Help menu: • **Help.**Opens the Package Manager Help page. • **Online Help for CMS UI.** Opens the online help for the current CMS UI version available on the Micro Focus Software Information Portal. • **Online Help for UCMDB Server.** Opens the online help for the current UCMDB Server version available on the Micro Focus Software Information Portal. • **Online Help for Content Pack.** Opens the online help for the current Content Pack version available on the Micro Focus Software Information Portal. • **About.** Opens the About dialog box. The **ABOUT** tab provides version, patch (if available), copyright, and third-party notice information. For more information, see "About Window" on page 122. The **LICENSE** tab provides license information, including license status, license summary, and a license status link. Clicking the license status link opens the license summary report, which contains license consumption summary and available licenses, and a link that allows you to export a detailed license consumption report. For more information about licenses, see "Universal Discovery Licensing Overview" on page 422. Clicking **OK** exits the About window.
+ CREATE PACKAGE	**Create custom package.** Enables you to create a package out of existing resources. Opens the **Create Package** menu. For details, see "How to Create a Custom Package" on page 219.

UI Element (A-Z)	Description
INSTALL PACKAGE	**Install Package.** Enables you to upload and install a Package. In the **Select file for upload** field, select the required Package from your local file system to upload and install on the server. **Content Pack.** Enables you to upload and install a Discovery and Integrations Content Pack. In the **Select file for upload** field, select the required content pack from your local file system to upload and install on the server. For details, see "How to Install/Deploy a Discovery and Integration Content Pack" on page 223 **Note:** Only the content packs that are located in the **C:\UCMDB\UCMDBServer\content\content_packs** can be installed on the server. If the required content packs are not located in the **C:\UCMDB\UCMDBServer\content\content_packs**, you have to upload them first, using the **Upload** button.
	Export Package List. Enables you to generate a report which contains a list of packages that are deployed in the system, or a list of filtered packages. Choose the export format for the table data from the drop-down list. The available options are: • **CSV**. • **XLS.** The table data is formatted as an Excel (.xls) file that can be displayed in a spreadsheet. • **PDF.** The table data is exported in PDF format.
Packages	Displays a list of existing packages.
Resources	Displays a list of existing resources.

Packages Page

This page allows you to view the list of existing packages. Also, you can select existing packages and perform bulk actions on them.

To access the Packages page, click the **Packages** tab on the Package Manager page.

The following table describes the user interface elements on the Packages page:

UI Element (A-Z)	Description
	Find. Enables you to search for a package by its name. Type a keyword in this field to search within the list. All the packages with the name that matches the keyword are displayed below.

UI Element (A-Z)	Description
	Filter. Opens the **Filter** menu. You use the **Filter** menu to show only the packages you want displayed on the Package Manager page. For details, see "Filter Menu" on page 213.
	Manage Visible Columns. Opens the **Manage Visible Columns** pane where you can select the columns you want to be displayed in the Package Manager page. By default, all the columns are selected. You can hide a column simply by deselecting it.
... 3	**Bulk Actions.** Enables you to perform bulk actions on the selected packages. The available options are: • **Undeploy.** Performs bulk undeploy on some or all of the selected packages. • **Delete.** Performs bulk delete for some or all of the selected packages. This action deletes the selected packages from the Package Manager while the resources from the packages remain in the system. • **Content Overview.** Enables you to view the resources included in the selected packages. • **Export.** Performs bulk export for some or all of the selected packages.
	Click to read a description of the package, as well as other relevant information.
Build Number	The build number of the package.
Category	The text you want to set as the category for the package.
Description	The description of the package, as displayed on the Package Properties page of the Create Custom Package.
Factory	A check mark that identifies the package as a factory package. **Note:** A factory package indicates a default package that is deployed with the installation.
Name	The name of the package.
Sort by	Enables you to sort the packages according to any of the visible columns, either upward or downward, using the arrows. Sorting is done by default using the Name field in ascending order.
Version	The version of the package (the UCMDB version or the content pack version).

Package Properties

This option allows you to edit an existing package.

To access the Package Properties page, open a package, and then select the **Package Properties** item to edit an existing package.

The following table describes the user interface elements on the Package Properties page:

UI Element (A-Z)	Description
Package Build Number	The build number of the package.
Package Category	A text for any notes you want to associate with the package.
Package Description	A description of the package.
Package Name	The name of the package. **Note:** The package name cannot be edited.

Resources Page

This page allows you to view the list of existing resources.

To access the Resources page, click the **Resources** tab on the Package Manager page.

The following table describes the user interface elements on the Resources page:

UI Element (A-Z)	Description
	Find. Enables you to search for a resource by its name. Type a keyword in this field to search within the list. All the resources with the name that matches the keyword are displayed below.
	Filter. Opens the **Filter** menu. You use the **Filter** menu to show only the resources you want displayed on the Package Manager page. For details, see "Filter Menu" on page 213.
	Manage Visible Columns. Opens the **Manage Visible Columns** pane where you can select the columns you want to be displayed in the Package Manager page. By default, all the columns are selected. You can hide a column simply by deselecting it.
Added at	The time when the resource was added in the package.

UI Element (A-Z)	Description
Extension	The extension of the resource.
Package Name	The package that contains the resource.
Resource Name	The name of the resource.
Sort by	Enables you to sort the resources according to any of the visible columns, either upward or downward, using the arrows. Sorting is done by default using the Resource Name field in ascending order.
System Type	The type of the resource.
Version	The version of the package (the UCMDB version or the content pack version).

Resource Selection

This option allows you to add the required resources to the package, by selecting the required resources from the various resource types.

To access the Resource Selection page, open a package, and then select the **Resource Selection** item.

> **Note:** You can make multiple selections from each resource type.

The Resource Selection page contains two tabs:

- Manage Resources
- Package Content Overview

Manage Resources tab

This tab allows you to add the required resources to the package.

The following table describes the user interface elements on the Manage Resources page:

UI Element (A-Z)	Description
	Find. Enables you to find a resource in the list of resources.
Clear all	Clears all the selected resources.
<Resource types>	Contains the resource types from which you can choose the required resources to add to the package.

UI Element (A-Z)	Description
	For details of a list of the available resource types and their descriptions, see "Resource Types" on page 205.
Select all	Selects all the resources.

Package Content Overview tab

This tab enables you to view the resources included in the package.

The following table describes the user interface elements on the Package Content Overview page:

UI Element (A-Z)	Description
<Selected resources>	Displays the resources that were selected to be part of the package, divided by their type.

Work with Package Manager

How to Create a Custom Package

When you create a new package, you give the package a unique name and description, and then select the resources you want included in the package.

To create a custom package using existing resources, click the

button on the Package Manager page.

The following table describes the user interface elements on the Create Package page:

UI Element (A-Z)	Description
Package Build Number	The build number of the package.
Package Category	A text for any notes you want to associate with the package.
Package Description	A description of the package.
Package Name	The name of the package.

For example, you want to create a custom package. To do this, follow these steps:

1. Click the + CREATE PACKAGE button, enter the required information, and then click **Go and Manage Resources**.
2. Select the resources to be included in the package, and then click **Save**. To view the resources selected, click the **Package Content Overview** tab.

How to Deploy a Package

You can deploy some or all of a package's resources to the from your local directory. The package must be on your local directory in order to deploy its resources.

To deploy resources from packages on your local directory:

1. Click the INSTALL PACKAGE button to open the **Install Package** menu.
2. Click the **Install Package** tab.
3. Click the **Select file for upload** field, select a package zip file, click **Open**, and then click the UPLOAD button.
4. Select the resources that you want to deploy. All the resources are selected by default.
5. When you have selected all the resources you want to deploy, click **Deploy Selected**.

> **Note:** Every time a package related to a change in the class model is deployed or undeployed, a zip file is generated in the **runtime\log\packageage_reports\customer_1\classModel** folder. The zip file contains the class model file before the change, the class model file after the change, and the package deployment report.

How to Delete a Package

You can delete a package from the Package Manager page while the resources from the package remain in the system. The package that is deleted is removed from the list of packages on the Package Manager page.

To delete an existing package, open the package, and then select the **Delete Package** item.

For example, you want to delete a package called **MyPackage.zip** from the system. To do this, follow these steps:

1. Open the **MyPackage.zip** package.
2. Click the **Delete Package** item in the left pane.
3. Click the **Delete** button in the **Delete Package** page.

How to Delete Multiple Packages

You can delete multiple packages from the Package Manager page while the resources from the packages remain in the system. The packages that are deleted are removed from the list of packages on the Package Manager page.

To delete multiple packages, select the packages, click the button in the right corner, and then click the **Delete** item.

For example, you want to delete multiple packages from the system. To do this, follow these steps:

1. Select the required packages.
2. Click the button in the right corner.
3. In the **Bulk Actions** menu, click the **Delete** item.
4. Select the packages you want to delete.
5. Click the **Delete Selected Packages** button.

How to Export the Packages List

You can generate a report which contains a list of packages that are deployed in the system, or a list of filtered packages.

For example, you want to generate a report which contains a list of packages that are deployed in the system. To do this, follow these steps:

1. Click the button.
2. Select **Export all Packages**.
3. In the **Type** drop-down list, select the export format for the table data.
4. Click the **Export** button.

> **Note:** If you want to generate a report that contains a list of filtered packages, select **Export filtered packages** option.

How to Export a Package

You can export some or all of a package's resources, or a whole package to your local directory.

To export a package, open the package, and then select the **Export Package** item.

For example, you want to export only some of the resources contained in a package to your local directory. To do this, follow these steps:

1. Open the package.
2. Click the **Export Package** item in the left pane.
3. In the **Export Package** page, choose the **Export Resources Only** option.
4. Click the **Export** button.

> **Note:** If you want to export the whole package, click the **Export Whole Package** option, and then click **Export**.

How to Export Multiple Packages

To export multiple packages to your local directory, select the packages, click the ··· button in the right corner, and then click the **Export** item.

For example, you want to export multiple packages to your local directory. To do this, follow these steps:

1. Select the required packages.
2. Click the ··· button in the right corner.
3. In the **Bulk Actions** menu, click the **Export** item.
4. Select the packages you want to export.
5. Click the **Export Selected Packages** button.

How to Install/Deploy a Discovery and Integration Content Pack

Universal CMDB is released together with the latest version of Discovery and Integration Content Pack. You can install a later Content Pack release by performing the following procedure:

1. If the required Content Pack is available on the local file system of the UCMDB server, access the Package Manager module. Click INSTALL PACKAGE to open the **Install Package** menu.
2. Click the **Content Pack** tab.
3. Click EXPLORE CONTENT PACK, select the package's files, and then click **Install Selected**.
4. UCMDB begins to install the Content Pack.

   When installation is complete, a message is displayed with the results of the installation.
5. If the required Content Pack is not available on the UCMDB server, access it from the ITOM Marketplace site. To access the site: **Data Flow Management > UD Community**.
6. Download the zip file and extract it to an accessible location on your drive.
7. In the **Package Manager > Install Package > Content Pack** tab, click the **Select file for upload** field, select the required content pack from your local file system, click **Open**, and then click the UPLOAD button to add the content pack on the local file system of the UCMDB server.
8. Click EXPLORE CONTENT PACK, select the package's files, and then click **Install Selected**.
9. UCMDB begins to install the Content Pack.

   When the installation is complete, a message is displayed with the results of the installation.

How to Undeploy a Package

This option allows you to delete the resources from the system and to remove them from the selected package.

Important:

- When you undeploy a package, the resources are removed from the system, and from the other packages that contain these resources. You can restore the resources only when a package containing those resources is deployed.
- If you delete all the resources from the package, the package is automatically deleted and removed from the list of packages on the Package Manager page.

The following table describes the user interface elements on the Undeploy Package page:

UI Element (A-Z)	Description
	Find. Enables you to find a resource in the list of resources.
Clear all	Clears all the selected resources.
<Installed Resources>	Displays the resources contained in the selected package. Select the resources you want to delete from the system.
Select all	Selects all the resources.

For example, you want to undeploy a package. To do this, follow these steps:

1. Open the package.
2. Click the **Undeploy Package** item in the left pane.
3. In the **Undeploy Package** page, select all the resources.
4. Click the **Undeploy Package** button.

How to Undeploy Multiple Packages

To undeploy multiple packages, select the packages you want to undeploy, click the button in the right corner, and then click the **Undeploy** item.

The following table describes the user interface elements on the Bulk Undeploy page:

UI Element (A-Z)	Description
	Find. Enables you to find a resource in the list of resources.

UI Element (A-Z)	Description
Clear all	Clears all the selected resources.
<List of packages >	Displays the packages selected. Select the packages you want to delete from the system.
Select all	Selects all the resources.

For example, you want to undeploy multiple packages. To do this, follow these steps:

1. Select the packages.
2. Click the ··· button in the right corner.
3. In the **Bulk Actions** pane, click the **Undeploy** item.
4. Select the packages you want to undeploy.
5. Click the **Undeploy Selected Packages** button.

Probe Dashboard

The **Probe Dashboard** option in the CMS Modules navigation pane opens the Probe Dashboard module. It retrieves and displays real-time information about data flow probes and workflow/discovery jobs in a centralized view, allowing you to easily view all probes and jobs, and also drill down to probe and job details.

This section contains the following:

Probe Dashboard Overview 225
Probe Dashboard User Interface 226

Probe Dashboard Overview

> **Note:** The Probe Dashboard module is available for users with the **Show Status Snapshot** permission.

The Probe Dashboard module retrieves and displays real-time information about data flow probes and workflow/discovery jobs in a centralized view, allowing you to easily view all probes and jobs, and also drill down to probe and job details from CMS UI, without having to logging into the UCMDB server.

The snapshot of probes is automatically updated every 30 seconds, and the snapshot of jobs is automatically updated every 5 minutes.

Probe Dashboard User Interface

To access	Go to CMS UI, click the menu icon on the upper left corner to expand the CMS Modules pane, and then click **Probe Dashboard**.

Probe Dashboard window

User interface elements of the Probe Dashboard main window are described below:

UI Element (A–Z)	Description
	CMS Modules. Opens the CMS Modules, and allows you to navigate through the available web-based CMS modules. For details on available modules, see the *Universal CMDB Home Help*.
<username>	**<username>.** Displays the current user that logs in to CMS UI. Clicking it allows to log out of the CMS UI.
	Help. Opens the Help menu: • **Help.** Opens the Probe Dashboard Help page. • **Online Help for CMS UI.** Opens the online help for the current CMS UI version available on the Micro Focus Software Information Portal. • **Online Help for UCMDB Server.** Opens the online help for the current UCMDB Server version available on the Micro Focus Software Information Portal. • **Online Help for Content Pack.** Opens the online help for the current Content Pack version available on the Micro Focus Software Information Portal. • **About.** Opens the About dialog box. The **ABOUT** tab provides version, patch (if available), copyright, and third-party notice information. For more information, see "About Window" on page 122. The **LICENSE** tab provides license information, including license status, license summary, and a license status link. Clicking the license status link opens the license summary report, which contains license consumption summary and available licenses, and a link that allows you to export a detailed license consumption report. For more information about licenses, see "Universal Discovery Licensing Overview" on page 422.

UI Element (A–Z)	Description
	Clicking **OK** exits the About window.
	Search. Type keyword(s) in this field to search within the probes list. **Note:** The search is performed only on the **Probe Name** field.
	Filter. Opens the Filters pane, where you can filter the probes by selecting **All** or a specific status of the following fields as filters: • Connection Status • CPU Status • RAM Status • Hard Disk Status
	Choose Columns. Opens the Choose Columns pane, where you can select the columns to display. Required columns are selected by default.
<Pie chart view> section	The pie chart view section comprises of four charts: • Connection Status • RAM Status • CPU Status, and • Hard Disk Status By default the total count of probes is displayed in each pie chart. When you hover the mouse over a specific pie section, the probe count displayed in the pie chart varies accordingly. When you click a specific pie section, the table view section below the pie charts displays details about the corresponding probes accordingly.
<Table view> section	By default the table view section displays the following information about all probes. you click a specific pie section, the table view section display varies accordingly. • **Domain*.** Domain where a specific probe belongs to. • **Probe Name*.** Probe name. Clicking a probe name opens the probe details window. See "Probe Details window". • **Connection Status*.** Connection status of a specific probe with the UCMDB server: Active or Inactive. • **IP.** IP address of the probe. • **CPU Usage*.** CPU usage rate. • **RAM Usage*.** RAM usage rate. • **Hard Disk Usage*.** Hard disk usage rate. • **Unsent CIs.** Total count of unsent CIs. • **Total Discovered CIs.** Total count of discovered CIs.

UI Element (A–Z)	Description
	• **Running Jobs.** Count of running workflow/discovery jobs. • **Total Jobs.** Total count of workflow/discovery jobs. • **Active Workers.** Count of the active worker threads. • **Total Workers.** Total count of the worker threads. **Note:** * indicates a required column.

Probe Details window

Clicking a probe name in the Probe Dashboard table view section opens the probe details window, which displays details about the selected probe.

User interface elements of the Probe Details window are described below:

UI Element (A–Z)	Description
←	**Back to Dashboard.** Allows you to return to the Probe Dashboard window.
▽ / ▷	**Collapse / Expand.** Clicking a header with a **Collapse** or **Expand** icon allows you to collapse or expand a subsection in the probe details window.
<Probe Details> window	Displays the following information: • **Basic Information.** Basic information about the selected probe. • **Discovery Progress.** Discovery progress of the workflow/discovery jobs. • **Jobs.** Displays the following details about the workflow/discovery jobs: Job Name, Progress, Thread Number, Succeeded Triggers, Total Triggers, Previous Invocation, and Next Invocation. You can drill down to more details about a selected job by clicking the job row in this section to opens the Probe Details pane in the right side of the window. For more details, see "<Job Details> pane". • **Discovery Result.** Discovery result of CIs returned by all the jobs, including CI Type, total count of CIs and CIs created, updated, or removed.
<Job Details> pane	You can access this pane by clicking a job row in the **Jobs** section of the Probe Details main window. The Probe Details pane comprises of the following sections:

UI Element (A–Z)	Description
	• **Basic Information.** Basic information about the selected job. • **Job Progress.** Progress of the selected job. For a discovery job, a progress bar is displayed. For a workflow job, specific workflow steps are displayed. • **Job Schedule.** Schedule information about the selected job. • **Discovery Result.** Discovery result of CIs returned by the selected job, including CI Type, total count of CIs and CIs created, updated, or removed.

Reports

The Reports module provides a method of displaying the data from views in a report format.

> **Tip:** To view a query in a report format, use the following URL: **http://<server_name>:<port>/ucmdb-browser/ucmdb_widget.jsp?server=<ucmdb-server>&locale=en#isQuery=true;tab=reports;report=<queryName>**

To access the Reports module, use one of the following methods:

- In CMS UI, click the **Menu** icon ( ) to expand the CMS Modules pane, and then click **Reports**.
- In CMS UI, click the **Menu** icon ( ) to expand the CMS Modules pane, and then click **UCMDB Browser**. In the UCMDB Browser module, click **Reports**.

The Reports module is divided into two sections:

Reports Dashboard

The Reports dashboard is divided into two sections:

- **Basic Reports**

  Basic reports list the CIs for a main and related CI type that you select. Each thumbnail includes:

  - The Report's name
  - The Report's icon

- The Report's description
- The Report's labels

Hovering your mouse over a Basic report allows you to access the following:

- **Execute Report**
- **Delete Report**
- **Edit Description**
- **Labels**

You can create Basic reports in the UCMDB Browser module.

> **Note:** You must be assigned the permission to create views and queries in UCMDB in order to create basic reports in the UCMDB Browser module.

- **Topology Reports**

  This section displays the 20 most visited topology reports. Each thumbnail includes:

  - The Report's name
  - The Report's icon
  - The Report's description
  - The Report's labels

  Hovering your mouse over a Topology report allows you to access the following:

  - **Execute Report**
  - **Labels**

  Every view defined in the Modeling Studio in UCMDB has a corresponding topology report. UCMDB Browser reports are based on one of the following:

  - **Pattern views** - A pattern view is based on a particular TQL query that defines the structure of the view. When the view is displayed or refreshed, the Modeling Studio queries the CMDB for all elements that fit the query, and automatically updates the view with those elements.
  - **Templates** - A template is a view that is based on a reusable pattern view (template) and has defined parameters which are saved as part of the template. The view displays only those CIs and relationships that satisfy the query definition and the conditions of the template. You cannot schedule this type of report or change its parameters in the UCMDB Browser module.

  The report settings are defined in the view definition in Report mode in the Pattern View Editor. For details, see "Pattern View Editor" in the *Modeling section of the UCMDB Help*. You cannot create Topology reports in the UCMDB Browser module.

Reports Right Panel

The right panel allows you access the following features:

User interface elements are described below (unlabeled elements are shown in angle brackets):

UI Element (A-Z)	Description
<search reports> field	Allows you to search for reports by entering a keyword. **Note:** In the Reports module, the search field acts as a filter for the reports.
CATEGORIES-LABELS switch	Allows you to switch between the Labels view and the Categories view. **CATEGORIES view** Displays the reports available in tree mode. **LABELS view** In the Labels view of the Reports module, you can quickly locate a group of reports that have certain labels. UCMDB administrators can manage the labels and assign labels to reports. To switch to the Labels view, click the CATEGORIES-LABELS switch at the top-right corner in the **Reports** tab. The right pane then lists all the labels. The Labels view works in the following manner: • If you do not select any label, the left pane displays all the reports. • If you select one or multiple labels, the left pane only displays the reports that have one of the selected labels. When a label is assigned to a report, the report icon shows the label name at the bottom. When a report has multiple labels and the icon cannot contain all the label names, a ... icon appears. You can click this icon to view all the labels assigned to the report. For more details about how to group reports with labels, see "Use labels to group reports" on page 245.
Expand button	Available in the **CATEGORIES** view only. Clicking the button expands the entire tree view of reports.
Collapse button	Available in the **CATEGORIES** view only. Clicking the button collapses the tree view of reports.
Clear All button	Available in the **LABELS** view only. Clicking the button clears all labels.

UI Element (A-Z)	Description
	Refresh Reports button. Refreshes the reports.
	View Scheduled Reports button. Clicking the button opens the View Scheduled Reports pane. See "View scheduled reports" on page 242.
Create Label	Available in the **LABELS** view only. **Create Label**. When you click the button, a Label Name text field displays. To create a label, in the Label Name text field, enter the label name, and then click Create Label or press **Enter**.
Create Label	Available in the **LABELS** view only. **Create Label +**. Indicates you are in the process of creating a label. Click the button to confirm the label creation.
Manage Label	Available in the **LABELS** view only. **Manage Label**. Opens the **Manage Label** dialog box, where you can rename or delete labels. See "Rename or delete a label" on page 245.

Create a basic report

1. In the Basic Reports section of the Reports module, click . The Basic Report Wizard opens.
2. Enter a name (and optional description) for the report, and click **Next**.

   > **Note:**
   >
   > - The name cannot contain the following characters: **, ; & = @ % / **
   > - The description will appear in the report icon and at the top of the generated report.
   >
   > You can edit the description after you create the report. To do this, point to the report, and then click **Edit Description** from the context menu.

3. Select the main CI type that you want to appear in the report, and then click **Next**.

   To quickly locate a CI type, you can filter the list of CITs by entering a text string, or click one of the favorite CI types above the list.

4. (Optional) Select an attribute condition for the main CIT (including an operator and value) that you want to appear in the report. To add additional attributes, click **[+] Add attributes**. Click **Next** to

select a related CI type.

> **Note:**
>
> - When you select the first attribute condition for the main CI Type, if the attribute selected is **Display Label** and the operator is **Like case insensitive**, after you save the report, these selections will be removed from the **attribute conditions** list and the value you added will be displayed in the **Name** field.
> - When you use the **Contains** operator, the different values added to an attribute should be separated by comma. This is because the **Contains** operator supports only one value in the UCMDB, and in the UCMDB Browser module the different values that are added to an attribute are split into multiple conditions.
> - When you use the **In** operator, the different values added to an attribute should be separated by comma.

5. (Optional) Select a related CI type, and then click **Next**.

   To quickly locate a CI type, you can filter the list of CITs by entering a text string, or click one of the favorite CI types above the list.

   You can only include one related CI type in a report. If you click more than one related CI type, the last item you clicked is the one that will be included in the report. To clear this field completely, click **Deselect**.

6. (Optional) Select attributes for the related CI type (including an operator and value) that you want to appear in the report. To add additional attributes, click **[+] Add attributes**.

   > **Note:**
   >
   > - When you use the **Contains** operator, the different values added to an attribute should be separated by comma, and listed in one field. This is because the **Contains** operator supports only one value in the UCMDB, and in the UCMDB Browser module the different values that are added to an attribute are split into multiple conditions.
   > - When you use the **In** operator, the different values added to a string attribute should be separated by comma, and listed in one field.

7. When you are finished, click **Save**.

Create a report from search

1. On the main search page, click **Advanced Search**.
2. Select the main CI type that you want to appear in the report, and then click **Next**.

   To quickly locate a CI type, you can filter the list of CITs by entering a text string, or click one of the favorite CI types above the list.
3. (Optional) Select an attribute condition for the main CIT (including an operator and value) that you want to appear in the report. To add additional attributes, click **[+] Add attributes**. Click **Next** to select a related CI type.
4. (Optional) Select a related CI type, and then click **Next**.

   To quickly locate a CI type, you can filter the list of CITs by entering a text string, or click one of the favorite CI types above the list.

   You can only include one related CI type in a report. If you click more than one related CI type, the last item you clicked is the one that will be included in the report. To clear this field completely, click **Deselect**.
5. (Optional) Select attributes for the related CI type (including an operator and value) that you want to appear in the report. To add additional attributes, click **[+] Add attributes**.
6. Click **Search**.
7. In the left pane, click **Select Attributes for Report**. The **Select Attributes for Report** dialog box appears.
8. (Optional) select the specific attributes that you want to be included in the report.
9. Click **Apply and go to Reports**.
10. (Optional) Perform the following steps if you want to save the report for later use:

    a. Click **Save Report** .

    b. Enter a report name and optional description, and then click **Save**.

    The report is added to the basic reports.

Open a report

> **Note:** To open a report, you can either select the report, or click the ▶ **Execute Report** option that

> appears when you hover the mouse over the report.

1. In the Reports tab, select the basic report to open.
2. Click ▶ **Execute Report**

The following actions are available in an opened report:

- **Delete Report** ✕
  > **Note:** **Delete Report** ✕ action is available only for the basic reports.
- **Save Report**
- **Select Attributes for Report**
- **Schedule Report**
- **Exports Results**
- **URL to Report**

The following features help you quickly locate an item in the opened report:

- **Expand All**: Click this button to expand all Related CIs.
- **Collapse All**: Click this button to collapse all Related CIs.
- **Search Results**: Type the keyword in this field and then press **Enter** to search within the generated report.
  > **Note:** The search is performed only on the **Display Label** field.

You can change the order of the columns in a report by dragging them to the desired position.

> **Note:** If you move the **Display Label** column and you save or export the report, the **Display Label** column restores to its initial position.

Generate a report

> **Note:** You can generate only the template-based topology reports.

1. In the Reports tab, select the template-based topology report that you want to generate.
2. Click **Generate Report** ▶.

The content of the report is generated according to the template that is specified in UCMDB. You can specify parameters for the included CIs that will be included in the generated report. To return to the default parameters, click **Reset parameters to default**.

The following actions are available in a generated report:

- **Generate Report**
- **Reset parameters to default**
- **Save Report**
- **Select Attributes for Report**
- **Schedule Report**
- **Exports Results**
- **URL to Report**

The following features help you quickly locate an item in the generated report:

- **Expand All**: Click this button to expand all Related CIs.
- **Collapse All**: Click this button to collapse all Related CIs.
- **Search Results**: Type the keyword in this field and then press **Enter** to search within the generated report.

> **Note:** The search is performed only on the **Display Label** field.

Edit a report

1. In the Reports tab, select the basic report that you want to edit.
2. Do one or more of the following:
   - To change the main or related CI type, click the name of the existing CI type.
   - To change attributes, click **Edit attribute conditions** next to the main or related CI type.
3. When you are finished, click **Save**.

Delete a report

1. In the Reports tab, select the basic report that you want to delete.
2. Click **Delete Report** ✕. A confirmation message appears.
3. Click **OK** to delete the report.

> **Note:** To delete a report, you can also hover the mouse over the report and click the ✕ **Delete Report** option.

Select content to be displayed in a report

1. In the Reports tab, select the report (basic or topology) that you want to configure.
2. (Optional) **Select Attributes for Report** to select the specific attributes that you want to be included in the report.

   You can select attributes from the tabs that represent the CI Types in the selected report.

   - To include all attributes in the report, click ».
   - To include a specific attribute in the report, select it in the left pane and click ›.
   - To remove a specific attribute from the report, select it in the right pane and click ‹.
   - To remove all attributes from the report, click «.
3. In the Attribute Order tab, select an attribute and use the up or down arrows to change the display order in the report.

   > **Note:** The attribute order is kept as it is defined by its owner in the UCMDB UI.
   >
   > However, if a user changes the order in the UCMDB Browser module and saves it, the new order will be kept for the user who changed it (the changes are saved in the user preferences).
   >
   > You can revert the changes and you can view the attribute order as it is defined in the UCMDB UI, by clearing the user preferences as follows:
   >
   > a. Go to **JMX Console > UCMDB-UI:name=User Preferences > clearUserPreferences**.
   >
   > b. In the **user name** field, enter the user's name.

c. Click **Invoke**.

4. When you are finished, click **OK**.

Schedule a report

Note: Scheduled reports do not work properly in a high availability environment.

1. In the Reports tab, select the basic report or pattern view-based topology report that you want to schedule.
2. Click **Schedule Report** .
3. Enter the following information:

Field	Description
Recipients	Enter the email addresses to which the report should be sent. If there is more than one recipient, separate the entries with semicolons. The administrator has to add every domain name you need to use to a list of allowed domains. (For example, **mydomain.com**.) To add a domain name to the list of allowed domains, follow these steps: a. In UCMDB, go to **Administration > Infrastructure Settings Manager > UCMDB Browser settings**. b. In the Name column, choose **Scheduled Reports trusted email domains for UCMDB Browser**. c. In the Value column, enter the needed domain name. If there is more than one domain required, separate the entries with semicolons. For example, **mydomain.com**; **mydomain1.com**. To allow all the domains to be used, in the value column enter **;** (semicolon).
Templates	Select one of the available templates from the drop-down list. A predefined text message appears in the Email content field.
Email subject	Enter the subject line of the email.
Email content	Enter the text that will appear in the body of the email.

Field	Description
	Note: If you select an existing template, a predefined text message appears in the Email content field. You can either leave it as it is, or modify it.
Select report formats	Select one or more of the formats (XML, XLS, XLSX, PDF, or CSV) of the attachments that will be included when the report is sent. By default, all formats are included.
Select action to perform	Select one of the following options: ◦ **Save to disk** In **Administration > Infrastructure Settings Manager > UCMDB Browser Settings> Scheduled Reports Save Folder for UCMDB Browser** setting, specify the destination folder for the exports of the scheduled reports. The full path name must be specified, beginning with the drive letter (absolute path). **Note:** • The destination folder is on the CMS UI machine, not on the local (user's) machine. The report will be saved in the sub-folder named after the user who scheduled the report. • After changing the default value, you must log in again in CMS UI for the change to take effect. • If a path is not specified, the **Save to Disk** option will be grayed out. ◦ **Send email**. The report will be sent by email.
Repeat	Select the frequency at which the report will be generated: ◦ **Once**. The report will be sent at once, with no delay. ◦ **Interval**. The report will be sent at a specific interval. You must specify the interval in minutes (0-59 minutes). ◦ **Hourly**. The report will be sent once per hour. You must select the minute (0-59 minutes). ◦ **Daily**. The report will be sent once per day. You must select the hour (0-23 hours) and minute (0-59 minutes). ◦ **Weekly**. The report will be sent once per week. You must select the hour (0-23 hours), minute (0-59 minutes), and day of the week. ◦ **Monthly**. The report will be sent once per month. You must select the day (1-31), hour (0-23), and minutes (0-59 minutes).

Field	Description
	> **Note:** If you select 31 as the day for the report to be sent, it will be sent only in months that contain 31 days (that is, only 7 times per year). To schedule reports to be sent on the last day of the month, use the Cron scheduling option. ◦ **Cron**. You can use a Cron expression to schedule a job. For more information, see "Cron Expressions" in the *Data Flow Management section of the UCMDB Help*, or http://quartz-scheduler.org/documentation/quartz-2.x/tutorials/crontrigger.
Exclude weekends	Select this checkbox to prevent the report from being sent on weekends. To specify the days of the week that are weekend days, in UCMDB, go to **Administration > Infrastructure Settings Manager > UCMDB Browser Settings** and set the **Days of the weekend** setting.

4. When you are finished, click **OK**.

How to create an email template

As an administrator, you can save the email content as a template, and then other users can reuse it at any time.

To create an email template:

1. Enter the text that will appear in the body of the email.
2. Enter the name in the Template name field.
3. Click the **Save** button.

   The newly created template is added in the Templates drop-down list.

   > **Note:**
   > ◦ You can delete a template by clicking the **Delete** button.
   > ◦ You can also update an existing template, by modifying the text message, and then clicking the **Save** button. The email content of the reports that are already scheduled will not be updated.

Specify the maximum number of templates that can be created

By default, the number of templates that can be created is limited to 100. To modify the value, follow these steps:

1. Go to **JMX Console > UCMDB:service=Settings Services > setSettingValue**.
2. In the **name** field, enter **ucmdb_browser.number_of_allowed_templates**.
3. In the **value** field, enter the value of the maximum number of templates that you want to be created.
4. Click **Invoke**.

Specify the maximum number of allowed emails that can be sent

By default, the number of emails that can be sent per second by an user is limited to five. To modify the value, follow these steps:

1. In UCMDB, go to **Administration > Infrastructure Settings Manager > UCMDB Browser settings.**
2. In the **Name** column, choose **Number of allowed emails**.
3. In the **Value** field, enter the value of the maximum number of emails that you want to be sent per second by an user.
4. Click **Save**.
5. Log out from CMS UI, and then log in again for the change to take effect.

> **Note:** The change takes effect according to the time set in one of the following settings:
>
> - **Time for which information in the Browser cache is valid**
> - **Time for which UCMDB Settings in the Browser cache is valid**
>
> For more information, see "Settings affecting overall system operation".

How to use Extended Simple Mail Transfer Protocol (ESMTP)

The email transfer mechanism uses Extended Simple Mail Transfer Protocol (ESMTP), which allows you to send emails to a server that requires secure connection.

To send an email using ESMTP:

1. In UCMDB, go to **Administration > Infrastructure Settings Manager > Mail Settings.**
2. Configure the following mail settings as described in the table below:

Activate TLS/SSL connection	If SMTP server requires secure connection via TLS/SSL then the value should be **True**, and UCMDB client properly configured. For instructions on how to configure UCMDB client, see "How to

	Configure the UCMDB Mail Server" in the *Administer section of the UCMDB Help*. Else if SMTP server accepts non-secure connection, the value should be changed to **False**.
SMTP server	Enter the address of the SMTP server.
SMTP server port	Edit the SMTP server port. The default value is **25**.
The username of SMTP server	Enter the user name of the primary SMTP server. If no authentication is required, leave this filed empty.
The password of SMTP server	Enter the password of the primary SMTP server. If no authentication is required, leave this filed empty.

3. Go to the UCMDB Browser module, and then follow the steps described in the "Schedule a Report" section.

> **Caution:** If SMTP server requires secure connection via TLS/SSL but the **Activate TLS/SSL connection** setting is set to **False**, the email is not sent and the following error message appears after 10 minutes: "An error has occurred, check server logs". If this happens, set the **Activate TLS/SSL connection** setting to **True**.

View scheduled reports

1. To view all the scheduled reports, click **View Scheduled Reports** in the Reports tab.
2. If you are an administrator, select one of the following:
   - **Mine.** Displays all scheduled reports for the currently logged-in user.
   - **All**. Displays all scheduled reports, grouped by user.

The scheduled reports view contains the following columns:

- Report Name
- Schedule Owner
- Current Status
- Last Execution Time
- Last Execution Status
- Next Execution Time

When viewing the scheduled reports, you can perform the following tasks:

- **Sort scheduled reports by column title**

  To do this, hover the mouse over a column title, click the down arrow , and then select **Sort Ascending** or **Sort Descending**.

- **Filter scheduled reports by column title**

  To do this, hover the mouse over a column title, click the down arrow , and then hover over **Filters** to display the filters that are available for that column. Available filters are displayed in the following table.

Column	Filters available	Description
Report Name	Custom text	Enter the desired text in the text box.
Schedule Owner	Custom text	Enter the desired text in the text box.
Current Status	○ Completed ○ Pending ○ Paused ○ Running	Select one or more filters.
Last Execution Time	○ Before ○ After	After selecting a filter, click the calendar icon to specify a date.
Last Execution Status	○ Success ○ Failure ○ None	Select one or more filters.
Next Execution Time	○ Before ○ After	After selecting a filter, click the calendar icon to specify a date.

  To clear a filter, hover the mouse over the filtered column title, click the down arrow , and then clear the **Filters** checkbox. To clear all filters, select the **Clear filter** icon ( ).

- **Delete a job**

  To do this, select the desired job, and then select the **Delete Job** icon ( ). Note that you cannot delete a currently running job.

- **Run a job**

  To do this, select the desired job, and then select the **Run Now** icon ( ). Note that you cannot run a currently running job.

- **Pause a job**

  To do this, select the desired job, and then select the **Pause Job** icon ( ). To resume a paused job, select the **Resume Job** icon ( ).

- **Refresh the list of jobs**

  To do this, select the **Refresh** icon ( ).

Export a report

1. Select the report (basic or topology) that you want to generate.
2. Click **Export results** .
3. Select the desired export format (XLS, XLSX, CSV, PDF, or XML). The report is exported in the selected format.
4. Click **Open**, **Save**, or **Cancel**.

Note:

- You can cancel the export of a report by clicking the button. The cancel button remains active while the export is in progress, even if you navigate to another module. Thus, you can cancel the export when you return to the respective report in the Reports module.
- In the reports that are exported to XLS, XLSX, and CSV, the **'** character is added in front of any CI attribute name that begins with one of the following characters: **@ + - =**.

Link to a report

1. Select the report (basic or topology) to which you want to link.
2. Click **URL to Report** .
3. Select one of the following:
   - **Copy URL**. Opens the **URL to Report** dialog box. Select the URL and click **Control+C** to copy the link to the clipboard.

     To send reports from other Micro Focus applications, use the following URL formats:

- For pattern-based reports:

  <*domain*>/ucmdb_browser.jsp#report=<*ReportName*>;tab=reports

- For template-based reports:

  <*domain*>/ucmdb_browser.jsp#report=<*ReportName*>&<*param1*>=<*value1*>&<*param2*>=<*value2*>&<*paramn*>=<*valuen*>;tab=reports

> **Note:** The **'tab=reports'** section may appear either before or after can be before or after **report.**

- **Email link**. Opens an email that contains a link to the report.

Use labels to group reports

Administrators can use labels to group related reports.

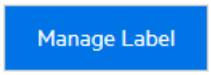
Create a label

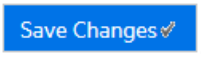
1. In the **Reports** tab, switch to the **LABELS** view.
2. Click **Create Label**

.
3. In the Label Name text field that displays, enter the label name, and then click

or press **Enter**.

Rename or delete a label

1. In the **Reports** tab, switch to the **LABELS** view.
2. Click **Manage Label** 

. The **Manage Label** dialog box appears.
3. Perform the following actions to rename or delete a label:
   - To rename a label, click **Rename**, enter the new label name, and then click **Save Changes** 

.

- To delete a label, click **Delete**.

4. Click **OK**

.

Assign labels to a report

1. In the **Reports** tab, point to the report that you want to label.
2. Point to **Labels** in the context menu, and then click one or multiple labels in the label list that appears.
3. Move the mouse out of the context menu.

> **Note:** You can assign labels to a topology report only when the topology report appears under the **Topology Reports** section.

Remove labels from a report

1. In the **Reports** tab, point to the report.
2. Point to **Labels** in the context menu, and then clear the checkboxes before the assigned labels.
3. Move the mouse out of the context menu.

Resource Manager

The **Resource Manager** option in the CMS Modules navigation pane opens the Resource Manager module, which enables you to quickly search and consume various UCMDB resources in one place.

This section contains the following:

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Resource Manager Overview

The web-based Resource Manager module is designed to allow users to quickly search and consume various UCMDB resources in one central place. You can search for a specific UCMDB resource that is supported to be consumed in the web-based modules accessible in CMS UI.

Compared to the traditional UCMDB UI, there is no longer the need for you to switch between Views and Query tree in the **Modeling > Modeling Studio** module to search for a view and a query.

You can consider the Resource Manager module as a search engine for UCMDB resources. The search scope for different roles is determined by the privileges each role has. If you are an ADMIN, you can search for any UCMDB resource; If you are a consumer, you can search only the resources that you have rights for.

The Resource Manager is easily accessible anywhere in the CMS UI through the top search bar with dedicated filters available for each supported resource type for accurate results.

This release supports the following resources types:

- **Queries.** Including Views, Integrations, Discovery, Templates, Perspectives, Impact Analysis, Enrichments.
- **Views.** Including Pattern Views, Templates, Perspectives, Perspective Based Views, Template Based Views, Dynamic Widgets, Automation Flow Mapping, and Basic Reports.
- **Models.** CI Types with the **SERVICE_MODEL** qualifier. By default, the following CITs can be searched: BusinessApplication, BusinessService, InfrastructureService.

Users can only focus on the resources they have permissions.

After locating a resource, if the resource is a view or a query, users can open it in topology map; if a model, then users can open it in the Service Modeling model if users have the required permissions for the corresponding modules.

How to Search and Consume Resources in Resource Manager

This chapter describes how to search and consume resources (views, queries, and models) with the Resource Manager module.

> **Note:** Users who search and consume various resources in the Resource Manager module need the corresponding permissions for the resources and the modules they access.
>
> If users do not have enough general action permissions, an error message will pop up asking them to check the logs for details about which permission is missing.

Prerequisites

For non-admin users who need to access the Resource Manager module, the administrator needs to assign them the following permissions:

1. In UCMDB UI, go to **Security > Roles Manager**.
2. In the Roles pane, select the role for the target users, then in the General Actions tab pane for the role, select the following actions in the Available Actions pane and move them to Selected Actions pane:
   - Data Retrieval Actions > Run Query by Definition
   - System Access Actions > Access to SDK
   - Configuration Management Actions > Deploy Packages
3. In the Resources tab pane for the role you selected, assign **View** permission for the desired view and/or query resources.

   > **Tip:** It is recommended to add desired view/query resources into resource groups, then associate **View** permission with the resource groups.

4. Save the change.

> **Note:**
>
> - A model is a CI, therefore non-admin users will get the same results as an admin user gets when navigating and searching models.
> - If a model is assigned to a user tenant (say, TenantA), while a non-admin user (for example, a user with view permission only) is not assigned to TenantA, then the non-admin user does not have the permission to search this model.

How to search resources with admin privileges

1. Log in to CMS UI as an admin user.
2. Expand the drop-down list to the right of the top search bar, select **Queries & Models** or **Views & Reports**, and then type a search string (for example **app**) in the search bar.

   Some auto suggestion strings pop up, select the desired string or press **Enter**.

> **Note:** If you selected **Views & Reports**, when hovering the mouse over an auto suggestion string, a quick open icon ( ) appears. Clicking the icon opens the selected resource in Topology Map directly.

3. Search results display in two columns: **Name** and **Path**.

   The search results counts are displayed at the top of page.

4. Scroll down to load more resources. Every time you scroll down, 50 more results are loaded.
5. Click the **Filter** icon ( ) in the upper right corner of the window. The Filters pane opens.

   Select one or more query types, the resources displayed vary with the filters you selected.

   > **Note:** If you search in **Views & Reports**, the **Filter** icon displays in blue ( ), where filters of the View type are selected by default.

6. Click a folder name or **Path** of any resource, the resources under the folder or path display accordingly.
7. Click a breadcrumb. You are navigated to the corresponding folder.
8. Click the **Back** icon ( ). You return to the search result page.
9. Click the **Filter** icon ( ) in the upper right corner of the window. The Filters pane opens.
10. Select one or more view types, and type a string in the search bar to search view resources.

    Or, select the Model type, and type a string in the search bar to search model resources.

11. View a specific resource.
    - Click any query or view. The query or view opens in Topology Map.
    - Click any model. The model opens in Service Modeling.

    Click the **Close view** button ( ). You return to the Resource Manager.

How to search resources with limited user permission

1. Log in to CMS UI as a non-admin user.
2. Expand the drop-down list to the right of the top search bar, select **Queries & Models** or **Views & Reports**, and then type a search string (for example **app**) in the search bar.

   Some auto suggestion strings pop up, select the desired string or press **Enter** directly.

> **Note:** If you selected **Views & Reports**, when hovering the mouse over an auto suggestion string, a quick open icon (⚭) appears in the right. Clicking the icon opens the selected resource in Topology Map directly.

3. Search results limited by the user permission display in two columns: **Name** and **Path**.

   The search results counts display at the top of page.

4. Scroll down to load more resources. Every time you scroll down, 50 more results are loaded.
5. Click the **Filter** icon (▽) in the upper right corner of the window. The Filters pane opens.

   Select one or more query types, the resources that display vary with the filters you selected.

   > **Note:** If you search in **Views & Reports**, the **Filter** icon displays in blue (▽), where filters of the View type are selected by default.

6. Click a folder name or **Path** of any resource, the resources under the folder or path display accordingly.
7. Click a breadcrumb. You are navigated to the corresponding folder.
8. Click the **Back** icon (←). You return to the search result page.
9. Click the **Filter** icon (▽) in the upper right corner of the window. The Filters pane opens.
10. Select one or more view types, and type a string in the search bar to search view resources.

    Or, select the Model type, and type a string in the search bar to search model resources.

11. View a specific resource.
    - Click any query or view. The query or view opens in Topology Map.
    - Click any model. The model opens in Service Modeling.

    Click the **Close view** button (×). You return to the Resource Manager.

How to navigate Resource Manager with admin privileges

1. Log in to CMS UI as an admin user.

   Once logged in, you are on the CMS UI landing page.

2. Click the **CMS Modules** icon in the upper left corner, then in the **CMS Modules** navigation pane, click **Resource Manager**.

Root folders are displayed: Query, View, and Model.

3. Click the **Query** folder. Query resources display.

   In navigation mode, there is only one column: **Name**.

4. Expand a query resource and drill down.
5. Click a breadcrumb. You are navigated to the corresponding folder.
6. Click the **Filter** icon (▽) in the upper right corner of the window.

   The Query filters are expanded and displayed, with filters for other resource types collapsed and grayed out.

7. Click the **Back** icon (←). You return to the root folder.
8. Do the same for the **View** and **Model** folders.
9. View a specific resource.
   - Click any query or view. The query or view opens in Topology Map.
   - Click any model. The model opens in Service Modeling.

   Click the **Close view** button (×). You return to the Resource Manager.

How to navigate Resource Manager with limited user permissions

1. Log in to CMS UI as a non-admin user.
2. Click the **CMS Modules** icon in the upper left corner, then in the **CMS Modules** navigation pane, click **Resource Manager**.

   Root folders are displayed: Query, View, and Model.

3. Click the **Query** folder. Only the query resources that the user has permissions display.

   In navigation mode, there is only one column: **Name**.

4. Click the **Filter** icon (▽) in the upper right corner of the window.

   The Query filters are expanded and displayed, with filters for other resource types collapsed and grayed out.

5. Expand a query resource and drill down.

6. Click a breadcrumb. You are navigated to the corresponding folder.
7. Click the **Back** icon (←). You return to the root folder.
8. Repeat the same steps to navigate Views and Models.
9. View a specific resource.
   - Click any query or view. The query or view opens in Topology Map.
   - Click any model. The model opens in Service Modeling.

   Click the **Close view** button (×). You return to the Resource Manager.

Service Modeling

> **Note:** Service Modeling is supported on UCMDB 10.22 (or later) with Content Pack 18 (or later).

Service Modeling enables you to model the infrastructure of a business service. A service can be regarded as a perspective-based view on a particular CI. When the discovery process runs, relationships between a CI and its owner and a CI and its stakeholders are found, triggering additional rounds (also referred to as "hops") of discovery for those related CIs.

To access the Service Modeling module, use one of the following methods:

- In CMS UI, click the **Menu** icon ( ) to expand the CMS Modules pane, and then click **Service Modeling**.
- In CMS UI, click the **Menu** icon ( ) to expand the CMS Modules pane, and then click **UCMDB Browser**. In the UCMDB Browser module, click **Service Modeling**.

> **Note:**
>
> - The link for a consumer-provider relationship between CIs is indicated with a blue line; otherwise the link is indicated with a black line. Also, all the incoming and outgoing links for a selected CI are represented with bolded lines.
> - Previously created models in the UCMDB UI and in the UCMDB Browser module can now be opened from Service Modeling. This includes Instance Based Models, Pattern Based Models that do not contain the **@** character in the name, models created in the Service Discovery module in UCMDB UI, and models created through Assisted Modeling. The Discovery and Save Layer actions are disabled for these models.

You can model services, as well as run discovery and troubleshoot the discovery process. New service models are based on CI types that have the SERVICE_MODEL qualifier in UCMDB. After running discovery, you are able to view the discovered CIs in the context of that business service.

When you create a new service model in the UCMDB Browser module, a discovery activity and a perspective-based view with the same name are created in UCMDB, based on the **Service_template** perspective. In addition, when you create a template-based model, the view also contains the specific perspective that you select when you create the model.

You can also access the Assisted Modeling feature in the UCMDB Browser module through the Service Modeling module. For more information, see Assisted Modeling.

> **Note:**
>
> - To enable a user to access the Service Modeling module in the UCMDB Browser module, in the Roles Manager in UCMDB, click the General Actions tab and add the Service Modeling permission (in the Data Flow Management Actions group) to the selected role.
> - To enable a user to create service models, assign Create permission for at least one CI type that has the SERVICE_MODEL qualifier assigned to it.
> - Users who have only View permission for a CI (and not Edit permission) will view the topology map in read-only mode.
> - To enable access for a user to access a particular view, in the Roles Manager in UCMDB, click the Browser CI Access Control tab and assign View permission to that view.
> - To enable a user to run discovery in the Service Modeling module starting from a URL, in the Roles Manager in UCMDB, click the General Actions tab and add the **Run Discovery and Integrations** permission (in the Data Flow Management Actions group) to the selected role.

For more information about models, see the *Modeling section of the UCMDB Help*.

The Service Modeling module is divided into two sections:

1. **Service Modeling Dashboard**

   The Service Modeling dashboard displays existing service models. The last service model displayed automatically opens when you open the Service Modeling module.

   The Service Modeling Dashboard displays a thumbnail for each service model, grouped by the state at which the model was deployed. You can hide the service models from a specific group simply by clicking the group's name. Each thumbnail includes:

   - The name of the service model.
   - The CI type on which the service model is based.
   - The owner, if one exists for the service. If no owner exists, you can select one on the map by clicking {+} Add Owner.
   - An icon showing the business criticality, indicating the relative importance of the service to the business.

2. **Service Modeling Left Panel**

   In the left panel you can do one of the following:

   - Create a service model.
   - Start assisted modeling. For more information, see Assisted Modeling.

- Search for a service model by name.
- Filter the discovered models by owner.
- Expand or collapse the service models in the dashboard according to their state at which the model was deployed.

Quick Start

This chapter lists the most common tasks and introduces the general concepts to help you start using the Service Modeling module.

Required Setup of Service Modeling

See "Service Modeling Setup" on page 258.

How to Run Automated Service Modeling

See "Model a Business Service Starting from a Specific Entry Point" on page 260.

How to View the Topology Map

See the following topics:

- "Add Layers to an Existing Model" on page 269
- "Set Border Rules on a Link" on page 278
- "Simulate the Impact of a CI's Failure" on page 271

Providers and Consumers

You connect to providers using connection strings. For example, if an Oracle database is a provider, to connect to its services, you might need:

- The IP address of the machine
- The SID

- The TCP port

These three pieces of information would comprise the connection strings required by a consumer, which are needed to connect to a service offered by that provider. For example, an Oracle connection string could contain the following information:

- IP addresses: 1.1.1.1, 2.2.2.2
- Port: 1521
- SID: abcd

A consumer is aware of at least one connection string for a provider, and this connection string is found in a known location, such as a configuration document, a database table, Windows registry, and so on. By searching through these locations, dependencies between consumers and providers can be discovered.

If the connection strings of a provider are found in a certain configuration document, then the provider and the container of the configuration document are connected with a consumer-provider relationship.

Service Border Rule

You use service-border rules to define when one service ends and another one starts. These rules enable the discovery process to categorize consumer-provider relationships as either **internal** or **external**.

- An external consumer-provider relationship connects two components that belong to different business services.
- An internal consumer-provider relationship connects two components that belong to the same business service.

The discovery process can report this category for consumer-provider relationships, since it is populated as the value of an attribute of the consumer-provider relationship.

You can therefore define the service scope to be all the components reachable from the start-point component by a path made only of internal consumer-provider relationships (that is, only consumer-provider relationships labeled as internal).

While discovering a service's components, the discovery process halts when it reaches a new provider that is connected by an external consumer-provider relationship. This means that the discovery process does not discover a provider's neighbors. To enable this functionality, you must define service-border rules before you initiate the discovery process.

However, in many cases, you want to discover the service before defining the service-border-rules. You want to see which components make up the service, and only then define the service-border-rules for these discovered components. To limit the discovery process and prevent it from endlessly discovery neighbors of neighbors, use the Hop Limit setting when you create a Service Discovery activity.

Hop Limit

You use the Hop Limit setting to limit the discovery process and prevent it from endlessly discovering neighbors of neighbors.

The hop count for a CI in a topology map is the total number of steps along the path from the root of the map (Business Element) to the CI.

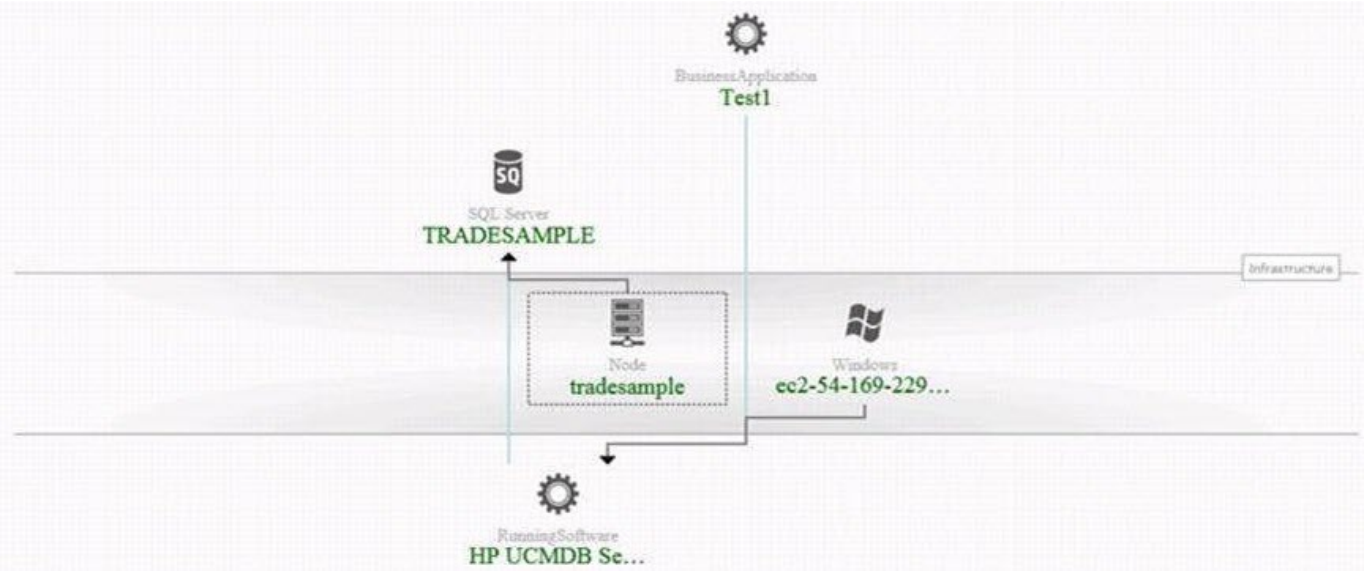
The discovery process halts when the discovery reaches a new provider and the hop count for this provider reaches the hop limit. This means that the discovery process does not discover the provider's neighbors.

When you create a Service Discovery activity in the UCMDB Browser module, the initial value of the hop limit is set to 10. You can edit the value in the UCMDB User Interface.

AWS RDS Tunnel Job

ASM supports Relational Database Service (RDS) deployed in Amazon Web Services (AWS). A new job AWS RDS Tunnel Job is introduced to correctly discover RDS database in AWS, allowing you to capture service models more accurately in AWS.

When a RDS Database CI is discovered by the AWS by Web Services job, the AWS RDS Tunnel Job will be triggered, which will then create an Ownership relationship between ServiceConnectionPoint and RDS Database CI, and then the Running Software Dependencies job will create a consumer-provider link. Below is an example of the final service map:



Supported Technologies

For the supported technologies of Automated Service Modeling (ASM), refer to *ASM Content Support Matrix* in the following document of the corresponding Content Pack that is deployed on the UCMDB Server:

Universal CMDB Discovery and Integrations Content Help

Service Modeling Setup

This chapter describes the necessary setup before running Service Modeling.

Set up the Data Flow Probes

- Verify that the Data Flow Probe is installed on a Windows machine

  > **Note:** The Data Flow Probe installed on a Linux platform is intended for the CMS Sync integration only, but not for discovery.

- Determine the network range of the network to be discovered

  > **Note:**

> - You must configure the probe's IP address in the probe range.
> - A Service Discovery activity will only try to connect to those IP addresses that may potentially be relevant for the discovered services, not to every IP address in the range. Make sure the network range is wide enough and contains all the IP addresses for your discovered services.

- Set the relevant credentials

  To enable the Data Flow Probes to connect to servers or applications using specific protocols, you must set the relevant credentials. Make sure the credentials have enough privilege; the root or root-equivalent privilege is highly recommended.

> **Note:** The Data Flow Probe tries to connect to a node by using each credential in turn. Universal Discovery then saves the successful credential. The next time the Data Flow Probe connects to this node, it first tries to connect using the successful credential.

Prerequisites

- The related credentials (NTCMD, SSH, and Universal Discovery Protocol) have been imported and verified.
- The load balancers are discovered.

  If the services to be discovered contain a load balancer, run the load balancer discovery before you discover any services.
- The lsof utility is installed on UNIX machines.

  The lsof utility can capture the TCP traffics between the discovered UNIX machines, and can check which process is listening on which port.
- The credentials have sudo permissions on UNIX machines.
- The web access management products are discovered.

  If the services to be discovered contain web access management products (such as WebSEAL), run the discovery jobs for them before you discover any services.
- The services are not deployed on Solaris Local Zone.

  Solaris Local Zone is not supported by ASM.
- The IIS Web Server should be IIS 7.0 (or later) on Microsoft Windows Server 2008 (or later).

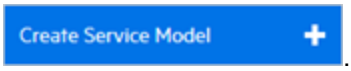
Using Service Modeling

This chapter introduces how to use the Service Modeling feature.

Model a Business Service Starting from a Specific Entry Point

This section introduces how to model a business service starting from a URL and from a Running Software CI.

Starting from a URL

1. In the **Service Modeling** tab, click 

.
2. From the **Choose Application Type** drop-down list, select **URL Entry Point**.
3. In the **IP-Port Entry Point** field, enter the address that is the starting point for the discovery activity.
4. Click **Check URL Availability** to verify that the address is available.
5. To further refine the model that will be created, you can click **More Properties (optional)** and define the following:

Field	Description
Name	Enter a name for the service model. For template-based models, a predefined name is assigned, consisting of the name of the CI on which the model is based and the type of the service.
Owner	Select an owner from the drop-down list. This list includes all CIs connected to the business service CI type with an Ownership relationship.
Stakeholders	Select a stakeholder from the drop-down list. This list includes all CIs connected to the business service CI type with a Usage relationship.
Business Criticality	Select the desired business criticality from the drop-down list. This attribute of the CI type indicates the relative importance of the service to the business. For more information, see "CI Type Manager Page" in the *Modeling section of the UCMDB Help*.

Field	Description
Type	Select a CI type from the drop-down list. By default, the BusinessApplication type is selected. This CI type represents the service on which the Service Model is based. Only CI types that have the SERVICE_MODEL qualifier assigned in the CI Type Manager in UCMDB appear in this drop-down list and can be used to model services.
Description	Enter an optional description for the model.
Category	Select a category for the model. Possible categories might be Draft, Test, Development, or Production.

6. When you are finished, click Start Modeling. This runs the service discovery activity in UCMDB (which is automatically created when you model a service) to discover the actual CIs that comprise the business service.

When you model a business service starting from a URL, the URL protocol of the Entry Point URL is **http://** or **https://**.

Starting from a Running Software CI

You can model a business service starting from a Running Software CI.

To do this, follow these steps:

1. Search for the Running Software CI that you want to use as the starting point.
2. In the search result, hover the mouse over the Running Software CI, click the icon, and then click **Create Service Model**.

   The **Create Service Model** page opens, and the **IP-Port Entry Point** drop-down list shows all the related **IpServiceEndpoint** of the Running Software CI.

   > **Note:** If the Running Software CI does not have any related **IpServiceEndpoint** CI, the **Create Service Model** page does not open and the following message pops up:
   >
   > `Service Discovery activity creation failed. Running software Ip-Port Entry Point not found.`

3. (Optional) Select an IP-Port entry point or type in a new IP-Port entry point.

By default, the **IP-Port Entry Point** field uses the most possible IP and port from all the related **IpServiceEndpoint** CIs. However, this value may be incorrect. In this case, you need to perform this step to specify the correct IP and port.

4. Click Start Modeling +.

When you model a business service starting from a Running Software CI, the URL protocol of the Entry Point URL is **rs://**.

Identify and Model Applications from Existing Data

1. In the **Service Modeling** tab, click Create Service Model +.
2. From the **Choose Application Type** drop-down list, select one of the available templates.

   > **Note:** To add a perspective-based view to this list of templates, add it to the UCMDB_Browser_Service_Modeling bundle as part of the TQL query definition in UCMDB.

3. Select one or more of the displayed CIs. You can filter the list of displayed CIs by typing a string in the **Quick Search** field.

   The CIs that are displayed in the list are the results of running a perspective-based view in UCMDB, but only the CIs that were returned by the contact node of the view. For example, if a view contains a Node (the contact node) connected to an IP address, only Node instances that are connected to IP addresses will appear in the list, and not all Nodes.

4. When you are finished, click Start Modeling +. The **Template Modeling** pane opens, which allows you to define properties for each of the models you are creating. You can change the following properties:

Field	Description
Name	Enter a name for the service model. For template-based models, a predefined name is assigned, consisting of the name of the CI on which the model is based and the type of the service.
Owner	Select an owner from the drop-down list. This list includes all CIs connected to the business service CI type with an Ownership relationship.

Field	Description
Stakeholders	Select a stakeholder from the drop-down list. This list includes all CIs connected to the business service CI type with a Usage relationship.
Business Criticality	Select the desired business criticality from the drop-down list. This attribute of the CI type indicates the relative importance of the service to the business. For more information, see "CI Type Manager Page" in the *Modeling section of the UCMDB Help*.
Type	Select a CI type from the drop-down list. By default, the BusinessApplication type is selected. This CI type represents the service on which the Service Model is based. Only CI types that have the SERVICE_MODEL qualifier assigned in the CI Type Manager in UCMDB appear in this drop-down list and can be used to model services.
Description	Enter an optional description for the model.
Category	Select a category for the model. Possible categories might be Draft, Test, Development, or Production.

> **Note:** Click **Apply same to all models** to apply each setting to all of the models you are working on.

5. Click Create Service Model +. A new CI of type BusinessApplication is created, and is connected in UCMDB to the CI on which the model is based.
6. If desired, you can change how information is displayed on the topology map. For more information, see:
   - "Show Additional Information on a Topology Map" on page 268
   - "Add Layers to an Existing Model" on page 269
   - "Simulate the Impact of a Service's Failure" on page 271
   - "Simulate the Impact of a CI's Failure" on page 271

Edit a Service Model

1. In the Service Modeling dashboard, open an existing service model.
2. Click Edit. The Service Properties widget opens.
3. Click **EDIT MODE**.

4. Change one or more of the following properties:
   a. Business Criticality
   b. Owner
   c. Location
   d. Deploy Type
   e. Description
   f. Stakeholders
   g. Name

   > **Note:** In the **Name** field, type in a new name for the service model. Renaming a model changes the name of:
   > - The CI that was created when the model was created.
   > - The view in UCMDB with the same name.
   > - The associated discovery activity.

5. Click **Save changes**.

Delete a Service Model

1. In the Service Modeling dashboard, click an existing service model.
2. Click Delete .

   Deleting a model deletes:
   - The CI that was created when the model was created.
   - The view in UCMDB with the same name.
   - The associated discovery activity.
3. Click **OK** to confirm the deletion.

Add an IP Range Manually

If the Probe shows the error message "the IP address is not in the discovery IP Range", you can manually add a new IP range.

1. On the Service Modeling dashboard, click an existing service model
2. Click **Discovery Issues > Probe Errors**. The Probe Errors pane displays.
3. Click a probe error entry with "the IP address is not in the discovery IP Range" error message.

   The error message displays in details.

4. Click Add IP Range.

   The Add IP Range section displays.

5. Find the probe of your interest to which you want to add an IP range.

   Click in the Search box, enter the IP address that is not in the discovery IP range, and then press **Enter**. The returned result displays which probe the searched IP address belongs to.

6. In the Probe List section, expand the data flow probes/probe clusters tree, and locate the probe.

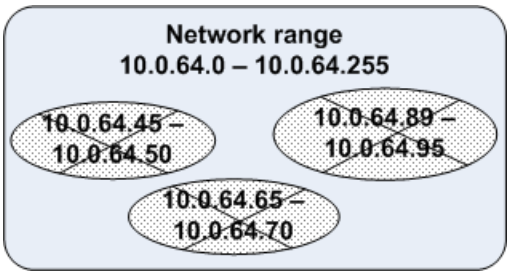
   a. Select the probe of your interest. All IP Range(s) available for the selected probe are displayed in the right pane.

   b. Click Add IP Range in the right pane. The IP range editing section appears below the list of existing IP ranges.

   Define the new IP range as described below:

UI Element	Description

Range	Define a range of IPv4 addresses using the following rules:
	• The IP address range must have the following format:
	start_ip_address – end_ip_address
	For example: **10.0.64.0 - 10.0.64.57**
	• The first decimal value (octet) of the start IP address and the end IP address must be identical.
	For example, **10**.1.2.3 - **10**.4.5.6
	• The range can include an asterisk (*), representing any number in the range of 0-255.
	  • If you use an asterisk, you do not need to enter a second IP address. For example, you can enter the range pattern **10.0.48.*** to cover the range from **10.0.48.0** to **10.0.48.255**.
	  • Use an asterisk in the lower bound IP address of the IP range pattern only. If you use an asterisk in the lower bound IP address

UI Element	Description
	and also enter an upper bound IP address, the upper bound IP address is ignored. • You can use more than one asterisk (*) in an IP address as long as they are used consecutively. The asterisks cannot be situated between two numbers in the IP address, nor can they be substituted for the first digit in the number. For example, you can enter **10.0.*.*** but not **10.*.64**.*.
Description	A description about the IP range you specified above.
Excluded IP Ranges	Clicking Add Excluded IP Range enables you to define a new range of IP addresses to exclude from the full range specified above, and enter a description about the excluded range if desired. **Note:** • The rules for entering an excluded range are the same as for entering a range. For details, see Range. • The excluded range must be defined in the same IPv4 format as the full network range. To delete an excluded IP range that is still in the editing stage, click ⊖ at the right end of the corresponding entry. **Examples:** You can divide a network range into several sub-ranges. For example, if the range is 10.0.64.0 – 10.0.64.255 and you define three excluded ranges: • 10.0.64.45 – 10.0.64.50 • 10.0.64.65 – 10.0.64.70 • 10.0.64.89 – 10.0.64.95  the ASM Discovery is performed over:

UI Element	Description
	• 10.0.64.0 – 10.0.64.44 • 10.0.64.51 – 10.0.64.64 • 10.0.64.71 – 10.0.64.88 • 10.0.64.96 – 10.0.64.255
OK	**OK.** Click this button to confirm adding the IP range you specified above.
Cancel	**Cancel.** Click this button to cancel adding the IP range you specified above.
Delete	Once you have added an IP range to the selected probe by clicking OK, this icon appears at the right end of the IP range entry. Click this icon to delete an IP range you added to the selected probe. **Note:** • You cannot delete any existing ranges. • You can only delete the IP range(s) you have added to the selected probe from the Probe Errors pane by clicking OK and before clicking Save. Once clicking Save, you will not be able to delete any IP ranges you added from the Probe Errors pane.
⌄/⌃	Expand/Collapse the editing pane for adding IP range.
Save	**Save.** Click this button to save the IP range you just added to the selected probe.

c. Click OK.

7. Click Save

Note: It takes around 30 seconds for the newly defined IP range to populate the value for the **IP Probe Name** property for the CI of type **ipAddress** on the UCMDB server side. Make sure you wait about 30 seconds before rerunning the discovery job. Otherwise the job may fail again due to an empty value for the **IP Probe Name** property.

View a Service Model in the Text Navigation Mode

1. In the Service Model dashboard, click an existing service model.
2. Click Show Navigation Tree.

   The right pane opens and lists all the CIs contained in the selected model.

   The following features help you quickly locate a CI in the model:

   - **Search for a CI**: Type the keyword in this field to search within the model
   - **Collapse All**: Click this button to collapse all folded CIs and to see only the first level CIs

Show Additional Information on a Topology Map

1. In the Service Modeling dashboard, click an existing service model.
2. Click ACTIONS and then click **Additional Info** to expand the Additional Info section.
3. Select one or more of the following checkboxes to see the specific information indicators:

History Changes	Displays changes on CIs that are in the model during the specified time period. **To display history changes:** a. Select **History Changes**. The number of history changes according to the current settings is displayed. b. Click **Change Settings** to select the beginning and ending dates for the changes. c. Click Run History to update the topology map.
Monitoring	Displays the number of KPIs on the CIs in the model. **Note:** This option is displayed only when you are using the Monitoring widget. Setup for the Monitoring widget is described in "Configure the BSM Health Indicator (for the Monitoring Widget)" on page 395.
Policy Status	Displays the number of policy results on CIs in the model.

	Note: ○ This option is displayed only when there is a live Configuration Manager (CM) system deployed in the UCMDB environment. ○ Policy indicators are counted for both the indicated CI and the service in which that CI is located.
Incidents	Displays incidents on CIs that are in the model during the specified time period. **To display incidents:** a. Select **Incidents**. The number of incidents according to the current settings is displayed. b. Click **Change Settings** to select the beginning and ending dates for the changes. c. Click Update Incidents to update the topology map.
Request for Changes	Displays change requests on CIs that are in the model during the specified time period. **To display change requests:** a. Select **Request for Changes**. The current number of change requests is displayed. b. Click **Change Settings** to select the time span for change requests. c. Click Update RFCs to update the topology map.
Problems	Displays the number of problems on CIs in the model.
Owner	Displays the CI's owner.
Infrastructure Info	Displays the composite data.
Discovery	Displays the discovery progress indicators.

Note: Your selections are saved for all the service models in your user preferences.

Add Layers to an Existing Model

Four out-of-the-box layers (perspectives) are provided:

- **Storage:** Represents the generic relation of storage-related data, starting from Running Software via Node to exported storage pieces.
- **Networking:** Represents Node-related network topology. Depicts Node to Switch connectivity with all interfaces, ports and VLANs relations.
- **Virtualization:** An overall virtualization representation of Node virtual dependency with Running Software in it.
- **Clusters:** Represents Cluster Topology from the perspective of Running Software and its relation to CRG, Cluster, and Physical Node.

The following layers are available if ASM Enhanced Package or Content Pack 17 (or later) is deployed:

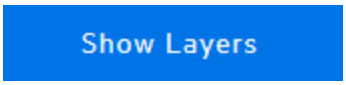
- **Related Node:** Select this layer to display the related nodes of all running software.

  Usually, the Related Node layer shows the Operating System of the computer on which the software is running.
- **Service Connection Point:** Select this layer to display the Service Connection Point (SCP) CIs.

  A SCP is created during service modeling when the discovery job finds the next hop. The SCP CI contains the information for the next hop. For example, IP address, port number, and reference information (such as context root, DB name). The SCP CI triggers the discovery job for the next hop.
- **Load Balancers:** When you select this layer, the topology map displays load balancers.

You can add layers to the topology map in the following way:

1. In the Service Model dashboard, click an existing service model.
2. Click

and then click **Add Layers**.
3. Click 

to execute the selected perspectives and to add new content to the current map.
4. Do one of the following:
   - Click **Close and Save Selected Layers** to save the selected layers, so that the next time you open this service model, the perspective and content that you added will be visible in the topology map.

- Click **Close without Saving Selected** to discard the selected layers and to close the **Add Layers** menu. Selected layers are not saved, but added content remains in the topology map for the duration of the current session.

Simulate the Impact of a Service's Failure

Dependent Services presents services (CIs of types that have the SERVICE_MODEL qualifier) that will impact the business service at a specified severity level, if they fail.

1. In the Service Modeling dashboard, click an existing service model.
2. Click ACTIONS and then click **Dependent Services**.
3. Select a CI in the map.
4. Specify the level of failure that you want to simulate.
5. Click Run Simulation. The CIs that are most likely to impact your service if they fail will be displayed.

For more information, see "Dependent Services Widget" on page 338

Simulate the Impact of a CI's Failure

1. In the Service Model dashboard, click an existing service model.
2. Click ACTIONS and then click **Impact Simulation**.
3. Select a CI in the map.
4. Specify the level of failure that you want to simulate.
5. Click Run Simulation. The impact of the failure of the selected CI will be displayed in the model.

Run Discovery Manually for a Service Model

Run Discovery Manually for a Service Model

By default, service discovery jobs run automatically once each day. If necessary, you can use the following procedure to run a discovery job manually.

1. In the Service Modeling dashboard, click an existing service model.
2. Click DISCOVERY.
3. Check and edit the entry point before running the discovery process:

   Click the **Entry Point** value to enter the **Edit Entry Point** mode, where you can add or edit the URL that is the starting point of the service.

   Once you have provided the entry point URL, you can click **Check URL Availability** to validate the URL.

   - If the URL is available, **URL Online** is displayed with a success indicator.
   - If the URL is not available, **URL Offline** is displayed with an error indicator.

   You can click **URL Online** or **URL Offline** again to check the current status of the entry point URL.

   To exit the Edit Entry Point mode, simply click ×.
4. Click Save & Run Discovery.

   Indicators for the discovery progress of each CI are displayed on the topology map.

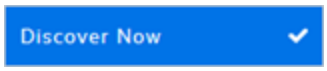
   While the discovery process is running, the status **Running Discovery** is displayed, and the number of discovery issues found is updating. You can click Stop Discovery to deactivate the currently running process, or click Discover Now to restart the process.

   After the discovery process completes, you can see a message indicating the discovery process has finished successfully or finished with errors.

In case of errors, you can click **Discovery Issues** to open the Discovery Issues pane, which lists errors grouped by the types of discovery issues . For details, see "Discovery Issues" below.

When you click a discovery issues type a pane opens and lists all the errors within the selected category.

To see in the Discovery Issues pane only the relevant discovery issues for a specific CI and for its trigger CIs, simply click the CI's Discovery indicator.

5. After you have provided the required information, click 

to rerun discovery.

Discovery Issues

The Discovery Issues pane lists errors grouped by the types of discovery issues . The following types of discovery issues may occur during discovery:

- Internal Errors
- Connection Errors
- Credential-Related Errors

  For credential-related errors, you can provide new credentials for the selected protocol, and you can save multiple protocols. When specifying credentials, you can specify the network scope for those credentials:

  - IPv4 (either as IP range or as Classless Inter-Domain Routing (CIDR)
  - IPv6

  > **Note:** The newly provided credentials takes effect only after the discovery process has been restarted.

- Timeout Errors
- Unexpected/Invalid Behaviors
- Information Retrieval Errors
- Resources-Related Errors
- Parsing Errors

- Encoding Errors
- SQL Related Errors
- HTTP Related Errors
- Specific Application Errors
- Probe Errors

  For probe errors, you can see a **pause indicator** and meaningful error messages in the following situations:

  Clicking **Probe Errors** in the Discovery Issues pane opens the Probe Errors pane, where you can click each of the probe errors to display detailed meaningful error messages.

  Detailed error messages are available in the following situations:

  - When the discovery job cannot run because the probe is suspended or disconnected, or there is no setup for the probe.
  - When the discovery job cannot run because the probe or the activity is in a blackout period.
  - When the discovery job cannot run because the IP is not in the discovery IP ranges.

    To fix this probe error, you can create a new IP range to contain the problematic IP address. To do so, click the probe error entry and then click **Add IP Range** Add IP Range. For details, see "Add an IP Range Manually" on page 264.

- Software Related Errors

  For Software Related Errors, you can see the ignored TCP connections of a running software and you can add the missing ports in the **portNumberToPortName.xml** file. See "Add a missing port manually" on the next page.

- Others

  For all other types of errors, you can click the Email Administrator link to send a message to an administrator for assistance.

  > **Note:** In some cases, if the message is too long, there might be an HTML limitation or an Email client limitation, and the message may not be displayed entirely in the email.

Add a missing port manually

1. In the Discovery Issues pane, click **Software Related Errors**, and then select an error entry with the following **Problem Source** message: "Some outgoing ports are filtered".
2. Click the **Application Signature** button.
3. Enter an Application Name.
4. Select all the ports you want to add in the **portNumberToPortName.xml** file.
5. Click **Save Mapping**.

   > **Note:**
   > - You can see the newly added ports in the **UCMDB UI > Data Flow Management > Adapter Management > portNumberToPortName.xml** file.
   > - You can also click the Email Administrator link to send a message to an administrator for assistance.

6. After adding the missing ports, click Discover Now to rerun discovery.

Manually Add an Entry Point to a Service Model Component

Sometimes the service map modeled by ASM may not be as complete as you expected. For example, you know there is another running software behind a load balancer, or your organization's policy stopped ASM to discover and model some CIs.

As a service modeler, if you fully understand your topology and know all the details about the topology, to achieve a full modeling topology diagram, you may extend the service map by manually adding an entry point to any component of a service model (business application or running software), so that the new entry point can trigger further ASM discovery to find the next hop from the service model component.

> **Caution:** Perform this action only when you fully understand your topology.

To add an entry point manually to a service model component,

1. From the Service Modeling dashboard page, click the service model (business application or running software) of your interest.

2. On the service map, hover your mouse over or click the component to which you want to add an entry point.

3. In the context menu, click and then select **Add Entry Point** Add Entry Point .

4. In the Add Entry Point pane that appears, provide values for the following settings:

Field (* required)	Description
IP*	Provide the IP address in IPv4 format. For details about IPv4 format, see "New/Edit Range Dialog Box" in the *Data Flow Management section of the UCMDB Help*.
Port*	Provide the port number
Context	Provide a context string. The context string is optional and is used to identify the unique module. For example, if the entry point refers to an application in Web Server as **http://1.1.1.1:8080/test**, the context string should be "**/test**".

5. Click **OK**.

   After the new entry point is added successfully, it will automatically trigger new instances of the Host Discovery by Shell jobs in this service activity to discover the target RunningSoftware CIs.

View a Service's Details

> **Note:** Only the widgets that you have permission to view are displayed.

1. In the Service Modeling dashboard, open an existing service model.

2. Hover your mouse over a CI in the model and click the button. Select one of the following:

Overview	Displays CI Overview mode for all of the widgets that contains information about the service model.
Service Properties	Displays the Service Properties widget, only for the Service CI. This option is present only if a Service CI is selected.The information displayed here is similar to the Properties widget. For more information, see "Properties Widget" on page 367. > **Note:** In the Service Properties widget, you can change the name of an existing service model. For more information, see "View a Service's

	Details" above.
Properties	Displays the Properties widget for the selected CI. For more information, see "Properties Widget" on page 367.
History	Displays the History widget. For more information, see "History Widget" on page 353.
Policy	Displays the Policy widget. For more information, see "Policy Widget" on page 363.
Change Requests	Displays the Change Request widget. For more information, see "Change Requests Widget" on page 333.
Incidents	Displays the Incidents widget. For more information, see "Incidents Widget" on page 360.
Problems	Displays the Problems widget. For more information, see "Problems Widget" on page 364.
Stakeholder	Displays the Stakeholder widget. For more information, see "Stakeholder Widget" on page 370.
Business Topology	Displays the Business Topology widget. For more information, see "Business Topology Widget" on page 331.
Storage Data	Displays the Storage Data widget. For more information, see "Storage Data Widget" on page 371.
Environment	Displays the Environment widget For more information, see "Environment Widget" on page 349.
Impact Simulation	Displays the Impact Simulation widget. For more information, see "Impact Simulation Widget" on page 358.
Defects	Displays the Defects widget. For more information, see "Defects Widget" on page 336.
Dependent Services	Displays the Dependent Services widget. For more information, see "Dependent Services Widget" on page 338.
Monitoring	Displays the Monitoring widget. For more information, see "Monitoring Widget" on page 363.
Dynamic (by name)	Displays dynamic widgets that contain the selected CI. For more information, see "Dynamic Widgets" on page 346.
Security	Displays the Security widget. For more information, see "Security Widget" on page 368.
Automation	Displays the Automation widget. For more information, see "Automation

	Widget " on page 330.
Discovery Progress	Displays the Discovery Progress widget. For more information, see "Discovery Progress Widget" on page 339.
Get Related	Displays the Get Related widget. For more information, see "Get Related Widget" on page 351.

Set Border Rules on a Link

By default, consumer-provider relationships between CIs are internal, meaning that they are contained within a service model. Use the service border rules functionality to define which relationships are actually external to your service trees.

1. In the Service Model dashboard, click an existing service model.
2. Hover your mouse over a CI in the map and select **Border rules on link** from the context menu .
3. Select a link from the displayed list.
4. Click Add New Border Rule. The following settings for the border rule are displayed:

Field	Description
Name*	Enter a name for the border rule. (Mandatory)
References	Describes one or more conditions on the References attribute of the selected consumer-provider link. You can enter comma-separated values.
Consumer	In this section, you define specify a CI type and attribute conditions for End 1 of the consumer-provider link. Attributes that have already been defined on the model automatically populate the corresponding fields here. **Note:** Only attributes of type **string** or **enum** appear in the list.
Provider	In this section, you specify a CI type for End 2 of the consumer-provider link.

Note: Carefully verify that the attributes you set actually contain values that you specify for

> border rules. Otherwise, you will not be able to access the border rule in the UCMDB Browser module. You will be able to access the border rules in UCMDB in **Data Flow Management > Adapter Management > <<No Package>> resource > Configuration Files**.

5. When you are finished, click Save Border Rule +.

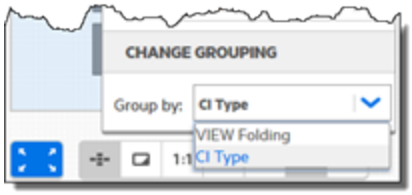
When a link is affected by a border rule during a discovery run, the Data Flow Probe updates the following attributes on the consumer-provider dependency link:

- **Is External** is updated from False to True.
- **Service Border Rules** is updated to include the names of the border rules that affect the link.

> **Note:**
>
> - When you add a border rule, the link does not immediately change to External (indicated with a dotted line for the link). Adding a border rule updates a configuration file on the Data Flow Probe. After the discovery process runs, the relationship in the topology map will be marked as External, providing that the relationship matched the conditions on at least one service border rule.
> - When a virtual link is marked as External, and that link contains multiple links, if at least one contained link is external, this link will show up as External.

Group the CIs in a Service Model by CI Type

1. In the Service Modeling dashboard, click an existing service model.
2. Click the **Change Layout** icon in the map toolbar at the left bottom of the window, and from the **Group by** drop-down list, select **CI Type**.



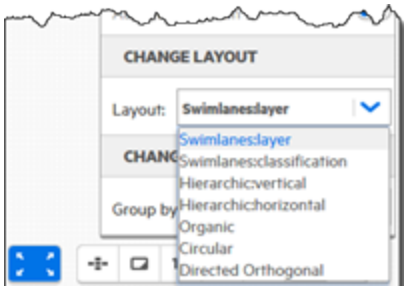
The topology map now displays the grouped CIs.

You can expand the grouped CIs, simply by clicking the displayed number.

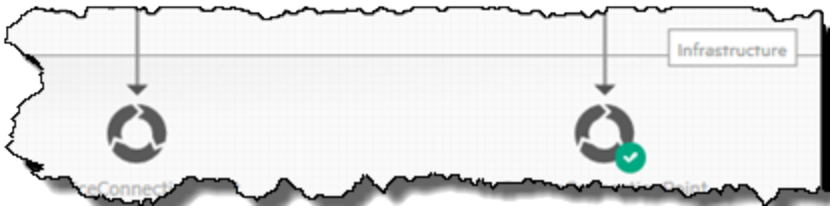
Arrange the CIs in a Service Model by Layers

You can arrange the CIs displayed in the topology graph by layers, according to the **layer** attribute that is assigned to the CIT.

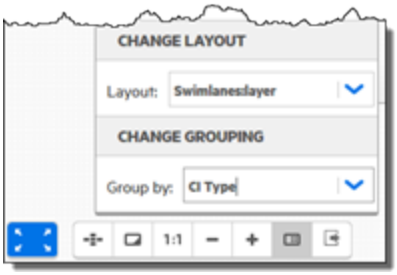
1. In the Service Modeling dashboard, click an existing service model.
2. Click the **Change Layout** icon in the map toolbar at the left bottom of the window, and from the **Layout** drop-down list, select **Swimlanes: layer**.



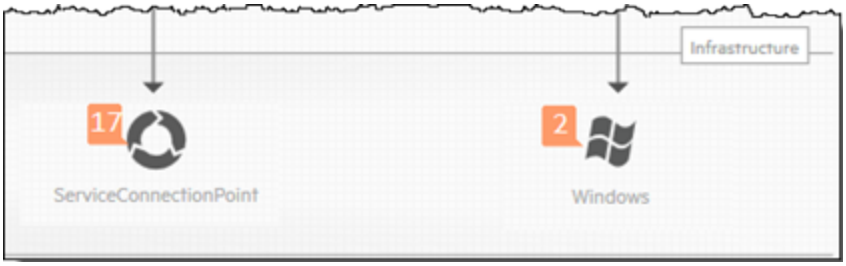
When you hover the mouse over a layer, the layer's label is displayed and the layer is emphasized.



> **Note:**
>
> To group CIs by CITs and also arrange them by layers, from the **Layout** drop-down list, select **Layers**, and from the **Group by** drop-down list, select **CI Type**.



The topology map now displays the CIs grouped by CI Types and arranged by layers.



Access a Service Model Using a Direct Link

As a user, you can access a service model using a direct link

The direct link to a Service Model is functioning exactly like the one for **Reports**. When a Service is opened from the dashboard, the **view=service_name** item is added to the Internet browser URL. When you switch back to the dashboard, this item is dropped. The link that is created when you select a service can be used as a direct link. That is to say, when another user uses it (or the same user, in a different internet browser), it leads the user directly to the selected service, without having to select the **Service Modeling** tab in the header and then select the service from the service dashboard.

Map Toolbar

When information is displayed in a topology map format, the map toolbar is available in the left bottom corner of the screen.

To access	Click an existing CI or service model from the UCMDB Browser module.

The map toolbar elements are described below:

UI Element (A–Z)	Description
	Full Screen. Changes the view to Full Screen.
	Open quick navigation. Turns on the quick navigation map. In the quick navigation map, the elements from the canvas are represented. You can drag and resize the selection in the map overview. If the map is too large, a big overview of the map is available, which allows you to use the map overview navigator to jump directly to a particular part of the map. A toggle button is available in the map to allow you to turn on/off the minimap. If the map is larger than 20 CIs, the state of the button is saved in your user preferences.
	Fit to screen. Sets the display of the topology map to fit to the current screen.
1:1	**1:1.** Change the map topology view to 1:1 scale
	Zoom out. Zooms out the map topology.
	Zoom in. Zooms in the map topology

	Change Layout. Displays the LAYOUT SETTINGS option menu.
	• **General**
	  ○ **Deactivate Re-Layout.** This toggle buttons allows you to set if you want to deactivate re-layout.
	  ○ **Auto-fit to screen.** This toggle button allows you to set if you want the layout to auto-fit the screen.
	• **CHANGE LAYOUT**
	  ○ **Layout: <option>**. Select to use one of the following layout options:
	  • Swimlanes: layer
	  • Swilanes: classification
	  • Hierarchic: vertical
	  • Hierarchic: horizontal
	  • Organic
	  • Circular
	  • Directed Orthogonal
	• **CHANGE GROUPING**
	  ○ **Group by: <VIEW Folding>** Select to use one of the following grouping options:
	  • VIEW Folding

UI Element (A–Z)	Description
	• CI Type
	Export to SVG. Allows you to export the topology map in an SVG format.

Troubleshooting Automated Service Modeling (ASM) - General Guideline

This chapter introduces the general troubleshooting guidelines for problems that may occur during the Service Modeling process.

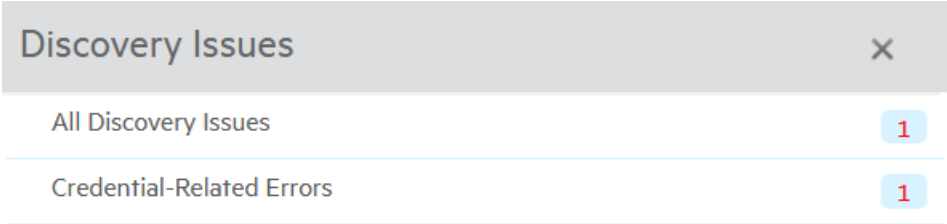
When an error occurs with a particular CI in the topology map, an error icon appears on the CI.

The following steps demonstrate the basic troubleshooting procedure for such an error:

1. View the error message in the UCMDB Browser module.

   a. Click the error icon on the CI.

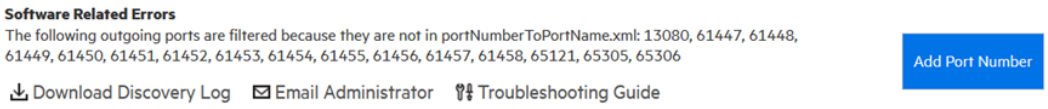
      The **Discovery Issues** pane appears and lists all the related discovery issues.

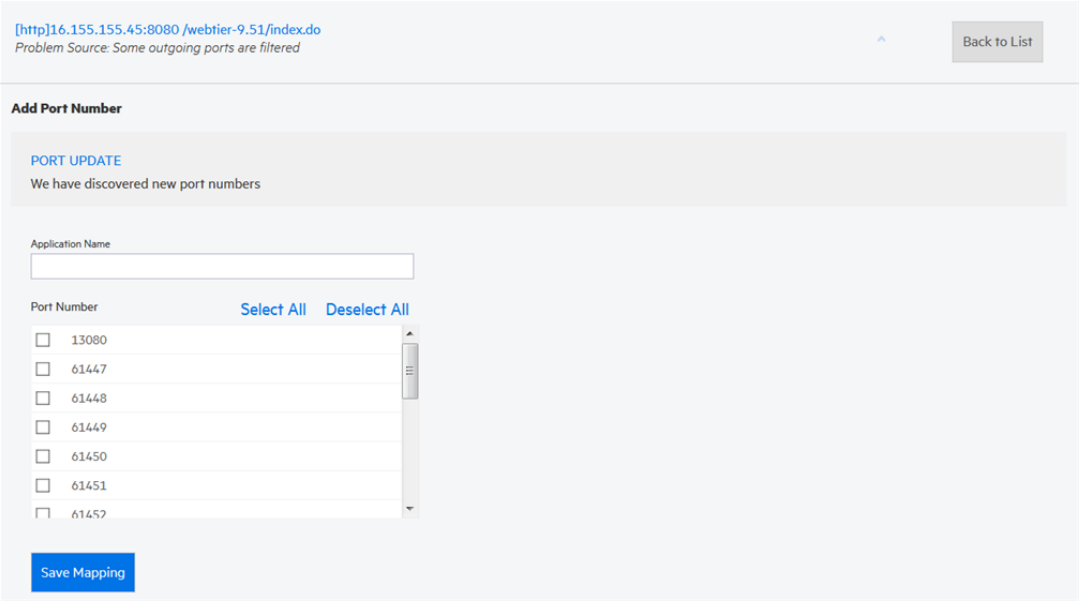
   b. Click one of the categories.

      A list of errors of the category appears.

c. Click an error to view the detailed error message.



2. Perform one of the following actions when appropriate.
   - For some errors under **Software Related Errors**, you can directly provide some missing information in the UCMDB Browser module. As in the above example, if you click the **Add Port Number** button, you will be able to add the missing port numbers.



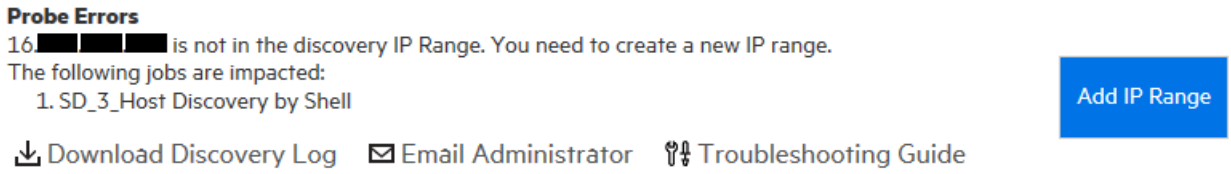
   - Search the error message in this chapter, and try the suggested solutions.
3. Rerun the Service Modeling task.

Troubleshooting ASM - Host Discovery by Shell job

This chapter describes the error messages you may receive from the Host Discovery by Shell job and provides suggested solutions.

Error Message: The IP address is not in the discovery IP Range

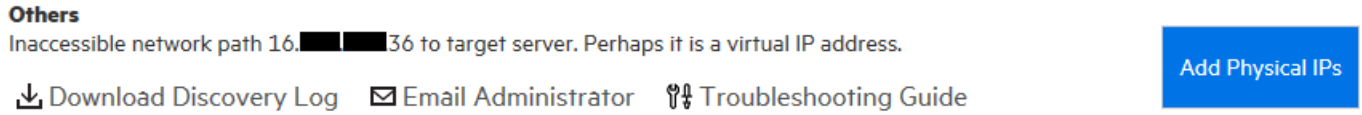
Error Category: Probe Errors



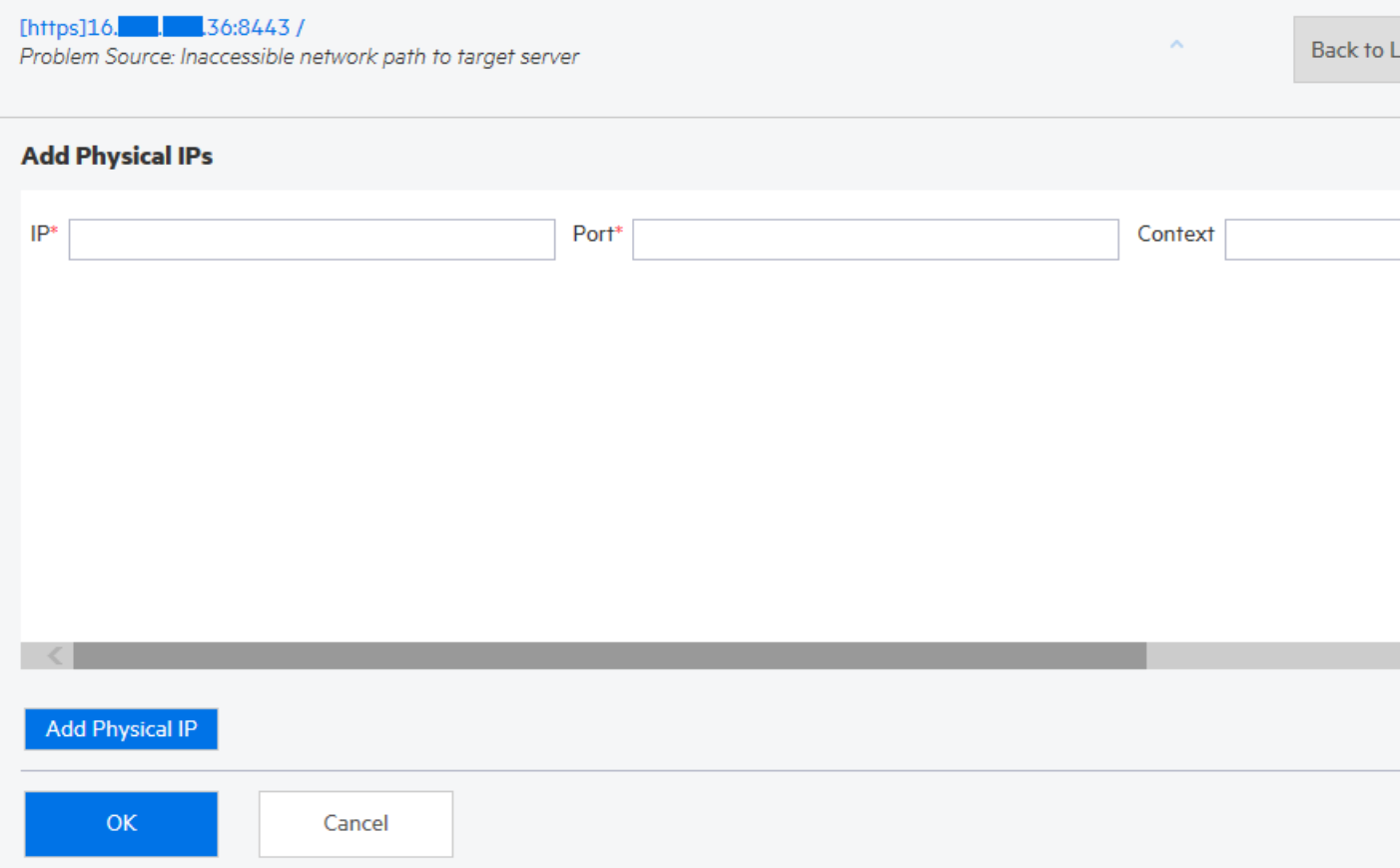
Solution: Add the IP address or range to the **Ranges** setting of the probe. For more details, see "Add an IP Range Manually" on page 264.

Error Message: Inaccessible network path to target server. Perhaps it is a virtual IP address.

Error Category: Connection Errors

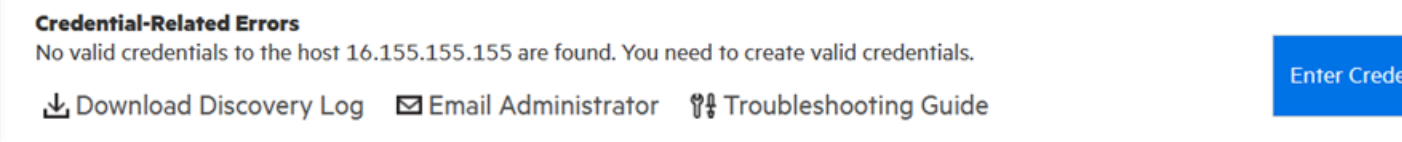


Solution: Add physical IPs as entry points of next hop

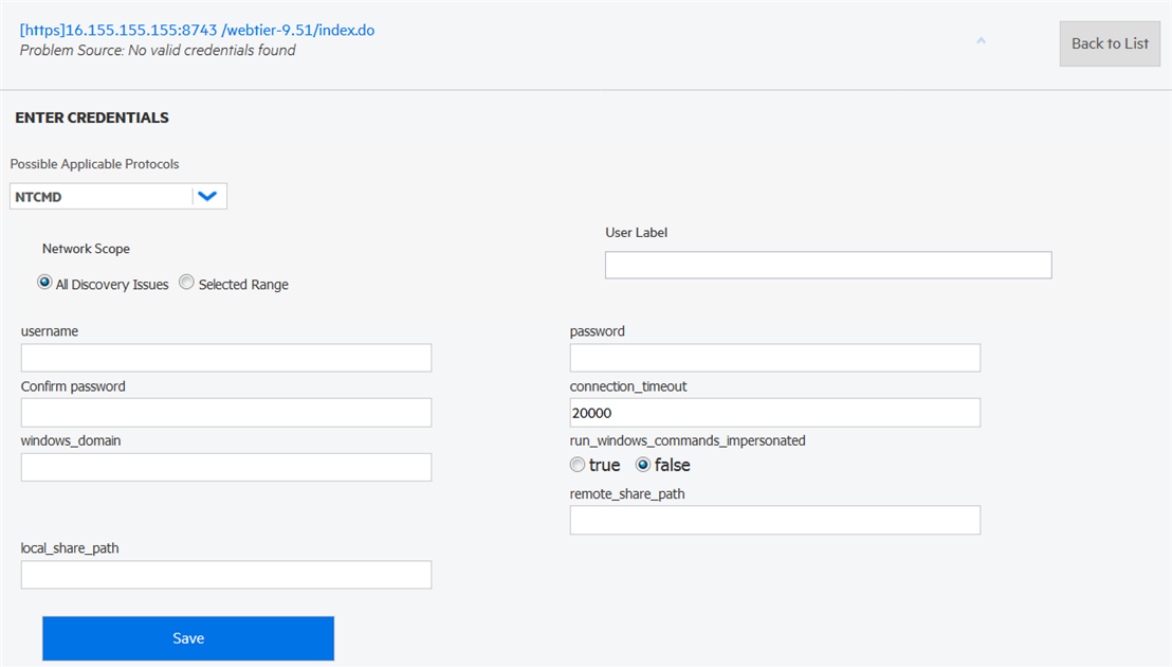


Error Message: Need credential to the host

Error Category: Credential-related Errors

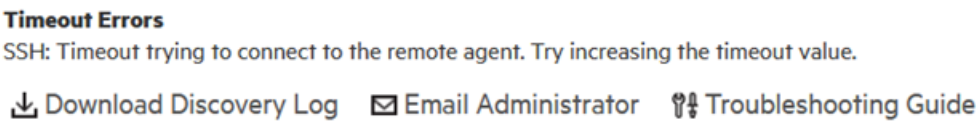


Solution: Add the valid credentials. For more information about how to do this, see "Add or Edit Credentials" on page 440.



Error Message: Connection timeout

Error Category: Timeout Errors



Solution:

- Increase the timeout value in protocol settings.
- For Windows machines, wait for a few minutes and then try again.

Error Message: The discovery job did not find any process listening on port: *<port_number>*

Error Category: Software Related Errors

Solution:

- Check if the configured account has sufficient privileges to run relevant commands. Specifically,
  - `ps -e`
  - `netstat -nap`
  - `lsof`

  Elevate privilege for UNIX credentials.
- Verify if the service is still accessible.
- Check if **lsof** is installed on the target machine if it runs UNIX.

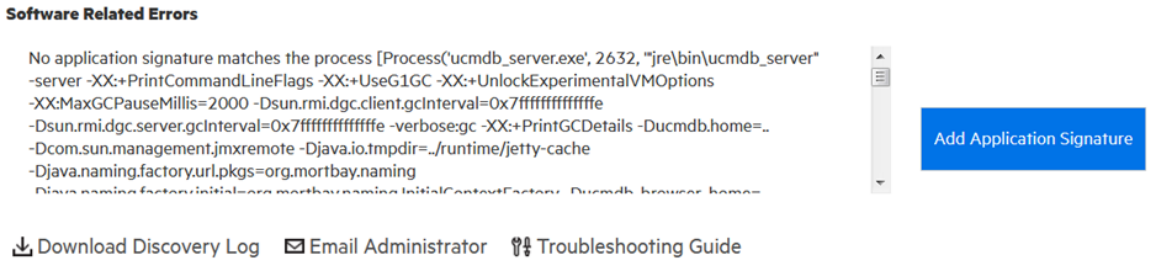
Error Message: No application signature matches the process *<process_info>* listening on port *<port_number>*

Error Category: Software Related Errors

Solution: Add the signature for the application. For more information about how to do this, see "Add or Edit Application Signatures" on page 441.

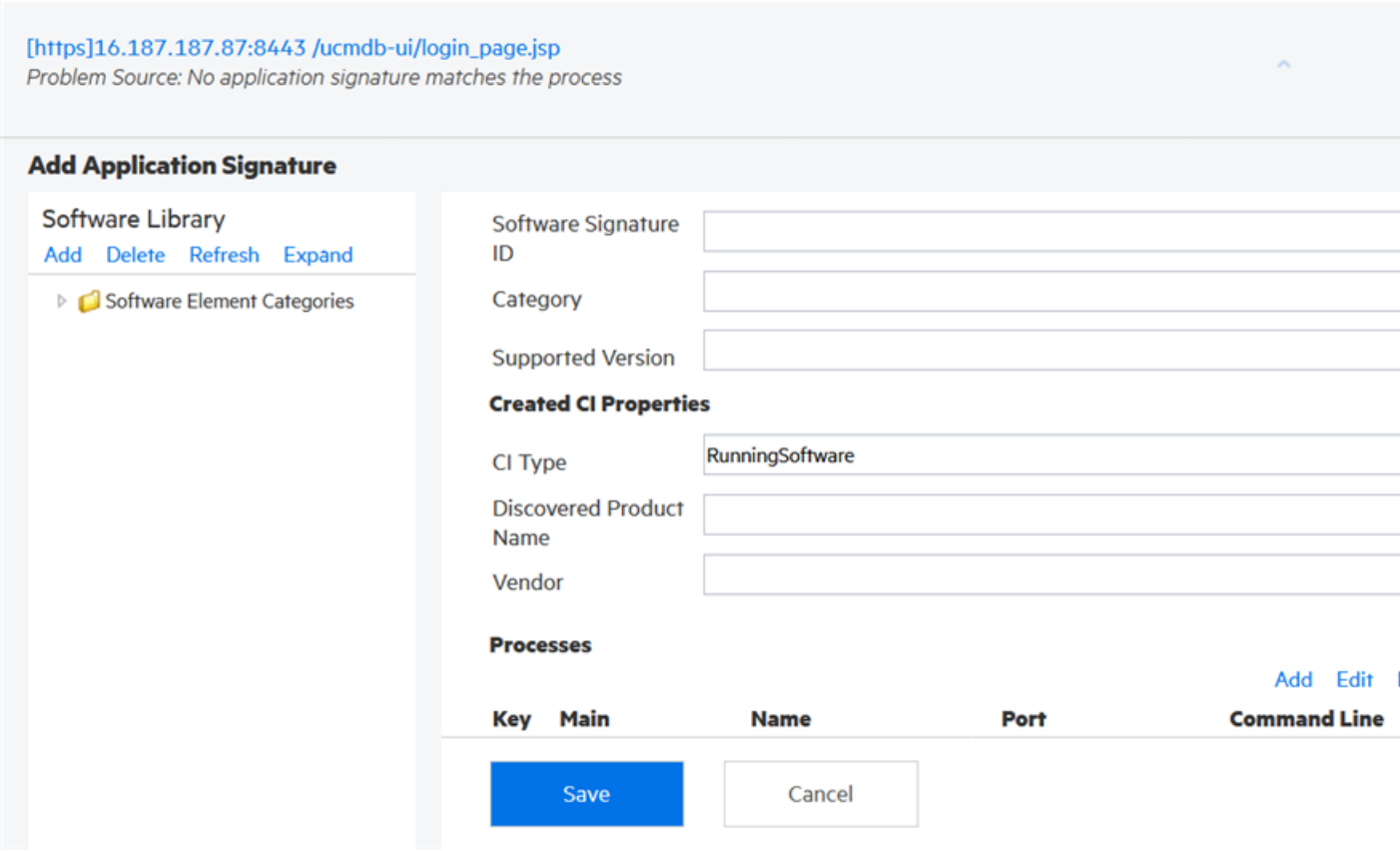
Error Message: The following outgoing ports are filtered because they are not in **portNumberToPortName.xml**

Error Category: Software Related Errors



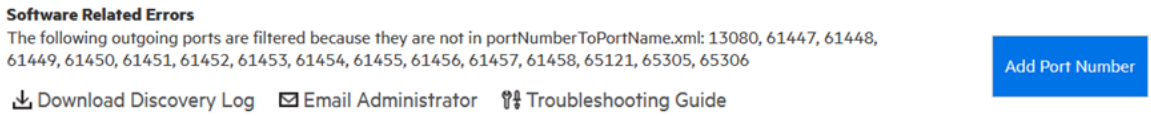
Solution: Add the port number to **portNumberToPortName.xml**.

To do this, click the **Application Signature** button in the error message and then follow the instructions. Alternatively, you can directly modify the **portNumberToPortName.xml** file to add the port number.



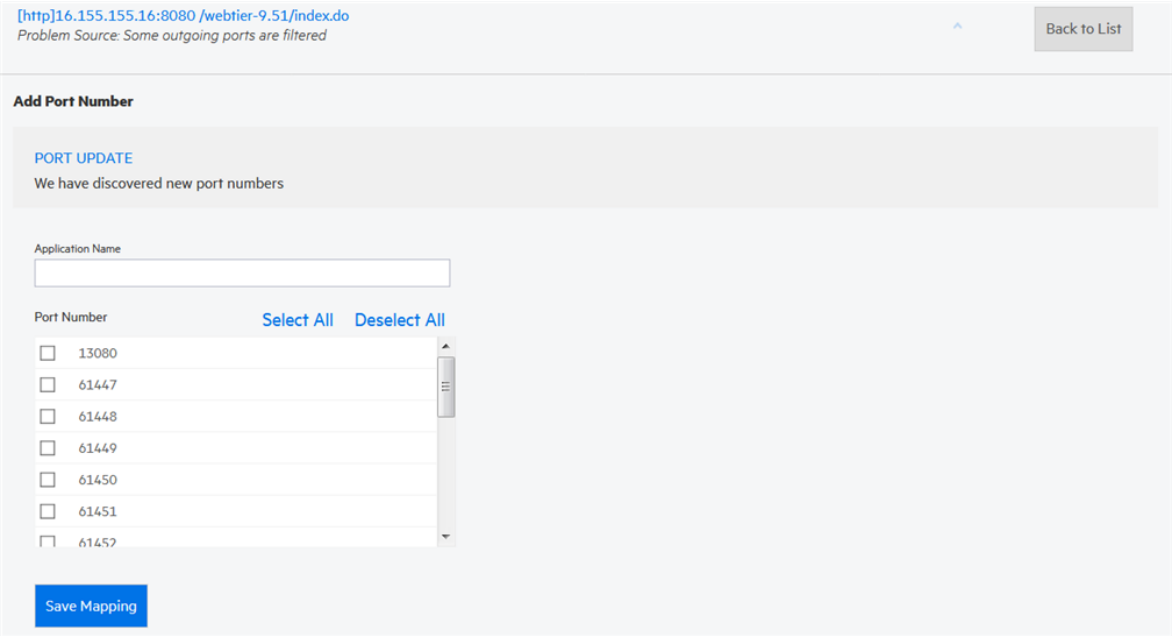
Error Message: The following outgoing ports are filtered because they are not in **portNumberToPortName.xml**.

Error Category: Software Related Errors



Solution: Add the port number to **portNumberToPortName.xml**.

To do this, click the **Add Port Number** button in the error message and then follow the instructions. Alternatively, you can directly modify the **portNumberToPortName.xml** file to add the port number.



Error Message: Failed to resolve host name to IP

Error Category: IP-related Errors

Solution: Check DNS server configuration.

Error Message: Need sudo permission

Error Category: Software Related Errors

Solution: Elevate privilege for UNIX credentials to run the relevant command.

Error Message: No lsof installed on the host

Error Category: Software Related Errors

Solution: Install lsof on the target machine.

Error Message: The host is a Solaris local zone

Error Category: Software Related Errors

Solution: None for this release. Currently Solaris local zone is not supported by ASM.

Error Message: No SCP reported from configuration signature.

Error Category: Others

Solution: No SCP reported from configuration signature for application <*Application Name*>. Check the **ConfigurationFileSignature.xml** file to make sure all parameter values for your application are correct.

Troubleshooting ASM - References

This chapter provides instructions for some of the solutions mentioned earlier.

Add an IP Range to the Ranges Setting

1. Go to **Data Flow Probe Setup** > **Domains and Probes** pane > **Domains and Probes** root node > a domain > **Data Flow Probes** > a Data Flow Probe.
2. In the **Ranges** pane, click **New Range** .
3. Provide the necessary information on the **New Ranges** dialog box, and then click **OK**.

Discover Load Balancers

1. Run the Host Connection by SNMP job.
2. Run one of the following jobs depending on the type of the load balancer:
   - F5 BIG-IP LTM by SNMP
   - Alteon application switch by SNMP
   - Cisco CSS by SNMP

Add or Edit Credentials

1. Go to **Data Flow Probe Setup** > **Domains and Probes** pane > **Domains and Probes** root node > a domain > Credentials > a protocol.
2. In the right pane, perform one of the following actions to add or edit an entry:
   - To add a new connection detail, click **Create new connection details for selected protocol type** .
   - To edit an existing credential, select the entry and then click **Edit connection details for selected protocol type** .
3. Provide the information on the dialog box that pops up, and then click **OK**.

Edit the portNumberToPortName.xml File

1. Go to **Data Flow Management > Adapter Management**.
2. Click the **Search** button , and then search for **portNumberToPortName.xml**.
3. Edit the **portNumberToPortName.xml** file, and then click **Save**.

Add or Edit Application Signatures

1. Go to **Data Flow Management > Adapter Management**.
2. In the Resources pane, select **Host_Resources_By_TTY > Adapters > TTY_HR_All**.
3. In the **Adapter Definition** tab > **Global Configuration Files** section, select **applicationsSignature.xml** and then click **Edit** .

Smart Software Analytics

The **Smart Software Analytics** option in the CMS Modules navigation pane opens the Smart Software Analytics module. It relies on data analytics to analyze large amount of scan files and suggest new software signatures, that can be used to recognize installed software. It automatically teaches unrecognized software by intelligently using Natural Language Processing (NLP) and machine learning technology. Smart Software Analytics provides you with an enhanced software recognition ratio that requires less manual effort.

This section contains the following:

How to Access Smart Software Analytics 291
Administration 292
Work with Smart Software Analytics 304
Troubleshooting and Limitations – Smart Software Analytics 321

How to Access Smart Software Analytics

The following software products are required to access the Smart Software Analytics module:

- UCMDB Server 2018.08.
- CMS UI 2018.08. For detailed instructions about installing CMS UI, access the following website: Installing CMS UI
- **Configure the REST API.** For detailed instructions about how to configure the REST API, access the following website: REST API Configuration.

To access Smart Software Analytics, follow these steps:

1. Go to CMS UI using either of the following methods:
   - Access CMS UI, using the following URL: **https://<server_name or IP>:<port>/ucmdb-browser**. Provide user name and password if required. Once you are logged in, you are on the CMS UI landing page.
   - Access UCMDB Browser legacy mode, using the following URL: **https://<server_name or IP>:<port>/ucmdb-browser/ucmdb_browser.jsp**. On the Search page, click **Return to CMS UI** under the search box.

     > **Note:**
     >
     > Add the UCMDB URL to your browser's list of Trusted Sites or Exceptions, and then refresh the UCMDB Browser's page if the following error message appears:
     >
     > `Something went wrong. You are probably using a self signed certificate. Please click 'OK' to visit UCMDB URL, then add it as an exception in your browser and refresh this page.`

   It is recommended that you access CMS UI using Chrome.
2. Click the **CMS Modules** icon in the upper left corner to expand the navigation bar, and then select **Smart Software Analytics**.

Administration

This chapter includes:

Smart Software Analytics Overview

> **Note:** The Smart Software Analytics module is available for users with the **Software Library** permission.

Accurate and fast software recognition brings a lot of benefits for the enterprise. It helps point out overspent software, avoid new purchases, respond quickly and accurately to external and internal software audits, reduce manual effort involved with the Software Asset Management (SAM) activities.

Due to limited labor resource and traditional inflexible recognition algorithm, the existing SAI teaching process is becoming a bottleneck in the whole software identification process to catch up with the latest software title publications.

Thus, with the aim to enhance software recognition ratio with less manual effort, version 10.33 of the Micro Focus Configuration Management System introduces a new feature called Smart Software Analytics(SSA), which automatically teaches unrecognized software by intelligently using Natural Language Processing (NLP) and machine learning technology.

With SSA, you can have an **autoteach.zsai** file automatically generated, as scheduled, from the unrecognized files in the scan file. This could significantly raise recognition ratio. In addition, you will have a monthly KPI report on how much work SSA has done that month, for example, number of processed scan files.

What's New

What's new in SSA 2018.08

No new features were implemented.

What's new in SSA 2018.05

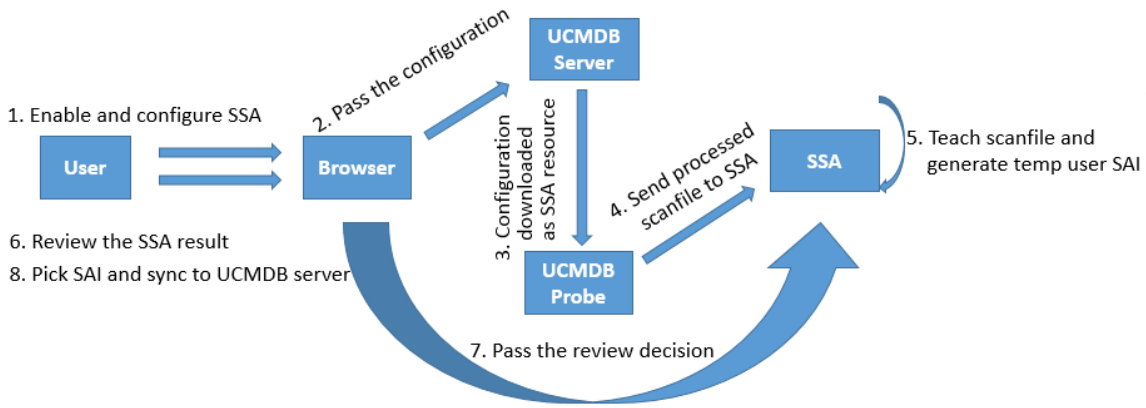
- Encrypted all sensitive data in SSA with AES 256 algorithm.
- Added support to change the store pass for Keystore and Truststore.
- Updated the IDOL library license for the machine learning model.

What's new in SSA 3.0

- Merged **Sraas Server** and **SSA Scheduler** services into one service **SSA Server** to reduce resource costs and improve the performance.
- Improved the instructions displayed in the command prompt window when you run **install_ssa_service.bat**, to remind you to check whether the prerequisite steps are performed before installing SSA.

Smart Software Analytics Workflow

The following chart illustrates the use case workflow of SSA:



1. Users enable and configure the SSA settings from the CMS UI. A JSON file is generated.
2. The CMS UI uses the UCMDB RESTAPI to send the JSON file to the UCMDB server.
3. The JSON file is automatically downloaded as a resource to the Data Flow Probe.
4. The Data Flow Probe sends generated/processed scan files to the SSA server according to the SSA configuration JSON file that has been downloaded.
5. The SSA server processes and teaches the scan files. Then, an **autoteach.zsai** file and a report file are generated.
6. Librarians review the **autoteach.zsai** from the CMS UI and save the reviewed signature to specific user SAI file.
7. CMS UI passes the review decision to the SSA server.
8. Librarians select and sync user SAI files to the UCMDB server.

Deploy Smart Software Analytics

Pre-deployment Considerations

This section covers the pre-deployment requirements that your organization should meet when planning the SSA deployment.

- System Requirements
- Get Installation Resources

- Security Consideration

System Requirements

- **Hardware**

Component	Requirement
Operating System	64-bit
Memory	16G
Number of Processors	8 or more processors

> **Note:** SSA would consume more resources on the UCMDB server and the Data Flow Probe server. It is strongly recommended to assign adequate hardware resources.

- **Operating System**

Hardware Platform	OS Type	OS Version and Edition	Supported	Recommended
x86-64	Windows Server 2016	Datacenter and Standard, 64-bit (without the **Nano Server** installation option)	Yes	Yes
x86-64	Windows Server 2012 R2	Standard/Datacenter editions, 64-bit	Yes	
x86-64	Windows Server 2012	Standard/Datacenter editions, 64-bit	Yes	
x86-64	Windows Server 2008	◦ SP2, Standard/Enterprise editions, 64-bit ◦ R2 and R2 SP1, Standard/Enterprise editions, 64-bit	Yes	

- **Additional Requirement**
  - Microsoft Visual C++ 2010 x64 Redistributable Package

Get Installation Resources

Before deploying Smart Software Analytics, make sure that you have installed and configured the following:

- UCMDB Server 2018.08
- CMS UI 2018.08

Also, get the following resources ready:

- SSA installation package
- (Optional) The latest Discovery Knowledge (DK) package for SSA, which is a monthly released **.zip** file including the full DK package and some configuration files specific to SSA.

Security Consideration

To enable SSA to work with CMS UI and UCMDB Server, make sure you deploy SSA service on the same domain as CMS UI.

For example, if you can visit CMS UI via **https://<CMS_UI_hostname>.microfocus.com:8090**. Your SSA service should be deployed on **https://<SSA_hostname>.microfocus.com** as well.

> **Tip:** It is recommended that you deploy these two products on the same machine.

Before starting SSA, to make sure that SSA could work with CMS UI and UCMDB Server, configure SSA as follows:

1. Go to **<SSA_HOME>\ssa-server\config\ssa_lwsso_config.xml** and then modify the following configuration:

   ```
   initString="This string should be replaced"
   <domain></domain>
   ```

   > **Note:**
   >
   > - The `initstring` should be the same as configured in UCMDB's LWSSO configuration. It can be retrieved by using the JMX method `retrieveLWSSOConfiguration`.
   > - A value for the `<domain></domain>` element is required. Specify here the domain which can be visited by both the SSA service and the CMS UI service.

   In the meantime, the LW-SSO configuration for CMS UI should be modified in the same way. For details about configuring LW-SSO for CMS UI, see "Configure LW-SSO" in the CMS UI Online HelpCMS UI Online Help.

2. Go to **<SSA_HOME>\ssa-server\config\config.properties** and modify the settings as shown below:

UCMDB connection configuration:

```
ucmdb.schema=https
ucmdb.domain=FQDN or IP
ucmdb.port=8443
```

CMS UI domain information:

```
browser.schema=https
browser.domain=FQDN Only
browser.port=8090
allowed.access.ip=*
```

3. (Optional) Change the certificate.

   SSA could work with UCMDB and Data Flow Probe with the out-of-the-box certificate configuration.

   If you want to change the OOTB certificate in the ecosystem, follow the procedure as described below:

   a. When UCMDB's certificate is changed, make sure that you perform the following steps:

      i. Export UCMDB's public certificate.

         A. Open the command prompt and run the command:

            ```
            C:\UCMDB\UCMDBServer\bin\jre\bin\keytool.exe -export -alias
            <keystore alias> -keystore <Keystore file path> -file
            C:\UCMDB\UCMDBServer\conf\security\server.cert
            ```

            where:

            - **keystore alias** is the name given to the keystore.
            - **Keystore file path** is the full path of the location of the keystore file.

            For example, for the out-of-the-box server.keystore use the following command:

            ```
            C:\UCMDB\UCMDBServer\bin\jre\bin\keytool.exe -export -alias
            hpcert -keystore
            C:\ucmdb\ucmdbserver\conf\security\server.keystore -file
            C:\HP\UCMDB\UCMDBServer\conf\security\server.cert
            ```

         B. Enter the keystore password.

         C. Verify that the certificate was created in the following directory: **C:\UCMDB\UCMDBServer\conf\security\server.cert**

ii. Delete the old certificate in SSA server's Truststore by using the following command:

```
<SSA_HOME>\jre\bin\keytool -delete -alias "ucmdb server" -keystore
<SSA_HOME>\ssa-server\config\interface.truststore -storepass ssapass
```

iii. Import the new certificate which comes from UCMDB by using the following command:

```
<SSA_HOME>\jre\bin\keytool -import -trustcacerts -keystore <SSA_
HOME>\ssa-server\config\interface.truststore -storepass ssapass -
alias "ucmdb server" -file <UCMDB CERT FILE>
```

b. When SSA server's certificate is changed, make sure that you perform the following steps:

i. Generate a new keystore (by using the command below to replace the `ssa-server keystore` under `<SSA_HOME>\ssa-server\config\interface.keystore`:

```
<SSA_HOME>\jre\bin\keytool -keystore <temp
folder>\interface.keystore -genkey -alias interface -keyalg RSA -
keysize 2048 -storepass ssapass -keypass ssapass
```

ii. Export the public certificate from new keystore of `ssa-server`:

```
<SSA_HOME>\jre\bin\keytool -export -alias interface -keystore <SSA_
HOME>\ssa-server\config\interface.keystore -storepass ssapass -file
<temp folder>\interface.crt
```

iii. Import **interface.crt** to the Data Flow Probe's Truststore.

A. Open the command prompt and execute the following command:

```
C:\UCMDB\DataFlowProbe\bin\jre\bin\keytool.exe -import -v -
keystore
C:\UCMDB\DataFlowProbe\conf\security\ProbeTrustStore.jks -file
C:\UCMDB\DataFlowProbe\conf\security\interface.crt -alias ssa
```

B. Enter the keystore password: **logomania**

C. When asked **Trust this certificate?**, press **y** and then **Enter**.

The following message is displayed:

Certificate was added to keystore.

c. When Data Flow Probe's certificate is changed, make sure that you perform the following steps:

i. Export Data Flow Probe's public certificate.

A. Open the command prompt and run the command:

```
C:\UCMDB\DataFlowProbe\bin\jre\bin\keytool.exe -export -alias
<ProbeName> -keystore
C:\UCMDB\DataFlowProbe\conf\security\client.keystore -file
C:\UCMDB\DataFlowProbe\conf\security\<ProbeName>.cert
```

B. When asked, enter the keystore password.

The following message is displayed:

Certificate stored in file <C:\UCMDB\DataFlowProbe\conf\security\<ProbeName>.cert>

ii. Replace the certificate in ssa-server using the following command:

```
<SSA_HOME>\jre\bin\keytool -import -trustcacerts -keystore <SSA_
HOME>\ssa-server\config\interface.truststore -storepass ssapass -
alias <ProbeName> -file <PROBE CERT FILE>
```

> **Note:** If SSA is already installed, you can still reconfigure the above security consideration settings.

Set up a Smart Software Analytics Server

Before the installation, review the "Pre-deployment Considerations" section above and make sure that you meet all the requirements.

> **Note:**
>
> - It is recommended to create a user with Administrator privileges. SSA must be installed and started by a user with Administrator privileges.
> - SSA supports only Windows platforms.
> - (For upgrade only) It is recommended to uninstall SSA 3.0 or 2018.05 before you install SSA 2018.08. If you want to keep your customized configurations made in SSA 3.0 or 2018.05, for example, the **scheduler.cron** parameter, keystore, and truststore, back up those configurations and copy them back to the corresponding folders in SSA 2018.08 after the installation.

Installing SSA server

To install the SSA server, follow these steps:

1. Extract the ZIP packages for Windows platform.
2. Check if there is a newer version of master SAI files that have been released. If yes, download the latest master SAI files and replace the older ones under the **<SSA_Install_Dir>\ssa-server\ssa\data\masterSAI** folder.
3. Execute the **<SSA_Install_Dir>\install_ssa_service.bat** script to register SSA as the Windows service: `CMS SSA Server`.
4. Input the store pass for SSA (at least six characters) in the command prompt window:

   ```
   Please input new store pass for SSA Keystore and Truststore: ******
   Please repeat new store pass for SSA Keystore and Truststore: ******
   Please input new safe word for your store pass:
   ```

   > **Note:** If SSA is already installed and you want to change the store pass, run **StorePassManager.bat** under the **ssa-server\bin** directory, and then input the original store pass, new store pass, and new safe word.

5. Execute the **<SSA_Install_Dir>\start_ssa_service.bat** script to start the service.

Now you can launch and configure SSA from CMS UI.

Post-Installation Setup

To ensure that Smart Software Analytics works in the best condition, it is recommended that you perform the following after installing Smart Software Analytics:

- Monitor SSA
- Back up User SAI Files
- Maintain the Master SAI Files

Monitor SSA

To monitor SSA, perform the following in a regular basis:

- Confirm that the SSA service is running properly.
- Check the log file for errors. In the log file, every change to the user SAI file and the **autoteach.zsai** file should be logged.

- Check the **<SSA_Install_Dir>\ssa-server\ssa\data\scanFile** folder. By checking the last modified time of each scanfile, you can have a clear understanding of the work done by SSA.

Back up User SAI Files

Always back up user SAI files timely in a regular basis to avoid potential data loss. All user SAI files are saved under the **<SSA_Install_Dir>\ssa-server\ssa\data\masterSAI** folder.

> **Tip:** As the SSA data is saved on the Windows file system, a backup system is used to prevent data loss due to file corruption. Whenever the SAI file is changed, a ***.bak** file would be saved in the same folder as backup.

Maintain the DK Package

The auto teach results would be more accurate with the latest DK package. Therefore, it is strongly recommended that you keep the DK package content on SSA up to date by downloading the latest package, which is released on ITOM Marketplace in a monthly base. Upload the master SAI files contained in the latest package when you finish downloading.

Understand Data Flow Inside Smart Software Analytics

To leverage SSA in a way to best suit your IT management needs, it is recommended that you understand the structure of SSA data folder and the data flow inside SSA before use.

Structure of SSA Data Folder

Path	Description
<SSA_Install_Dir>\ssa-server\ssa\data\report	To save report files. The UI reports are generated based on the data here.
<SSA_Install_Dir>\ssa-server\ssa\data\scanfile	To save the received scan files as backup. The scan file of same name would be overwritten.
<SSA_Install_Dir>\ssa-server\ssa\data\masterSAI	To save all SAI files, including master and custom user SAI files.
<SSA_Install_Dir>\ssa-server\ssa\data\runtime\autoteach	The suggestions given by SSA. The contents contained here can not be used as SAI until users review and commit them to a specific user SAI file.
<SSA_Install_Dir>\ssa-server\ssa\data\runtime\logs	The log information.
<SSA_Install_Dir\ssa-server\ssa\data\runtime\scanFile	The scan files to be processed by SSA.

> **Note:** The **runtime** folders are used to save the temp information generated by SSA.

Data Flow inside SSA

1. The scan files are uploaded by Data Flow Probe to the **<SSA_Install_Dir>\ssa-server\ssa\data\runtime\scanFile** folder.
2. By default, SSA will process the scan files in daily base at 1:00 am. You can customize the processing time by configuring the `scheduler.cron` parameter in **<SSA_Install_Dir>\ssa-server\config\application.properties**:

```
scheduler.cron=0 0 1 * * *
#Example of scheduler.cron
#"0 0 * * * *" = the top of every hour of every day.
#"*/10 * * * * *" = every ten seconds.
#"0 0 8-10 * * *" = 8, 9 and 10 o'clock of every day.
#"0 0 6,19 * * *" = 6:00 AM and 7:00 PM every day.
#"0 0/30 8-10 * * *" = 8:00, 8:30, 9:00, 9:30, 10:00 and 10:30 every day.
#"0 0 9-17 * * MON-FRI" = on the hour nine-to-five weekdays
#"0 0 0 25 12 ?" = every Christmas Day at midnight
```

3. Restart the SSA service.
4. After SSA finishes processing, the scan files will be copied to **<SSA_Install_Dir>\ssa-server\ssa\data\scanFile** as backup. Meanwhile, the result will be added to **<SSA_Install_Dir>\ssa-server\ssa\data\runtime\autoteach\autoteach.zsai**.
5. If you access the View Teaching Status page for **TEACH SERVER** on the SSA UI, when you modify auto-taught SAI entries in the **TEACH SERVER** page, the modifications will be reflected in **<SSA_Install_Dir>\ssa-server\ssa\data\runtime\autoteach\autoteach.zsai**.
6. If you commit any data in the View Teaching Status page for **TEACH SERVER**, the data would be removed from **<SSA_Install_Dir>\ssa-server\ssa\data\runtime\autoteach\autoteach.zsai** and added to the selected User SAI file.
7. You can further modify the user SAI files under **<SSA_Install_Dir>\ssa-server\ssa\data\masterSAI** via the SSA UI.
8. You can push the SAI files under **<SSA_Install_Dir>\ssa\data\masterSAI** to UCMDB server via SSA UI.
9. After a running of the **Inventory Discovery by Scanner** job on UCMDB side, the newly processed scan file will be sent to SSA for the next auto teach. Signatures that have been confirmed will not be suggested anymore.

Enable and Configure Smart Software Analytics

To enable and configure Smart Software Analytics, follow these steps:

1. Access the Smart Software Analytics module.

   a. Access CMS UI, using the following URL: **https://<server_name or IP>:<port>/ucmdb-browser**. Provide user name and password if required. Once you are logged in, you are on the CMS UI landing page.

   It is recommended that you access CMS UI using Chrome.

   b. Click the **CMS Modules** menu icon in the upper left corner to expand the navigation bar, and then select **Smart Software Analytics**.

2. Click the **SSA CONFIGURATION** button. The Settings pane is displayed.

3. Enable and configure SSA settings as described in the following table.

UI Element	Description
Enable SSA	Switch to enable or disable SSA.
SSA Server Domain	Provide the fully qualified domain name (FQDN) of your SSA server. For example, **ssa.microfocus.com**. CMS UI automatically checks whether the SSA server can be connected. If not, the following message is displayed: "SSA Server is not available." **Note:** For the first time to connect to an SSA server with self-signed certificate, you need to open another web browser window to accept the certificate by visiting the following URL: **https://<SSA_domainname>:9554**
Define the schedule to send scanfile to SSA	Select the Data Flow Probe for which you will define the schedule. You can define the schedule for all probes or a specific probe.
<The frequency drop-down list>	Define how frequently the selected probe or probes are scheduled to send scan files.

UI Element	Description
Hour	Define the exact hour when the selected probe or probes are scheduled to send scan files. **Important:** Before using SSA, check the Date and Time settings on the machines where SSA server, UCMDB server and CMS UI are deployed. Make sure that these settings are consistent with each other. Otherwise, there might be overtime issues when SSA runs.
SUBMIT	Click this button to submit the SSA schedule configuration to the UCMDB server.

Work with Smart Software Analytics

Smart Software Analytics User Interface

This chapter includes:

Smart Software Analytics Page

To access	Go to CMS UI, expand the navigation bar on the left, and then click **Smart Software Analytics**. For details, see How to Access Smart Software Analytics.

User interface elements are described below:

UI Element (A-Z)	Description
admin	Click to display the **LOGOUT** button.
?	Click to open the Help page.
Available user sai	SSA data type drop-down box: Click the arrow to get the user SAI list, master SAI list or the KPI report.
SYNC ALL TO UCMDB	Click to sync all SAI files on SSA server, including both user and master SAI files, to UCMDB server. For more information, see "How to Sync SAI Files to UCMDB Server" on page 310.
SSA CONFIGURATION	Click to open the SSA CONFIGURATION page. For more information, see "Enable and Configure Smart Software Analytics" on the previous page.

UI Element (A-Z)	Description
TEACH SERVER	Click to open the View Teaching Status page for the **autoteach.zsai** file.
	Click to open the Create User Sai page. **Note:** This option is only available when **Available user sai** is selected from the Sai data type drop-down box.
	Click to open the Upload User/Master Sai page.
	Click to delete the selected user SAI files. **Note:** This option is only available when **Available user sai** is selected from the Sai data type drop-down box.
<SAI file name>	Click to open the View Teaching Status page for this SAI file.
PUSH TO UCMDB	Click to push the selected user SAI files to UCMDB server. For more information, see "How to Sync SAI Files to UCMDB Server" on page 310.

View Teaching Status Page

This page enables you to check, create, edit, review or delete SAI entries contained in the **autoteach.zsai** file on SSA server.

To access	On the Smart Software Analytics page, click **TEACH SERVER**.

User interface elements are described below:

UI Element (A-Z)	Description
admin	Click to display the **LOGOUT** button.
	Click to open the Help page.
	Click to go back to the Smart Software Analytics page.
Publisher	**Search Filter**: Click the arrow to select the level of the SAI entries for which you want to search: publisher, application, release, version, or file.
<Search box>	Type here the search keywords.
SEARCH	Click to trigger the search.
ALL	Click to return all available entries contained in the SAI file.

UI Element (A-Z)	Description
+	Click to create a publisher entry.
	Click to batch review SAI entries.
	Click to delete batch delete user SAI files.
≡	Click to show or hide the left-hand pane that contains entries of publisher and application level.
<Left pane>/<Right pane>	In the left pane, you can a list of SAI entries which are grouped by publisher. Each publisher entry is a hierarchical tree that consists of contents up to five levels: • The top level: publisher • The second level: application • The third level (if any): release • The fourth level (if any): version • The fifth level (if any): file If the information in an SAI entry has been previously recognized and included in master SAI files, then the color of the icon in front of this entry is green. Otherwise, the color is gray. You can expand an SAI entry down by clicking to get entries of sub-levels. The release, version and file information, if any, is expanded under the right pane.

View User Sai Page

This page enables you to check, create, edit, or delete contents of user SAI files on SSA server:

To access	On the Smart Software Analytics page, select **Available user sai** in the SAI data type drop-down box, and then click a user SAI file name from the file list.

User interface elements are described below:

UI Element (A-Z)	Description
admin	Click to display the **LOGOUT** button.
?	Click to open the Smart Software Analytics's Help page.
←	Click to go back to the Smart Software Analytics page.

UI Element (A-Z)	Description
Publisher	**Search Filter**: Click the arrow to select the level of the SAI entries for which you want to search: publisher, application, release, version, or file.
<Search box>	Type here the search keywords.
SEARCH	Click to trigger the search.
ALL	Click to return all available entries contained in the SAI file.
+	Click to create a publisher entry.
	Click to delete batch delete user SAI files.
≡	Click to show or hide the left-hand pane that contains entries of publisher and application level.
<Left pane>/<Right pane>	In the left pane, you can a list of SAI entries which are grouped by publisher. Each publisher entry is a hierarchical tree that consists of contents up to five levels: • The top level: publisher • The second level: application • The third level (if any): release • The fourth level (if any): version • The fifth level (if any): file If the information in an SAI entry has been previously recognized and included in master SAI files, then the color of the icon in front of this entry is green. Otherwise, the color is gray. You can expand an SAI entry down by clicking to get entries of sub-levels. The release, version and file information, if any, is expanded under the right pane.

View Master Sai Page

This page enables you to check contents of master SAI files on SSA server.

To access	On the Smart Software Analytics page, select **Available master sai** in the SAI data type drop-down box, and then click a master SAI file name from the file list.

User interface elements are described below:

UI Element (A-Z)	Description
admin	Click to display the **LOGOUT** button.
?	Click to open the Smart Software Analytics's Help page.
←	Click to go back to the Smart Software Analytics page.
Publisher	**Search Filter**: Click the arrow to select the level of the SAI entries for which you want to search: publisher, application, release, version, or file.
<Search box>	Type here the search keywords.
SEARCH	Click to trigger the search.
ALL	Click to return all available entries contained in the SAI file.
≡	Click to show or hide the left-hand pane that contains entries of publisher and application level.
<Left pane>/<Right pane>	In the left pane, you can a list of SAI entries which are grouped by publisher. Each publisher entry is a hierarchical tree that consists of contents up to five levels: • The top level: publisher • The second level: application • The third level (if any): release • The fourth level (if any): version • The fifth level (if any): file You can expand an SAI entry down by clicking to get entries of sub-levels. The release, version and file information, if any, is expanded under the right pane.

How to Check SAI Files on SSA

Through the SSA user interface, you can check contents of both master and user SAI files. To do this, follow these steps:

To check contents of SAI files on SSA through user interface, follow these steps:

1. Access the Smart Software Analytics module. For details, see How to Access Smart Software Analytics.

2. On the Smart Software Analytics page, select **Available user sai** or **Available master sai** in the SSA data type drop-down box.
3. Open an SAI file by clicking the file name.
4. Check the contents included in the SAI file.

   If you are checking a user SAI file, you can perform edit, create or delete operations on the SAI entries in addition to check operation. For details, refer to the following tasks:

   "How to Create SAI Entries" on page 320

   "How to Edit SAI Entries on SSA" on page 313

   "How to Delete SAI Entries on SSA" on page 319

   > **Note:** For master SAI files, you only have read permission.

How to Check SSA KPI Report

To check SSA KPI report through user interface, follow these steps:

1. Access the Smart Software Analytics module. For details, see How to Access Smart Software Analytics.
2. On the Smart Software Analytics page, click the drop-down arrow of the SSA data type box, and then select **KPI Report**.

How to Upload SAI Files to SSA

> **Note:** It is not recommended to manually copy SAI files to **<SSA installation directory>\ssa-server\ssa\data\masterSAI**. If you want to do so, restart the SSA service after manually copying SAI files to SSA.

Through the SSA user interface, you can upload user SAI files and master SAI files to SSA server. To do this, follow these steps:

User SAI

To import a user SAI file to SSA server through user interface, follow these steps:

1. Access the Smart Software Analytics module. For details, see How to Access Smart Software Analytics.

2. On the Smart Software Analytics page, select **Available user sai** in the SAI data type drop-down box.
3. Click the **UPLOAD USER SAI** icon . The Upload User Sai window opens.
4. Click the text box to the left of the **UPLOAD** button. The File Upload window opens.
5. Select the user SAI file that you want to upload to SSA and then click **Open**.
6. Click **UPLOAD**. An upload status message is prompted.
7. Wait for a few seconds until the upload is finished.

Master SAI

To import a master SAI file to SSA server through user interface, follow these steps:

Access the Smart Software Analytics module. For details, see How to Access Smart Software Analytics.

2. On the Smart Software Analytics page, select **Available master sai** in the SAI data type drop-down box.
3. Click the **UPLOAD USER SAI** icon . The Upload Master Sai window opens.
4. Click the text box to the left of the **UPLOAD** button. The File Upload window opens.
5. Select the Master SAI file that you want to upload to SSA server and then click **Open**.
6. Click **UPLOAD**. An upload status message is prompted.
7. Wait for a few minutes until the upload is finished.

How to Sync SAI Files to UCMDB Server

Through the SSA user interface, you can sync the SAI files on SSA server to UCMDB server. Currently, 2 options are provided for syncing SAI files on SSA server to UCMDB server through user interface:

- Sync all SAI files to UCMDB server

  With this option, SSA will try to send all SAI files, both user and master, on SSA server to UCMDB server. For two SAI files with the same name, the system will automatically compare which file is newer before executing the push action. The newer one will be kept on the UCMDB server.

- Sync selected user SAI files to UCMDB Server

  With this method, you can push the selected user SAI files to UCMDB server.

Sync All SAI files to UCMDB server

To do this, follow these steps:

1. Access the Smart Software Analytics module. For details, see How to Access Smart Software Analytics.
2. On the Smart Software Analytics page, click **SYNC ALL To UCMDB** at the upper right corner of the page. All available user SAI files and master SAI files are then synced to your UCMDB server.

Sync Selected User SAI Files to UCMDB Server

To do this, follow these steps.

Access the Smart Software Analytics module. For details, see How to Access Smart Software Analytics.

2. On the Smart Software Analytics page, select the user SAI files that you want to sync to your UCMDB server.
3. Click **PUSH to UCMDB** at the bottom of the page.

SAI files successfully synced from SSA server to UCMDB server will be saved under the **<UCMDB Server installation directory>\runtime\sai** folder.

How to Create User SAI Files

To create a user SAI file on SSA through user interface, follow these steps.

1. Access the Smart Software Analytics module. For details, see How to Access Smart Software Analytics.
2. On the Smart Software Analytics page, select **Available user sai** in the SAI data type drop-down box.
3. Click the **CREATE USER SAI** icon . The New Sai window opens.
4. Fill in the **Name** and **Description** fields as necessary.
5. Click **SAVE**.

How to Delete User SAI Files on SSA

Through the SSA user interface , you can delete user SAI files contained in SSA server. To do this, follow these steps:

1. Access the Smart Software Analytics module. For details, see How to Access Smart Software Analytics.
2. On the Smart Software Analytics page, select **Available user sai** in the SAI data type drop-down box.
3. Select the user SAI file that you want to delete.
4. Click the **DELETE USER SAI** icon . A confirmation dialog box is displayed, asking whether you want to delete the selected SAI file.
5. Click **DELETE**.

How to Check SAI Entries on SSA

To check SAI entries on SSA through user interface, follow these steps:

1. Access the Smart Software Analytics module. For details, see How to Access Smart Software Analytics.
2. Perform one of the following depending on the type of SAI file where the entries to be checked are included:
   - **Entries in autoteach.zsai**: On the Smart Software Analytics page, click **TEACH SERVER**.
   - **Entries in a user SAI file**: On the Smart Software Analytics page, select **Available user sai** in the SAI data type drop-down box, and then click the user SAI file name from the file list
   - **Entries in a master SAI file**: On the Smart Software Analytics page, select **Available master sai** in the SAI data type drop-down box, and then click the master SAI file name from the file list
3. Locate the SAI entry that you want to check.

   To help locate the SAI entry fast, you can filter the displayed SAI entries by using the search function on the page.

   To filter the displayed SAI entries by using the search function, follow these steps:

a. From the drop-down list to the left of the search box, select one of the following filter conditions:
   - Publisher
   - Application
   - Release
   - Version
   - File

b. In the search box, type the keyword as needed.

c. Click **Search**.

Click **ALL** under the drop-down list to return all entries in this SAI file.

How to Edit SAI Entries on SSA

Through the SSA user interface, you can edit SAI entries contained in the **autoteach.zsai** file and other user SAI files. To do this, follow these steps:

1. Access the Smart Software Analytics module. For details, see How to Access Smart Software Analytics.
2. Perform either of the following depending on the type of SAI file where the entries to be edited are included:
   - **Entries in autoteach.zsai**: On the Smart Software Analytics page, click **TEACH SERVER**.
   - **Entries in a user SAI file**: On the Smart Software Analytics page, select **Available user sai** in the SAI data type drop-down box, and then click the user SAI file name from the file list.
3. A list of SAI entries which are grouped by publisher is displayed. Locate the SAI entry that you want to edit.

   To help locate the SAI entry fast, you can filter the displayed SAI entries by using the search function on the View Teaching Status page. For details, refer to Search for an SAI Entry.
4. Hover your mouse over the SAI entry that you want to edit, click the ellipsis icon that appears, and then select **Edit**.
5. A properties window is displayed. Modify the properties as needed. Refer to the following examples of properties window for SAI entries of different levels.

> **Note:**
>
> - Properties may vary slightly subject to the specific SAI entry to be edited.
> - When you modify the value in a text box , the system will help validate the new value you type by giving an instructive message in red.

Example of the Publisher Properties window:

Field / Element Name	Description
Name	A text field to state the publisher name.
Description	A text field to briefly describe the publisher of the application.

Example of the Application Properties window:

Field / Element Name	Description
Publisher	A text field to state the publisher of the application.
Application	A text field to state the application name.
Description	A text field to give a brief description about the application.
Application Type	A drop-down list of application types from which you can select an appropriate one to describe the application, for example: administrative software.
APPLICATION RULE	Click this button to open the **App Rules Editor**. You can see a list of application rules, with brief information regarding rule name, rule type, release format and version format. To edit or delete an application rule, hover your mouser over the application rule, click the ellipsis icon that appears, then select **Edit** or **Delete** as needed. Once you click **Edit**, the App Rules Editor opens, instructing you to modify the rule details: ◦ Rule Type ◦ Rule Description ◦ Installed Package to Match • Package Name • Package Type • Recognize the app even if the package has no files? • Number of package occurrences

Field / Element Name	Description
	◦ Properties for the version to be created • Operating System • Commercial • Language • Regular Expression ◦ Format / map matched group • Format • Regex group index • Mapping

Example of the Release Properties window:

Field / Element Name	Description
Publisher	A text field to state the publisher with which this release is associated.
Application	A text field to state the application with which this release is associated.
Name	A text field to state the release name or number.

Example of the Version Properties window:

Field / Element Name	Description
Publisher	A text field to state the publisher with which this version is associated.
Application	A text field to state the application with which this version is associated.
Release	A text field to state the release information with which this version is associated.
Version	A text field to the detailed version information.
Version Desc	A text field to give a brief description about the version.
OS	A drop-down list of operating systems, from which you can select an appropriate one to describe the operating system on the computer where this application is

Field / Element Name	Description
	recognized.
Language	A drop-down list of languages used to state which language this application supports. For example, you can select **Neutral** to indicate multi-language support.
Commercial	A drop-down list with options to state whether this application is for commercial or for free. From the **Commercial** drop-down list, you may select any of the following: ○ Free ○ Commercial ○ Unknown
Install Strings	Click this field to open the Install Strings Editor. You can see a list of install strings, containing information regarding xxx, xx and xxx. To edit the said information or to delete the entire application rule, hover your mover overs the item, click the ellipsis icon that appears, and then select **Edit** or **Delete**.
Match all install strings	With this check box selected, all imported install strings regarding this version should be matched for it to be recognized successfully by SSA.
Size Matters	Select this check box to show file size. If this check box is not selected, file size will be “N/A".

Example of the File Properties window:

Field / Element Name	Description
File Name	A text field to state the file name.
Relation to App	A drop-down list with options to state the relation between the file and the application: ○ Main ○ Associated ○ Third-party

Field / Element Name	Description
	Tip: You can click the batch edit icon on the upper right of the file list to modify the relation for multiple files.
Size	A text field to state the file size.
Size Matters	Select this check box to show file size. If this check box is not selected, file size will be “N/A".
Exe File Type	A drop-down list with options used to state the file type.
Signature	A text field to state the signature of the file.
Version Data	A text field to state the version data of the file.
OS	A drop-down list of operating systems, from which you can select an appropriate one to describe the operating system on the computer where the application of this version is recognized.
Language	A drop-down list of languages used to state which language the application of this version supports. For example, you can select **Neutral** to indicate multi-language support.

6. Save your changes.

How to Review SAI Entries on SSA

Through the SSA user interface, you can review SAI entries in the **autoteach.zsai** file and commit them to a user SAI file of your interest. To do this, follow these steps:

1. Access the Smart Software Analytics module. For details, see How to Access Smart Software Analytics.
2. On the Smart Software Analytics page, click **TEACH SERVER**. The View Teaching Status page for the **autoteach.zsai** file opens and a list of SAI entries which are grouped by publisher is displayed.
3. Locate the SAI entry that you want to review.

To help locate the SAI entry fast, you can filter the displayed SAI entries by using the search function on the View Teaching Status page. For details, refer to Search for an SAI Entry.

4. Hover your mouse over the SAI entry that you want to review, click the ellipsis icon that appears, and then select **Review**.

5. A reviewed icon then appears to the left of the entry. Meanwhile, a dialog box appears at the bottom of the page, asking you to commit the reviewed SSA result to a user SAI file.

   For example, if you have reviewed the contents of a publisher, you will see a dialog box resembling the following:

   Click the drop-down arrow to select the user SAI file to which you want to commit the reviewed entry. Then, click **COMMIT**.

   > **Note:**
   >
   > - If no user SAI file is available, a text box with a grayed **new.sai** hint inside will appear where the drop-down combo box is located as shown in the screen shot above. Directly click **COMMIT** so that a user SAI file named **new.sai** will be created and the reviewed SSA result will be moved to this user SAI file. Or, type a different name in the text box for the SAI file to be created and then click **COMMIT**.
   > - When you commit an entry to a user SAI file, all contents under this entry, including information of its sub-levels, will be committed to that user SAI file.

6. The reviewed entry is then moved from the **autoteach.zsai** file to the specified user SAI file.

You can also review multiple SAI entries at the same time by using the batch review icon on the toolbar of the left or right pane.

Recommended Review Process

When reviewing SAI entries, you can refer to the following process that we recommend:

1. Before reviewing SAI entries, expand the Publisher, Application, Release, Version and File layer one by one.
2. Check and edit the entries starting from the lowest level to the top level, in an order as shown below:

   a. Check and edit the properties of all files under the same version
   b. Check and edit the properties of all versions under the same release
   c. Check and edit the properties of all releases under the same application
   d. Check and edit the properties of all applications under the same publisher
   e. Check and edit the properties of the publisher
3. With information of all levels checked and confirmed, review the publisher and commit it to a user SAI file of your interest.

> **Note:** If you want to review and commit properties contained in a sub-level instead of reviewing and committing the whole publisher, do remember to commit the properties timely because if you re-log in the UI without the commit operation, the uncommitted information would be lost.

How to Delete SAI Entries on SSA

Through the SSA user interface, you can delete SAI entries contained in the **autoteach.zsai** file and other user SAI files. To do this, follow these steps:

1. Access the Smart Software Analytics module. For details, see How to Access Smart Software Analytics.
2. Perform either of the following depending on the type of SAI file where the entries to be deleted are included:
   - **Entries in autoteach.zsai**: On the Smart Software Analytics page, click **TEACH SERVER**.
   - **Entries in a user SAI file**: On the Smart Software Analytics page, select **Available user sai** in the SAI data type drop-down box, and then click the user SAI file name from the file list.
3. A list of SAI entries which are grouped by publisher is displayed. Locate the SAI entry that you want to delete.

   To help locate the SAI entry fast, you can filter the displayed SAI entries by using the search function on the View Teaching Status page. For details, refer to Search for an SAI Entry.
4. Hover your mouse over the SAI entry that you want to delete, click the ellipsis icon that appears, and then select **DELETE**.
5. A confirmation dialog box appears, asking whether you want to delete the entry, with the following options provided:

- **CANCEL**
- **DELETE AND BLACKLIST**
- **DELETE**

> **Note:**
>
> - When you delete an SAI entry, all contents under this entry, including those of its sub-levels, are deleted.
> - The **DELETE AND BLACKLIST** button is only available when you try to delete an SAI entry of publisher or application level.
> - If you BlackList a publisher or application, the signatures of this publisher or application will never be suggested again. To have SSA suggest signatures of that publisher or application, go to the **<SSA_Install_Dir>\ssa\data\report** folder on the SSA server, and then remove that blacklisted publisher or application from the **Blacklist.txt** file.

6. The result is then deleted.

You can also delete multiple SAI entries by using the batch delete icon on the toolbar of the left or right pane.

How to Create SAI Entries

Through the SSA user interface, you can create SAI entries for the **autoteach.zsai** file or other user SAI files. To do this, follow these steps:

To create SAI entries through CMS UI, follow these steps:

1. Access the Smart Software Analytics module. For details, see How to Access Smart Software Analytics.
2. Perform either of the following depending on the type of SAI file where you want to create the entries:
   - **Entries in autoteach.zsai**: On the Smart Software Analytics page, click **TEACH SERVER**.
   - **Entries in a user SAI file**: On the Smart Software Analytics page, select **Available user sai** in the SAI data type drop-down box, and then click the user SAI file name from the file list.
3. Perform the following respectively to create SAI entries of different levels:

- Publisher: Click the + icon on the left pane to create a new publisher entry.
- Application: Hover your mouse over the publisher entry under which you want to create a new application entry, click the ellipsis icon that appears, and then select **Create**.
- Release: Hover your mouse over the application entry under which you want to create a new release entry, click the ellipsis icon that appears, and then select **Create**.
- Version: Hover your mouse over the release entry under which you want to create a new version entry, click the ellipsis icon that appears, and then select **Create**.
- File: Hover your mouse over the version entry under which you want to create a new file entry, click the ellipsis icon that appears, and then select **Create**.

4. Follow the on-screen instructions to fill in the required information for the entry you are creating.

Troubleshooting and Limitations – Smart Software Analytics

Troubleshooting Smart Software Analytics

This section includes:

- Is My SSA working
- How to Reset SSA
- Overtime Issues Occur When SSA Runs

Is My SSA Working

To check if SSA works properly, perform the following:

1. Check if the SSA service is still running.
2. Check the log files for errors.
3. Monitor **<SSA_Install_Dir>\ssa-server\ssa\data\runtime\scanFile** folder against accumulated files, which indicate that error occurs.
4. If SSA does not work, restart the SSA service. Then, SSA will reload all SAI files.

If SSA still fails to work normally after you restart the SSA service, it is possible that some SAI files are corrupted and a reset is needed.

How to Reset SSA

Restarting the SSA service could solve most problems. But if any SAI file is corrupted, you will need to reset SSA.

To reset SSA, follow these steps:

1. Delete all **runtime** folders.
2. Clean **<SSA_Install_Dir>\ssa-server\ssa\data\report** if you do not need the report information.
3. Back up the user SAI files and only leave Master SAI files under **SSA_Install_Dir\ssa-server\ssa\data\masterSAI**.
4. Restart the SSA service.
5. Re-import all user SAI files. For details, see "How to Upload SAI Files to Through User Interface" in the CMS UI Online HelpCMS UI Online Help.

> **Note:** In addition to uploading the SAI files to SSA server using SSA UI on CMS UI, you can also manually copy back the user SAI files into **<SSA_Install_Dir>\ssa-server\ssa\data\masterSAI**. But you need to restart the SSA service after doing so.

Overtime Issues Occur When SSA Runs

Check the Date and Time settings on the machines where SSA server, UCMDB server and CMS UI are deployed. Make sure that these settings are consistent with each other. Otherwise, there might be overtime issues when SSA runs.

Limitations – Smart Software Analytics

This version of SSA has the following limitations:

- Multiple-session is not supported. Only one user has write permission on the SAI data via the SSA UI. Other users only have read rights.
- As part of the security mechanism, a self-signed certificate is used for the communication between CMS UI and UCMDB Server. When the CMS UI is accessed for the first time on a machine, the

web browser would pop up a warning message for the self-signed certificate. Users need to acknowledge that to continue with the log-in. You can refer to the *Hardening section of the UCMDB Help* for instructions about how to replace it with a more secure certificate.

- Data Flow Probes that are upgraded to version 2018.08 do not contain the out-of the-box certificate from SSA. Therefore, these Data Flow Probes cannot upload scan files to SSA server.

> **Workaround:** Import SSA's certificate into these Data Flow Probes. To do so, follow the instructions in step 3.b.iii. "Import interface.crt to the Data Flow Probe's Truststore" in Smart Software Analytics - Pre-Deployment Considerations > Security Configuration.

UCMDB Browser

The **UCMDB Browser** module in the CMS Modules navigation pane allows you to access the legacy UCMDB Browser in a new window.

To access the UCMDB Browser module, use one of the following methods:

- In CMS UI, click the **Menu** icon ( ) to expand the CMS Modules pane, and then click **UCMDB Browser**.
- Use the following URL: **https://<server_name or IP>:<port>/ucmdb-browser/ucmdb_browser.jsp**. Provide user name and password if required.
- To access the UCMDB Browser legacy mode using this URL **https://*<server_name>*:8443/ucmdb-browser**, go to **UCMDB > Administration > Infrastructure Settings Manager > UCMDB Browser settings**, and then set the value of the **Redirect to dashboard page** setting to **False**.

This section contains the following:

Getting Started with the UCMDB Browser module 324
UCMDB Browser Landing Page 325
Accessing the Administration Console for the UCMDB Browser module 327
Enable the Start Assisted Modeling link in the UCMDB Browser module for specific users 328

Getting Started with the UCMDB Browser module

The UCMDB Browser module is a lightweight web-based client used to access UCMDB data.

What does it do?

The UCMDB Browser module provides a simple and intuitive search for Configuration Items (CIs) in the UCMDB and displays important data in the context of the selected CI. It is an ideal tool for providing quick access to specific CI information.

The UCMDB Browser module also enables users to model services using automated service modeling and assisted modeling technologies. As part of its capabilities the UCMDB Browser module let users

report on any data from the UCMDB, thus making it the primary tool for users to interact with UCMDB and federated data.

For a CI that is found as a result of a search query, relevant data is presented and gathered into information widgets (for example, Properties, Environment, and Impact Simulation widgets). Data is presented by default in a CI overview mode, with the option to view more comprehensive data in a widget details mode.

The UCMDB Browser module has a lightweight UI that ensures simple access to UCMDB information. No user administration is required (this is handled by UCMDB), and no upgrades are needed when updating to a newer version.

The UCMDB Browser module is HTML-based that runs on standard web browsers and has iPad tablet support. See the *Support Matrix section of the Universal CMDB Browser Help* for specific versions.

Who should use it?

The UCMDB Browser module is targeted for the following customers:

- **Non-UCMDB administrators,** such as business owners or subject matter experts.
- **Mobile device users,** such as tablet users, wishing to take advantage of mobility and the more intuitive UI found on those devices.
- **UCMDB administrators,** who need quick CI access.

UCMDB Browser Landing Page

The Search page and the CMS UI header are automatically displayed when you access the UCMDB Browser module.

UI Element	Description
CMS	You can open the Search page from anywhere else in the UCMDB Browser module simply by clicking the CMS icon in the upper left corner of the UCMDB Browser module window.
Search module	Enables you to locate a specific CI. Hovering your mouse over the **Search** tab allows you access to the following modules: • Quick Search

UI Element	Description
	• Advanced Search • Most Visited • Most Searched For details, see "Search" on page 138.
Reports module	Provides a method of displaying the data from views in a report format. For details, see "Reports" on page 229.
Service Modeling module	Enables you to model the infrastructure of a business service. For details, see "Service Modeling" on page 253.
Notifications module	Enables you to see which property (CI or attribute) has changed, been added, or been deleted since the last time notifications were generated. For details, see "Notifications" on page 418.
<Username>	Hovering your mouse over the **<Username>** allows you to access the following: • **Server** details • **Last login time** • **Administration Console**. For details, see "Accessing the Administration Console for the UCMDB Browser module" on the next page. • **Logout**
Settings	Hovering your mouse over the **Settings** icon allows you to access the following: • **Manage System Categories.** See "Assign Color Categories" on page 407. • **Schedule Notifications.** See "Notifications" on page 418. • **Manage Discovery Status.** See "Discovery Indicators" on page 417.
	HELP Opens the UCMDB Browser Help page or a custom help page. You can create a custom help page for the UCMDB Browser users in the **UCMDB UI > Administration > Infrastructure Settings Manager > UCMDB Browser Settings > Custom Help Page URL**. In the **value** field, add a URL, for instance **http://www.microfocus.com**. When the non-administrator user accesses the Help section in the UCMDB Browser module, the custom Help page opens.
	WHAT'S NEW Opens the **What's New** page, which describes the new features and

UI Element	Description
	enhancements of the version. **Note:** When you first access the UCMDB Browser module, the **What's New** page is displayed, containing the new features and enhancements of the version. This happens when you connect the first time to any UCMDB server.
	ABOUT Displays the UCMDB Browser's version and the Copyright Information.
Return to CMS UI	Opens the CMS UI in a new web browser tab. For details, see the *Universal CMDB Home Help*. As an administrator, you can hide the **Return to CMS UI** link for the users without administrative privileges. To hide the link, go to the **UCMDB > Administration > Infrastructure Settings Manager > UCMDB Browser Settings** and change the value of the **Show Return to CMS UI link to admins only** setting to **True**. The default value is **False**. Also, you can use the value of the **UCMDB Browser URL** setting to access CMS UI, by changing the value of the **Override the Return to CMS UI link** setting to **True**.

Accessing the Administration Console for the UCMDB Browser module

You can access various administrative tools for the UCMDB Browser module from within the **Administration Console for UCMDB Browser**.

The Administration Console for UCMDB Browser is available for users with the Administration privileges. Bi-directional direct links are available from the UCMDB Browser module to the Administration Console.

To access	• In the UCMDB Browser module, hover your mouse over the **<username>** , and then select **Administration Console** from the context menu.
	• Use one of the following URLs:
	  ○ **http://<browser-home>/admin**, or
	  ○ **http://<browser-home>/Admin.jsp**

User interface elements of the Admin Console are described below:

UI Element (A–Z)	Description
VERSION	Displays the following information: • UCMDB Browser module version • UCMDB Server product name, version, and build • Content Pack version and build.
HELP	Opens the UCMDB Browser module online help in a separate window.
<username>	Displays the current user that logs in to the Admin Dashboard. Hovering your mouse over it allows to access the following options: • **Browser UI.** Returns to the CMS UI. • **Logout.** Logs out of the CMS UI.

Modules in the Administration Console for the UCMDB Browser module

The table below describes main modules available in the Administration Console for the UCMDB Browser module.

Module	Description
CACHE OPERATIONS	Opens the Cash Operations dashboard. You can click the Invalidate EhCache Data button to invalidate the EhCache values stored in the UCMDB Browser module. The data are usually cached from the UCMDB server.
LOGS	Displays a list of UCMDB Browser logs. You can perform the following actions on a log entry: **View Full**, **Download**, and **Tail**.
SESSION MANAGER	You can view all logged in users with their active sessions for CMS UI.

Enable the Start Assisted Modeling link in the UCMDB Browser module for specific users

In some cases, you may wish to grant users access to the Service Modeling module in the UCMDB Browser module, but not to Assisted Modeling. To enable this functionality, a new

AssistedModelingVisible infrastructure setting control is introduced. This allows you to grant or revoke access to Assisted Modeling to different user roles, which will enable or disable the Start Assisted Modeling link in the Service Modeling module.

If you are upgrading to this version of UCMDB, you must manually grant access to Assisted Modeling to each user role. To do this, follow these steps:

1. Go to **UCMDB UI > Administration > Infrastructure Settings Manager**, locate the **AssistedModelingVisible** setting, and set its value to **true**.
2. Log in to the UCMDB JMX console. in the *Administer section of the UCMDB Help*
3. In the UCMDB JMX Quick Search box, enter **listResourceTypes**.
4. Enter your Customer ID. (**Default: 1**)
5. Click **Invoke** to display the **URM Services** mbean.
6. Select **Auth_ROLE** to display the list of roles.
7. Click the Resource ID that corresponds to the user role to which you want to grant permission to access Assisted Modeling, and then add the following lines of code to the resource XML:

   ```
   <xmlGlobalPermittedAction>ASSISTED_MODELING</xmlGlobalPermittedAction>
   ```

   ```
   <xmlGlobalPermittedAction>EXPORT_REPORT</xmlGlobalPermittedAction>
   ```

8. Click **Save resource** to apply your changes.

Widgets

Learn about Widgets

Automation Widget

The Automation widget allows the user to execute Operations Orchestration (OO) flows on the selected CI and the CIs that are in the selected CI's environment. These flows are run according to the user's permissions in OO. This widget displays all the available OO flows that can be run on the selected CI and CIs within the CI's environment, and displays a history of the available flows that have actually been run on those CIs.

For the Automation Widget to appear in the UCMDB Browser module, this widget must be enabled in UCMDB by going to **Administration > Infrastructure Settings > UCMDB Browser Settings**, and setting **Enable the Automation widget=True**.

The UCMDB Browser module comes with an Automation Flow adapter that is deployed on the UCMDB server when the UCMDB Browser module first loads. For this widget to work, the UCMDB administrator must configure this adapter, as described in "Configure the Automation Flow Adapter (for the Automation Widget)" on page 399. The UCMDB Browser module also deploys several out-of-the-box automation flows that can be used immediately after the CMS UI connects to the UCMDB server, and can be used as examples for constructing other automation flows.

To select and define Automation Flows in UCMDB, see "Select and Define Automation Flows (for the Automation Widget)" on page 400

CI Overview Mode

This mode displays the total number of available flows that can be run on the selected CI and CIs in its environment (called **Available Flows**), and the number of times that any of the available flows have been executed on the selected CI or on CIs in its environment (called **Execution History**).

Widget Details Mode

This mode is split into the following sections:

- **Available Flows.** This section displays the flows that can be run on the selected CI and CIs in its environment. From here you can:
  - Select an Automation Flow
  - Select the CIs on which to run the flow
  - Configure the flow's input parameters
  - See a summary of the configuration before running it
  - Run the configured flow
  - See on which CIs the flow was executed, and on which CIs it was not

  Running the Automation Flow is possible only when all mandatory input parameters have input values.
- **Execution History.** This section displays the actual flows from the Available Flows section that have been run on the selected CI and CIs in its environment. It displays the status of each run, the date when the flow was run, and on which CI it was run.

  For all flows with the status Canceled, Ended, Finished, or Unknown, the user can **re-run** the flow using the menu on the right side of the Automation Flow history record. Each execution has a **Response Report** that opens the OO report related to the specific execution. This OO report can also be opened from the menu on the right side of the Automation Flow history record.

Business Topology Widget

The Business widget is based on a dynamic widget and can be configured according to dynamic widget capabilities. For more information, see "Dynamic Widgets" on page 346. The widget provides additional modes for displaying the business topology of a CI. It looks for containment and dependency relationships between a business element and other CIs.

> **Note:** You should only specify the report layout in the dynamic widget definition if the Widget Type is set to **Properties**. Otherwise, your specified layout is disregarded.

CI Overview Mode

A count of CIs contained in the current CI's environment are displayed, divided by classification. Only

classifications containing at least one CI are displayed. Each classification includes the name of the classification, its icon, and the number of CIs included in it. Clicking a particular classification displays the widget details and filters the selected classification (in both Topology Group CIT mode and Textual mode).

Widget Details Mode

Viewing the widget details does the following:

- Replaces the data displayed in CI Overview mode.
- Presents the detailed environment data in Map mode, CIT Group mode, or Textual mode, whichever was last used. The default mode is the Widget Type value that is selected during creation of the dynamic widget in UCMDB.

  > **Note:** If graphical mode does not display, it may be due to the fact that the drive of the machine where the UCMDB server is installed is full. Free up some space on that drive in order to view graphical mode.

  - **Toolbar**

    The top row of the Business widget acts as a toolbar and enables you to:

    - Switch between the different presentation modes
    - Click a button (in graphical mode only) that opens or closes the CIs pane. The default mode for the CIs pane is opened.

      The CIs pane details the CIs contained in the classification that is selected in the CIT Group pane, dividing it into all relevant CI types.

  - **Map mode**

    > **Note:** When the CMS UI is embedded in a UCMDB server running on a Linux system, runlevel 5 (enabled X server) is needed for the graphical mode of the Dynamic widget to operate properly. In addition, add `unset DISPLAY` to the **server.sh** script. Restart the UCMDB Server for the **server.sh** changes to take effect.

    - Classification icons are displayed in layers according to relationships in the topology and not according to the actual hierarchy.
    - When you select a CI, a refocus link appears in the corner of the selected node. Clicking this link causes the UCMDB Browser module to refocus on that node.

Directional lines representing links are displayed with other items in the view if the selected CI has a direct relationship with at least one other CI (either in the same classification or in a different classification).

- **CIT Group mode**
  - For each classification containing at least one CI, the name and number of CIs in that classification is displayed. Clicking a classification displays all CIs contained in that classification and matching the current filter. In addition, a thumbnail is displayed for each CI type that contains at least a single CI.
  - Classification icons are displayed in layers according to the relative hierarchy of the CIs as displayed in the topology map in UCMDB.

  Directional lines representing links are displayed with other items in the view if the selected CI has a direct relationship with at least one other CI (either in the same classification or in a different classification).

- **Textual mode**
  - **Left pane.** The left pane displays an alphabetical list of all classifications containing at least one CI. Each classification is broken down into a list of the CI types in that classification that have at least one CI. Selecting any line in this pane displays its details in the right pane.
  - **Right pane.** The right pane displays detailed information about the item that is selected in the left pane, divided by CI type.

Change Requests Widget

The Change Requests widget presents the Change Requests related to the selected CI. CI Overview mode displays the total number of Change Requests for each Change Request state. Widget Details mode displays a list of all the Change Requests related to the CI and all their details. The Change Request widget is presented only when Micro Focus Service Manager (SM) configuration element is enabled and configured in the Infrastructure Settings in UCMDB. All data presented is taken from the UCMDB federated RequestForChange CI and its relationships.

> **Note:** The Create Time for federated CIs will show the Open Time of the Change Request in SM. Using non federated RequestforChange CIs (populated with other integrations) will cause the Create Time to be the time when the Change Request was created in UCMDB and not the time when the Change Request was opened in the external data source.

A Change Request is considered related to a CI if it meets one of the following criteria:

- All Change Requests linked directly to the CI.
- If the selected CI is a Model: All Change Requests linked to all the CIs contained in that model (meaning, any other contained model or CI).
- If the selected CI is a Person: All Change Requests that are connected to all the CIs owned by that person.
- In all other cases: All Change Requests that are linked with a composition link to the selected CI (for example: Running Software to Windows Server).

CI Overview Mode

In this mode, change requests related to the selected CI that have one of the following statuses are presented:

- **Recent.** All Change Requests that terminated in the recent time frame (default – 3 days, is refreshed if the selected time frame is changed in the widget details).
- **In Progress.** All Change Requests that are currently in-progress. A Change Request is considered In Progress if it is open, meaning that its planned start date has passed and its planned end date has not yet passed. Also, its phase must qualify as In Progress, meaning that it is defined in the In Progress list in the XML configuration file.
- **Overdue.** An overdue Change Request is a Change Request that was In Progress but whose planned end-date has passed.
- **Planned.** All Change Requests that are planned to start in the recent time frame (default – 3 days, is refreshed if the selected time frame is changed in the widget details.
- **Delayed.** A Change Request is Delayed if it was a Planned Change Request but its planned start-date has passed.

The UCMDB administrator can define which IT SM RFC Phase is mapped to each one of the Change Request statuses Recent, In Progress, and Planned (the Overdue and Delayed statuses are automatically calculated by the UCMDB Browser module). The UCMDB Browser module is configured by default in the following manner:

UCMDB Status	IT SM RFC Phase
Recent	Evaluation, Closure
In Progress	Implementation
Planned	Approval

If a Change Request's phase does not exist in the configuration list it is ignored, meaning that it is not included in the Change Request summary or detailed list.

If a Change Request's planned start date or end date are not defined, the UCMDB Browser module uses the current date for both planned start/end dates (in both the CI Overview and Widget Details modes).

Widget Details Mode

This mode adds the following to the summary displayed in the CI overview:

- Timeline Span toggle: +/-3 days , +/-1 week, +/-1 month. Selecting a timeline span details all Change Requests related to the selected CI that are contained within the selected timeline (that is, either their start date or due date are within that timeline). Note that changing the timeline should change the summary displayed in the CI overview.
- Show toggle: **All/Late**. Selecting **All** details all Change Requests related to the CI in the selected timeline, selecting **Late** presents only those Change Requests that are either overdue or delayed (as explained above).
- All relevant Change Requests, sorted by their status (**Recent**, **In Progress**, **Overdue**, **Planned,** and **Delayed**). The internal sort within each status group is according to Change Request phase and then planned start date.

The following information is provided per each Change Request:

- **ID.** This is a clickable field that refocuses on the RequestForChange CI when selected
- **Phase**
- **Planned Start Date.** Is emphasized if the Change Request is Delayed.
- **Planned End Date.** Is emphasized if the Change Request is Overdue.
- **Affected CIs.** Up to 10 CIs within the context of the selected CI are presented, with a link to show all results in the event that there are more than 10 affected CIs within the context of the selected CI linked to the Change Request. Affected CIs can be refocused.
- **Affected Service.** The first BusinessService CI, within the context of the selected CI, connected to the Change Request CI through a membership link. If no such CI exists, the Affected Service header is not displayed. The Affected Service can be refocused.
- **Severity**
- A direct link to the Service Manager system with the context of the selected change request is presented per each change request, if this link is configured by the system administrator. For

instructions on how to configure this direct link to Service Manager, see "Configure a Direct Link to Service Manager for a Selected Problem, Incident, or Change Request" on page 60.

Defects Widget

The Defects widget presents the defects opened on all ALM projects that are linked (directly or indirectly) to the selected business element CI. In CI Overview mode, defects are displayed according to the defect number; in Widget Details mode, defect details are displayed, as described below.

A business element CI can be linked directly to one or more ALM project(s), using ALM filters (). A business element CI can also be linked indirectly to ALM projects, through its descendants (it is connected to another business element CI which is linked directly to one ALM project or more).

This widget is displayed only if it has been properly configured in UCMDB. For details on this configuration, see "Integrate with ALM (for the Defects Widget)" on page 401.

This widget and the Defects adapter use the Defects CI type (part of Universal Data Model or UDM) for federating data from ALM and using it in the widget.

CI Overview Mode

The total number of Open defects in all projects linked to the selected CI are displayed, according to severity level. The severity levels are Low, Medium, High, Very High, and Urgent.

Widget Details Mode

The following information on defects related to the selected CI is displayed:

Left pane:

The following filters are used to filter the defects displayed in the widget's right pane:

- **Refine field.** Enter a value here to filter the displayed defects to only those defects that contain this value in one of the attributes configured for search refinement. For example, if 12 is typed, all defects that contain “12” in at least one of the configured attributes remain visible, the others are hidden. This is a cross filter with the other two filters (Severity and First-level, described below).

  Configure attributes for the Refine search as follows:

  ```
  <search_refining_attribute_names>DefectReferenceNumber,DefectSummary
  </search_refining_attribute_names>
  ```

  This is a comma-separated list, and the attributes listed here must belong to the Defect CI type. An attribute that does not belong to the Defect CI type is ignored.

An "X" button appears to the right of the field, which allows clearing the entered text.

- **Severity.** This is a toggle between available severity levels. You can filter defects according to severity level. For example, you can choose to display only defects with Urgent severity level. The default is All Severities, meaning that it displays defects of all severity levels. The number of defects for each severity level is displayed.
- **First level filtering.** Since the resulting number of related defects can be high, it is possible to filter them according to one of the following:
  - If more than a single ALM Project is defined (either directly or indirectly), you can filter defects according to a specific project. The number of defects per ALM project is displayed. With this type of filtering, it is only possible to see defects of a specific ALM project. There is no option to see all defects of all ALM projects in a single view.
  - If a single ALM project is defined, first level filtering is determined by the system administrator.

Right pane:

All relevant defects, filtered by the search string, severity level, and first-level filtering are presented. Since all displayed defects belong to a single ALM project, the defect details presented are configurable. Each defect can be presented in a collapsed or expanded mode; collapsed is the default.

In collapsed mode, the following information is displayed:

- Defect ID
- Summary: The summary data is truncated to fit the two line column size.
- Severity (configurable, see above)
- Release: By default, sorting is done using the Severity field on a downward order. It is possible to sort defects according to any of the above fields, either upward or downward, using the arrows that appear on each field's label.

Sorting is done by default using the Severity field in descending order. Sorting defects by any field, either ascending or descending, is done using the arrows displayed on each field's label.

Expanding a Defect

The following information is added to the data presented in the collapsed mode when expanding the defect:

- Full summary information
- All defect-related properties that the UCMDB administrator configured to be displayed per ALM project.

All properties are textual, and are presented in two columns.

Defect Description in Widget Details Mode

The defect description setting configures which attribute of the Defect CIT is displayed in Expanded mode. The default setting is DefectSummary, as shown below:

```
<description_attribute_name>DefectSummary</description_attribute_name>
```

The setting here must be an attribute of the Defect CI Type. If it is not, DefectSummary is used by default.

Severity Mapping

From the UCMDB Browser settings, it is possible to configure the list of values of the DefectSeverity attribute that are mapped to severity levels in the UCMDB Browser module.

For each Severity, the mapping can be configured from the UCMDB Browser settings as follows:

```
<severity_urgent_values>5:Urgent</severity_urgent_values>
<severity_very_high_values>4:Very High</severity_very_high_values>
<severity_high_values>3:High</severity_high_values>
<severity_medium_values>2:Medium</severity_medium_values>
<severity_low_values>1:Low</severity_low_values>
```

If the DefectSeverity of the Defect CI type has the value: “2:Medium”, it is mapped as Medium in the UCMDB Browser module. It is also possible to have a comma-separated list of values here.

> **Note:** The severity displayed in the UCMDB Browser module can be modified through UCMDB. Go to **Administration > Infrastructure Settings Manager > UCMDB Browser Settings**.

Dependent Services Widget

The Dependent Services widget presents all services (that is, all CIs that have the SERVICE_MODEL qualifier) that will have an impact on a selected CI if they fail, according to a specified impact severity level.

The following table displays the severity levels used in the UCMDB Browser module and the comparable severity levels in the UCMDB server:

UCMDB Browser module	UCMDB Server
Critical	Critical(9)
High	Major(8)

UCMDB Browser module	UCMDB Server
Medium	Minor(6)
Low	Warning(2)

The severity level for a CI is cleared (set to None) when you log in to the CMS UI.

> **Note:** To view data in the Dependent Services widget, there must be an impact rule created in UCMDB and you must have View permission for the **Resource Groups > Impact Analysis** resource.

This widget uses out-of-the-box impact rules from UCMDB. To specify the impact rules used by this widget, see "Specify Impact Rules" on page 394.

CI Overview Mode

This mode summarizes the number of services that may impact the selected CI, according to the four severity levels: Critical, Major, Minor, and Normal.

Widget Details Mode

This mode presents detailed information on the services that may impact the selected CI. You can change the severity, which will rerun the analysis to show a different level of impact.

Discovery Progress Widget

The Discovery Progress widget presents the progress of running discoveries, and enables you to drill down to discovered CI instances. The discovery progress information displayed is the last status known by the UCMDB server for each job Trigger CI within the context selected for discovery.

> **Tip:** You can also access the Discovery Progress widget simply by clicking the CI's Discovery Indicator in the **Search** and **Reports** modules.

CI Overview Mode

The Triggered CIs View - Progress/Status Matrix displays a summary of the status of triggered CIs through the progress of discovery.

UI Element (A-Z)	Description
Progress bar	Displays the percentage of new trigger CIs that have completed the discovery process for the set of jobs contained within the focus area that you have selected for discovery since the last time the activity was modified. **Note:** When you activate discovery, the trigger CIs list is prepared. During this time, discovery progress may not be reflected immediately. The discovery progress is refreshed when loading the preview, opening the Widget Details mode, or clicking **Refresh Job List** from the Widget Details mode.
Show All	Clicking the **Show All** link or the **DISCOVERY PROGRESS** widget header link opens the Widget Details Mode.

Understanding the Progress/Status Matrix and the Progress Bar

Progress Status	Total			
Pending Probe	Displays the total number of trigger CIs waiting for the Probe to pick them up for execution.	Displays the number of triggered CIs successfully waiting for the Probe to pick them up for execution.	--	--
Reached Probe	Displays the total number of triggered CIs that reached the Probe, and may have started running.	Displays the number of triggered CIs that successfully reached the Probe, and may have started running.	Displays the number of triggered CIs that successfully reached the Probe and have started running, but have warnings.	--
Completed	Displays the total number of triggered CIs that completed running (successfully or unsuccessfully).	Displays the number of triggered CIs that successfully completed running.	Displays the number of triggered CIs that successfully completed running, but have warnings.	Displays the number of triggered CIs that failed to complete running, did not reach the Probe, or were not picked up by the Probe for execution.
Total	Displays the total number of triggered	Displays the total number of	Displays the total number of	Displays the total number of failed

Progress Status	Total			
	CIs.	successful triggered CIs.	triggered CIs that were successful, but had warnings	triggered CIs.

Widget Details Mode

The following information related to the triggered CIs is displayed:

Left pane:

The left pane summarizes the number of CIs that match the current filter. The left pane is divided into two sections:

1. **Summary** section
   - **All.** Shows the total number of triggered CIs. Clicking this line displays, in the right pane, details of all triggered CIs.
   - **Completed.** Shows the total number of triggered CIs that completed running (successfully or unsuccessfully). Clicking this line displays, in the right pane, details of all triggered CIs that completed running. A further breakdown summary is displayed in the **Completed** section below.
   - **In Progress.** Shows the total number of triggered CIs that are still running. Clicking this line displays, in the right pane, details of all triggered CIs that are still running.
2. **Completed** section

   The following filters are used to filter the triggered CIs that completed running (successfully or unsuccessfully):

   - **Successfully.** Displays the number of triggered CIs that successfully completed running. Clicking this line displays, in the right pane, the triggered CIs that successfully completed running.
   - **With Warnings.** Displays the number of triggered CIs that successfully completed running, but have warnings. Clicking this line displays, in the right pane, the triggered CIs that successfully completed running, but have warnings.
   - **With Errors.** Displays the number of triggered CIs that failed to complete running, did not reach the Probe, or were not picked up by the Probe for execution. Clicking this line displays, in the right pane, the triggered CIs that failed to complete running, did not reach the Probe, or were

not picked up by the Probe for execution.

> **Note:** When you refresh the jobs list, the selected filter does not change.

Right pane:

Displays the following:

- **Check Network Availability** Check Network Availability. Allows you to check the network availability for any of the IP addresses of a Node type CI from the UCMDB Browser module. For detailed instructions, see "Check Network Availability from the Discovery Progress Widget" in the *Universal CMDB Browser Online Help*.
- **Refresh Job List** Refresh Job List. Allows you to refresh the job list.
- **Details** section.

  Displays the job list and the following details for all triggered CIs.

Column	Description
Job Name	Displays the list of jobs that have reached the selected stage of discovery and with the selected status.
Status	Displays the following status for the triggered CI. The success data is retrieved from the UCMDB Server side. When there is warning/error with a triggered CI, the data from the UCMDB Server is overwritten by the data from the probe side. ○ **Success.** Displays the word **Success** in green. The success data is retrieved from the UCMDB Server side. When there is a warning/error with a triggered CI, the data from the UCMDB Server is overwritten by the data from the probe side. ○ **Warning.** Displays the word **Warning** in orange. For the triggered CI with a **Warning** status and a **Warning** message, a down arrow is displayed at the beginning of the row. Clicking the down arrow expands a short warning message for the triggered CI. To collapse the warning message, click the up arrow. ○ **Error.** Displays the word **Error** in red. For the triggered CI with an **Error** status and an **Error** message, a down arrow is displayed at the beginning of the row. Clicking the down arrow expands a short error/warning message for the triggered CI. To collapse the error/warning message, click the up arrow.

Column	Description
	Note: In the error/warning message list, the error messages are flagged with ⊗, and the warning messages are flagged with ⓘ. If a triggered CI contains both error and warning messages, **Error** is displayed as its status.
Probe	Name of the probe.
Trigger CI	Name of the trigger CI.
Last Discovery Time	Displays the time that the triggered CI was last discovered (touched) by a probe.

- **Context Menu** ≡

  Hovering your mouse over a record allows you to access the **Context Menu** ≡ displayed at the right end of the line.

  Clicking the **Context Menu** ≡ button allows you to access the following:

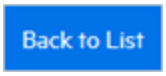
  - **Show Details**

    Displays the following details for the selected triggered CI. This option is only available for CIs with an **Error** or a **Warning** status.

Column	Description
^/v	Displayed at the beginning of the row, allowing you to expand/collapse a list of detailed error/warning messages for the triggered CI. By default, the list of detailed error/warning messages is expanded. To collapse the message list, click the up ^ arrow. To expand the message list, click the down v arrow.
Error/Warning Message	Displays a short error/warning message with the ⊗ or ⓘ flag.
Severity	Displays the severity of the error/warning.
Message Code	Displays a message code (for example, 302).

    Note:

> - To view the **Show details** action, you must have the **Run Discovery and Integration** or **View Discovery Status and Error** permission.
> - To view the detailed information for a triggered CI, you can also click the triggered CI's status. You can view the **Show Details** tooltip each time you hover the mouse over an **Error** or a **Warning** status.
> - The **Show details** action is disabled for the triggered CIs that successfully completed running.

To go back to the jobs list, click the 

button.

- **Rerun**

  Allows you to rerun a discovery job.

  > **Note:** To use the **Rerun** action, you must have **Run discovery and Integrations** permission.

  For instructions about how to rerun a discovery job, see "Rerun a Discovery from the Discovery Progress Widget" in the *Universal CMDB Browser Online Help*.

- **View Discovery Log**

  Allows you to open the discovery log details page and view the log for the selected job.

  > **Note:**
  >
  > - If the selected discovery job has no communication log, or the discovery job completed successfully, you will see a "No data" message after clicking the **View Discovery Log** action.
  >
  > Communication log is available for a discovery job when the following conditions are met:
  >
  > - The **Create communication log** setting in the Execution Options section is set to **Always** (go to **UCMDB UI > Data Flow Management > Universal Discovery > Adapter Management > Adapter Configuration**).
  > - Error(s) occurred during the running of the discovery job.

  The **RAW/WELL FORMATTED** switch at the upper right side of the page allows you to toggle between displaying raw log data or displaying formatted log data for easy troubleshooting purpose.

  Support matrix for the View Discovery Log features:

Supported web browsers	RAW Log	WELL FORMATTED Log
Microsoft Internet Explorer 9	Yes	No
Microsoft Internet Explorer 10	Yes	Yes
Microsoft Internet Explorer 11 (or later)	Yes	Yes
Google Chrome 30 (or later)	Yes	Yes
Mozilla Firefox 33 (or later)	Yes	Yes
Apple Safari 9.1 (or later)	Yes **Note:** View raw data only.	Yes

- **RAW.** Displays the discovery log data dynamically in its raw form.

  The DOWNLOAD button available at the top of the page allows you to download the raw log data in the **Log.xml** file to your local drive.

  > **Note:** This button is not available if you use a web browser other than Microsoft Internet Explorer 10 (or later), Google Chrome, or Mozilla Firefox.

- **WELL FORMATTED.** Retrieves and processes the raw discovery log data, and then displays the log data in the formatted form.

  This page contains two sections:

  - Job summary section. Displays the discovery job related information. You can click **JOB**, **DESTINATION**, **PROTOCOL**, **PARAMETER**, or **SCANNER STATUS** tab for more details about the discovery job.
  - **LOG** details section. Contains the following:

UI Element	Description
<Search box>	Type a key word in the Search box to search the log entries. When you type a key word, log entries that match the key word are highlighted with yellow background.
	Click to display available filters: • Execute CMD

UI Element	Description
	• Connect • Warning • info • debug • error • warn You can select one or more filters to filter the log entries. When doing so, only log entries that match the filter(s) are displayed, but no log entries are highlighted.
Results	Displays total count of log entries. When a search key word is entered or one or more filters are selected, it displays total count of log entries that match the key word or selected filters.
<Table of log entries>	Displays log entries in a table with three columns (**Time Stamp**, **Severity**, and **Content**). Drag down the scroll bar to dynamically load and display log entries. Log entries of different severities are displayed in different color for easy reading: • **info.** Displayed in blue. • **debug.** Displayed in green. • **error.** Displayed in red. When hovering your mouse over a log entry, the log entry is displayed in black with light gray background. If you click to select it, the selected log entry is highlighted with light green background. You can click the up or down arrow next to a column header to sort the log entries.
<Log entry data>	Displays the log data for a selected log entry. Click the **Raw** tab to view the log entry data in its raw form; click the **Formatted Log** tab to view the processed log message for easy reading and troubleshooting purpose.

To go back to the jobs list, click the Back to List button.

Dynamic Widgets

Dynamic widgets are widgets that display data about a particular view. You create dynamic widgets in the Modeling Studio in UCMDB.

> **Note:**
>
> - After you create a dynamic widget in UCMDB, you must log out of the CMS UI and then log in again to see the newly created widget.
> - Only one level of grouping is supported.
> - If no grouping option has been specified in the hierarchy tree, all CI attributes appear in a single screen.
> - You must use the **> Resource Creation Action > Dynamic Widget** action on the **Security > Roles Manager > General Actions** tab to control which users may create new dynamic widgets in the Modeling Studio (for use in the UCMDB Browser module).

CI Overview Mode

On the Widget tab of the dynamic widget configuration, you must set an attribute to **True** in the Overview column for it to be displayed in CI Overview mode.

The CI Overview mode displays up to six individual properties (six random properties from all nodes specified in the dynamic widget).

Widget Details Mode

On the Widget tab of the dynamic widget configuration, you must set an attribute to **True** in the Details column for it to be displayed in Widget Details mode.

Properties in Widget Details mode are displayed in different ways, depending on the dynamic widget's configuration:

- If no grouping classifications have been specified in the hierarchy tree of the dynamic widget's configuration, all attributes that are defined as **True** for being shown in Widget Details mode are displayed in a list.
- If grouping classifications have been specified, in the first level of this mode CIs are displayed by group (as specified in the hierarchy tree) and show a maximum of two random attributes that are defined as **True** for being shown in CI Overview mode. Selecting one of the CIs shows all of the attributes for that CI that are defined as **True** for being shown in Widget Details mode, grouped by the group name for that attribute that was specified in the widget's configuration.

Create a dynamic widget

1. In UCMDB, go to **Modeling > Modeling Studio**.

> **Note:** To create a dynamic widget, you must have Create Dynamic Widget permission assigned in the Roles Manager in UCMDB.

2. Click **New** and from the drop-down list, select **Dynamic Widget**. In the **New Dynamic Widget** dialog, select the base TQL query on which your new dynamic widget is based, or select **Create new query** to build a new TQL query.

   a. In the View tab, add the query nodes and relationships that define the query.

   >>for version 3.1 - delete this paragraph and note, and unconditionalize the <ol>, after confirmation with dev<<

   Specify whether to use a manual (default) or rule-based hierarchy when defining the TQL query.

   > **Note:** If you are starting with a blank widget, you must add at least one query node in order to save your widget.

   b. In the Report tab, select a node in the Hierarchy pane, and choose the attributes for that node that you want to appear in the widget.

   c. In the Widget tab, select a node and set values for that node's attributes:

UI Element	Description
Overview	Boolean. Specifies whether this attribute appears in the CI Overview mode.
Details	Boolean. Specifies whether this attribute appears in the Widget Details mode.
Refocusable	Boolean. Causes the attribute to appear as a hyperlink, which will refocus to the CI on which it is defined.
Group Name	String. Specifies the name of the section under which the attribute will be grouped in the Widget Details mode.

   - Select the **Show path** checkbox to cause the UCMDB Browser module to display the route in the dynamic widget from a specific node in the view definition to all the node's children.
   - Select the **Enforce Browser CI access control** checkbox to ensure that the dynamic widget displays data only according to the permissions that were specified in UCMDB (on the Browser CI Access Control tab in the Roles manager). If the checkbox is not selected, the dynamic widget will display all data, without permission enforcement.
   - Select an initial display mode for the dynamic widget.

- **Properties Mode**. Displays individual properties for CIs.

  > **Note:** If you do not select a Widget Type value, Properties Mode is enabled by default.

- **Topology Map Mode**. Displays CIs according to your current topology (folding definitions are also reflected).
- **Topology CIT Group Mode**. Displays CIs grouped by CI type according to your current model.
- **Topology Textual Mode**. Displays a list of CIs broken down by CI type.

The topology mode that you select is the initial view selection until you change to another one in the UCMDB Browser module.

3. When you are finished, click **Save** .

For additional details, see "Modeling Studio" in the *Modeling section of the UCMDB Help*.

Environment Widget

The Environment widget presents the closest environment of the selected CI (as defined in by the calculated links that are specified in the CI Type Manager in UCMDB). Details about CIs in the environment can be displayed in either textual or graphical mode.

User preferences are saved in the UCMDB server's user preferences.

CI Overview Mode

A count of CIs contained in the selected CI's environment are displayed, divided by classification. Only classifications containing more than one CI are displayed. Each classification includes the name of the classification, its icon, and the number of CIs included in it. Clicking a particular classification displays the widget details and filters the selected classification (in both Graphical Mode and Textual Mode).

When you click the direct link icon, another web browser window opens, displaying UCMDB's IT Universe Manager in the Get Related CIs module.

Widget Details Mode

The widget details mode presents the detailed environment data in either textual or graphical mode, whichever was last used. Graphical mode is the default view mode.

> **Note:** If graphical mode does not display, it may be due to the fact that the drive of the machine

> where the UCMDB server is installed is full. Free up some space on that drive in order to view graphical mode.

- **Toolbar**

  The top row of the Environment widget acts as a toolbar and enables you to:

  - Switch between graphical and textual modes
  - Click a button (in graphical mode only) that opens or closes the CIs pane. The default mode for the CIs pane is opened.

    > **Note:** You can also open the CIs pane by selecting a classification in the Topology map.

    The CIs pane details the CIs contained in the classification that is selected in the Topology pane, dividing it into all relevant CI types.

- **Graphical mode**

  > **Note:** When the CMS UI is embedded in an UCMDB server running on a Linux system, runlevel 5 (enabled X server) is needed for the graphical mode of the Environment Widget to operate properly. In addition, add `unset DISPLAY` to the **server.sh** script. Restart the UCMDB Server for the **server.sh** changes to take effect.

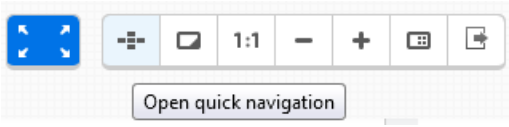
  In graphical mode, information is displayed in a topology map format, with the CIs grouped by CI Types. In this map, the groups cannot be expanded.

  You can navigate in the Environment Widget easily by turning on the quick navigation map.

  In the quick navigation map, the elements from the canvas are represented. You can drag and resize the selection in the map overview.

  If the map is too large, a big overview of the map is available, which allows you to use the map overview navigator to jump directly to a particular part of the map.

  A toggle button is available in the map to allow you to turn on/off the minimap. If the map is larger than 20 CIs, the state of the button is saved in your user preferences. For more details about the Map Toolbar, see "Map Toolbar" on page 281.

  Directional lines representing links are displayed with other items in the view if the selected CI has a direct relationship with at least one other CI (either in the same classification or in a different classification).

- **Textual mode**
  - **Left pane.** The left pane displays a list of all classifications containing at least one CI. Each classification is broken down into a list of the CI types in that classification that have at least one CI. Selecting any line in this pane displays its details in the right pane.
  - **Right pane.** The right pane displays detailed information about the item that is selected in the left pane, divided by CI type.

Get Related Widget

The Get Related widget presents an improved way to explore environment data. In addition to viewing the CIs that are related to a selected CI, you can add or remove from the map CIs that are related to a CI in the map. Details about related CIs can be displayed in either textual or graphical mode.

User preferences are saved in the UCMDB server's user preferences.

CI Overview Mode

A count of CIs contained in the selected CI's environment are displayed, divided by classification. Each classification includes the name of the classification, its icon, and the number of CIs included in it.

When you click the direct link icon, another web browser window opens, displaying UCMDB's IT Universe Manager in the **Get Related CIs** module.

Widget Details Mode

The widget details mode presents the details about related CIs in either textual or graphical mode, whichever was last used. Graphical mode is the default view mode.

- **Toolbar**

  The top row of the Get Related Widget acts as a toolbar and enables you to switch between graphical and textual modes.

- **Graphical mode**

> **Note:** When the CMS UI is embedded in an UCMDB server running on a Linux system, runlevel 5 (enabled X server) is needed for the graphical mode of the Get Related Widget to operate properly. In addition, add `unset DISPLAY` to the **server.sh** script. Restart the UCMDB Server for the **server.sh** changes to take effect.

In graphical mode, information is displayed in a topology map format. Using the Get Related widget allows you to automatically bring in the map all the related CIs.

In UCMDB, **Administration > Infrastructure Settings Manager > UCMDB Browser Settings > Maximum nodes that can be explored using Get Related** setting, you can specify the maximum number of nodes to be displayed in the map. The default value is 20.

> **Note:** If you do not want to limit the number of nodes to be displayed in the map when accessing the Get Related widget, the value of the **Maximum nodes that can be explored using Get Related** setting in UCMDB, **Administration > Infrastructure Settings Manager > UCMDB Browser Settings** has to be **-1**.

If the number of related CIs is higher than the specified number, the following message is displayed : *"The CI contains over "X" related CIs. Select the CIs you want to show on map"*.

In the Get Related Map you can explore the related CIs for all the CIs displayed in the map. You can manually add or remove from the map CIs that are related to a selected CI, by using the Right panel. To go back to a previous state displayed in the get related map, select the desired CI in the Navigation Context menu. You can view in the Right panel the CI Type's count information displayed in parentheses.

> **Note:**
>
> - The **Get Related** action is not available for the federated CIs.
> - To access the Get Related widget, you must have the **Get Related** permission, and the value of the **Enable Get Related Context Menu** setting in UCMDB, **Administration > Infrastructure Settings Manager > UCMDB Browser Settings** has to be **True** (this is the default value).

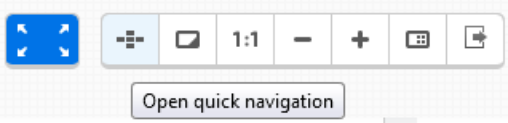
> **Note:** To access the Get Related widget, you must have the **Get Related** permission, and the value of the **Enable Get Related Context Menu** setting in UCMDB, **Administration > Infrastructure Settings Manager > UCMDB Browser Settings** has to be **True** (this is the default value).

- You can navigate in the Get Related Widget easily by turning on the quick navigation map.

  In the quick navigation map, the elements from the canvas are represented. You can drag and resize the selection in the map overview.

  If the map is too large, a big overview of the map is available, which allows you to use the map overview navigator to jump directly to a particular part of the map.

A toggle button is available in the map to allow you to turn on/off the minimap. For more details about the Map Toolbar, see "Map Toolbar" on page 281.



Directional lines representing links are displayed with other items in the view if the selected CI has a direct relationship with at least one other CI.

- **Show Additional Information on the Topology Map**

  If desired, you can view additional information for the CIs displayed in the map. For more information, see "Show Additional Information on a Topology Map" on page 376

- **Textual mode**

  In Textual mode, information is presented in a list format. You can see a list of the CIs that are displayed in the Topology Map. By default, the list of CIs is expanded.

History Widget

The History widget is used to compare details about the selected CIs between different points in time. The comparison is based on the UCMDB History storage, and can present the following information:

- Changes in attribute values.
- Changes in connectivity between the selected CI and related CIs (due either to addition or deletion of links between CIs).
- Creation of the CI in UCMDB.

The Selected tab displays historical changes for the selected CI only. The Model tab shows CIs related to the selected CI that have historical changes. Clicking one of the related CIs displays historical changes for that related CI.

> **Note:**
>
> - Changes are compared between two points in time. Additional or multiple changes are neither counted nor presented. For example, the value of an attribute that changes on date X from value A to value B, and then on date Y from value B to value A, is not displayed as changed.
> - Dates presented in the History widget are displayed in the format defined in the user's default browser. Only changes after Jan. 1, 1970 are shown. If no changes were made on the selected

> CI between the two comparison dates, the message “No data available for History widget” is displayed.
>
> - For all historical comparison purposes, the snapshot time taken into account is the time that the CI was changed.

User preferences are saved per user according to the last user's selection:

- The Compare mode (either Selected or Model mode, explained below)
- The latest From and To dates for comparison

CI Overview Mode

This mode displays a graph summarizing the historical changes that occurred in the selected CI (the default display option) or its model during the previous four weeks. The X axis lists five dates, from four weeks ago to the current date. The Y axis shows the number of changes in a single day.

Widget Details Mode

The following information is displayed in the widget details mode:

- Presents the Compare mode and the beginning and end dates used for comparison. The default end date is the current date and time. The default beginning date is the current end date minus the **History Widget From Date** setting that is set in UCMDB. The beginning date always starts from 12:00 AM. For example, if the **History Widget From Date** setting is 5, and the current date is Jan. 30, 2013, then the default beginning date is Jan. 25, 2013 at 12:00 AM. The default value for the **History Widget From Date** setting is 7, but this value can be changed by the UCMDB Administrator, as explained in "Change the History Widget 'From Date'" on page 383.
- If the Compare mode in the last user’s filter is Selected, the History Comparison View for the selected CI, according to the filter settings, is displayed.
- If the Compare mode in the last user’s filter is Model, the Model view, with all classifications and CI types according to the filter settings (either the last user selection or default values) is displayed.

The widget details are divided into the following sections:

- **Filter section**

  When the History widget is expanded, the Filter section is loaded with the latest user selections (as saved in the user preferences, if any). If there is no latest user selection, the default values are:

- Compare mode – **Selected**
- Last history comparison dates:
  - **From** date – this date is calculated as follows: current date minus the **History Widget From Date** setting that is set in UCMDB, starting from 12:00 AM.
  - **To** date – the current date

Each time a filter field is changed, its data is saved in the user preferences.

Use the following UI elements to configure the information displayed by the History widget:

- The Compare mode tabs toggle between displaying the history comparison only on the selected CI, or in the wider context of the model (explained above). When you toggle between the two modes, the following changes occur:
  - If the value changes to **Selected** – the History Comparison view for the selected CI using the current filter is displayed (regardless of the previous view).
  - If the value changes to **Model** – the Model view, with all classifications and CITs resulting from the current filter (regardless of the previous view) is displayed.
- The date pickers allow you to select From and To dates (defining the history comparison date boundaries). Any valid date can be selected. When you select dates, the history comparison is recalculated according to the new dates, resulted in the displayed view being refreshed (either history comparison or CI selection).

> **Note:** If the **To** date is earlier than the **From** date, an error message is displayed.

- **Model View**

  The Model view displays all CIs contained in the selected CI's model that match the current filter (that is, have at least one historical change during the selected time frame), divided by classification and CI type. This area is only visible when the Compare mode is set to Model, and it is divided into two panes:

  - **Left pane**

    The left pane summarizes the number of CIs that match the current filter, divided into an alphabetical list of classifications and CI types.

    - The first line (displaying the word **All**) shows the total number of CIs matching the current filter. Clicking this line displays, in the right pane, all CIs contained in the selected CI's model and matching the current filter.

    - For each group with more than a single CI, the name and number of CIs in that group is displayed. Clicking a group displays, in the right pane, all CIs contained in that group and matching the current filter.
    - Following each group's name, an alphabetical list of all CI types in that group (with more than a single CI) is displayed. Clicking a CI type displays, in the right pane, all CIs of that CI type and matching the current filter.
    - The icon, name, and number of CIs in that group are displayed for each CI type.
  - **Right pane**

    The right pane displays the details of the data in left pane, divided into all relevant CI types. For each CI type, the following details are displayed.

    - The name of the CI type and the number of CIs contained in it.
    - The list of CIs contained in the CI type, including the icon, name, and type for each CI.

    In addition, hovering over a displayed CI shows a selection button. Clicking this button opens the History Comparison view for the selected CI.

    Ten CIs are displayed for each CI type. If there are more than ten CIs for a CI type, a link appears, enabling you to view all of the CIs.

    Clicking on a CI in this pane opens the History Comparison view for that CI.

    If the number of CIs matching the current filter is 0, the first line of the widget displays **All 0**, and the right pane is empty.

- **History Comparison View**

  The History Comparison view displays a list of the changes in a specific CI between two selected points in time. This view appears when:

  - The Compare mode is set to Selected – the selected CI is used for the historical comparison.
  - The Compare mode is set to Model and a CI is selected in the Model view – that CI is used for the historical comparison. In this case, a Back button also appears. Clicking the Back button switches back to the Model view.

  In the upper left corner of the History Comparison view, the following information is displayed for the CI used for comparison: CI icon, name, and CI type. Clicking on the CI name here takes you to the CI Overview for the CI under comparison.

  The History Comparison view has two sections: Changed Attributes and Changed Related CIs. These sections are described in detail below.

  Changed Attributes section

The Change Attributes section displays the number of changes detected in the CI between the specified From and To dates, grouped by months and days.

The date appearing in the header of the From column is the closest date to the current date from among:

- the filter's From date
- the date that the CI was created
- the earliest date that has history events for the selected CI

When clicking on a month in this section, it expands and shows the number of changes made in that month grouped by days, along with the date of the latest change made in a day and the user who caused that change.

When clicking on a day, it expands and displays the changed attributes from that day, their old and new values, and also the date of the latest change and the user who caused that change. If the value of a byte type attribute does not fit entirely in the panel (it is displayed truncated), the indicator **"..."** appears next to the displayed text and a **Show All** link appears next to it. Clicking **Show All** displays the byte type attribute value entirely in a pop-up window.

If no changes are detected during the selected time period, the message "There are no items to display" appears.

Changed Related CIs section

The Changed Related CIs section displays a list of all CIs that were either attached to (linked to) or detached from the selected CI between the From and To dates, grouped by months and days.

This section does not load by default. Instead, a **Load Changed CIs** Load Related CIs button is available, allowing you to load relationship changes only on demand by clicking the button.

The Load Related CIs button is also available in the Model view. Clicking this button in Selected view or Model view, displays the relationship changes in both Selected view and Model view.

The following information is displayed for each CI listed in this section:

- CI icon
- name
- CI type
- linkage state, which is either Related or Not Related

When clicking on a month in this section, it expands and shows the number of changes made in that month grouped by days, along with the date of the latest change made in a day and the user who caused that change.

When clicking on a day, it expands and displays the changes from that day in the related CIs (due either to addition or deletion of links between the selected CI and related CIs), their old and new states, and also the date of the latest change and the user who caused that change. When expanded, if you click the CI type, icon, or name, the CI Overview for that CI is displayed.

Impact Simulation Widget

The Impact Simulation widget presents the impact analysis of a selected CI (that is, which CIs are impacted by it, according to a selected impact severity level).

The following table displays the severity levels used in the UCMDB Browser module and the comparable severity levels in the UCMDB server:

UCMDB Browser module	UCMDB Server
Critical	Critical(9)
High	Major(8)
Medium	Minor(6)
Low	Warning(2)

The severity level for a CI is cleared (set to None) when you log in to the CMS UI.

> **Note:** To view data in the Impact Simulation widget, there must be an impact rule created in UCMDB and you must have View permission for the **Resource Groups > Impact Analysis** resource.

This widget uses out-of-the-box impact rules from UCMDB. To configure the impact rules used by this widget, see "Specify Impact Rules" on page 394

CI Overview Mode

This mode summarizes the number of CIs impacted by the selected CI by means of an Impact Bar, according to the four severity levels: Critical, Major, Minor, and Normal.

Widget Details Mode

This mode presents detailed information on all the CIs impacted by the selected CI. You can change

the severity, which will rerun the analysis to show a different level of impact.

- **Toolbar**

  The top row of the Impact Simulation Widget acts as a toolbar and enables you to switch between graphical and textual modes.

- **Graphical mode**

  > **Note:** When the CMS UI is embedded in an UCMDB server running on a Linux system, runlevel 5 (enabled X server) is needed for the graphical mode of the Impact Simulation Widget to operate properly. In addition, add `unset DISPLAY` to the **server.sh** script. Restart the UCMDB Server for the **server.sh** changes to take effect.

  In graphical mode, information is displayed in a topology map format.

  Graphical mode contains the following:

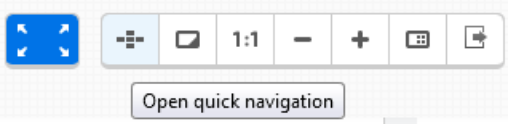
UI Element (A-Z)	Description
Additional Info	Allows you to view additional information for the CIs displayed in the map. For more information, see "Show Additional Information on a Topology Map" on page 376
Filter	Clicking one of the following filters displays in the map all the CIs according to the selected filter: ◦ By Class Qualifier • Business Model • Filter Analysis ◦ By CI Type **Note:** The filter applied in Graphical mode will also have effect in the Textual mode.
Impact	Allows you to change the severity, which will rerun the analysis to show a different level of impact. **Note:** The maximum number of CIs that can be displayed in the Topology Map is 500. If there are more than 500 CIs, they will be listed in the Textual mode, which is automatically displayed.

  - You can navigate in the Impact Simulation Widget easily by turning on the quick navigation map.

    In the quick navigation map, the elements from the canvas are represented. You can drag and resize the selection in the map overview.

If the map is too large, a big overview of the map is available, which allows you to use the map overview navigator to jump directly to a particular part of the map.

A toggle button is available in the map to allow you to turn on/off the minimap. For more details about the Map Toolbar, see "Map Toolbar" on page 281.



Directional lines representing links are displayed with other items in the view if the selected CI has a direct relationship with at least one other CI.

> **Note:** The **Notifications** and **Choose category** options from a CI's context menu are disabled for the Impact Simulation widget.

- **Textual mode**

  Textual mode contains the following:

UI Element (A-Z)	Description
Left pane	◦ **Severity** Allows you to change the severity, which will rerun the analysis to show a different level of impact. ◦ **Filters** Displays a list of CIs impacted by the selected CI, according to the four severity levels. Selecting any line in this pane displays its details in the right pane. **Note:** When a filter is selected in Graphical mode, the **Filters** section in Textual mode filters only the results displayed in the Topology Map.
Right pane	The right pane displays detailed information about the item that is selected in the left pane, divided by CI type.

Incidents Widget

The Incidents widget presents the incidents related to the selected CI. CI Overview mode shows the number of incidents per priority, where the priority groups are Urgent, Major, Minor, and None. Widget Details mode displays incident details. The Incidents Widget is presented only when the Incidents

setting element is enabled and configured from the Infrastructure Settings Manager in UCMDB. All data presented is taken from the UCMDB federated Incidents CI and its relationships.

> **Note:** The Create Time for federated CIs will show the Open Time of the Incident in SM. Using non federated Incidents CIs (populated with other integrations) will cause the Create Time to be the time when the Incident was created in UCMDB and not the time when the Incident was opened in the external data source.

This widget displays incidents related to the selected CI as follows:

- All incidents linked directly to the CI through a Connection link.
- **If the selected CI is a Model.** All incidents linked to all the CIs contained in that model (meaning, any other contained model or CI).
- All incidents linked to CIs that are connected to the currently selected CI through a composition or membership relationship.
- **For BusinessService CIs.** All incidents linked directly to the CI through an **applicationLink** link.

If an incident's priority does not map to a UCMDB Browser's Internal Priority, it should not be counted in CI Overview mode nor presented in Widget Details mode. For instructions on how to configure the UCMDB Browser's Internal Priorities, see "Configure Browser Internal Priorities (for the Incidents and Problems Widgets)" on page 107.

CI Overview Mode

This mode presents the number of open incidents from SM that have an Open Date within the Timeline Span selected in the Widget Details mode (see the description below). The incidents are categorized by their Internal Priority, where:

- Open incidents are all incidents whose status (an IT SM attribute, federated to UCMDB) is within a configured range of values defined by two configuration parameters. If an incident status does not belong to that set of values, it is not considered open.
- Internal Priority is a UCMDB Browser set of values (1-4), where each value has a configurable label and is mapped to a set of IT SM Priority values (an SM attribute, federated to UCMDB). For instance, a valid configuration could be of four Internal Priorities (Urgent, Major, Minor, None), where each is mapped to a specific unique set of IT SM Priority values.
- Both configuration parameters are defined only by the UCMDB administrator.

Widget Details Mode

This mode adds the following information to the summary displayed in CI overview mode:

- **Timeline Span toggle.** This is a 4-way toggle, with the options **Less than a day**, **Between 1 to 3 days**, **More than 3 days**, and **Show All**. Selecting a timeline span displays all open incidents related to the selected CI that are in the timeline span (that is, their Open Date is within that timeline span). Changing the timeline span also changes the incident groups displayed in CI Overview mode. The default timeline span in Widget Details mode is **Less than a day**, unless there are no incidents in that span, in which case **Between 1 to 3 days** is displayed. The timeline span remains in effect for each user until it is changed.
- All relevant incidents, divided by their Internal Priority. The internal sort within each priority group is according to the incident's Open Date. The following items are provided per each incident:
  - **Incident ID.** This is a clickable field that refocuses on the Incident CI when selected.
  - **Status**
  - **Impact**
  - **Urgency**
  - **Priority**
  - **Open Date**
  - **Title**
  - **Outage Start** (this is an optional SM parameter)
  - **Affected CI.** Only a single CI is presented with a link to display all results. The CI presented is either the node to which the incident is linked (if it is not the current CI) or a Business CI affected by the incident (if the current CI is directly linked to the Incident CI). If there is a Business Service connected directly to the incident, it should be displayed as an affected CI. Affected CIs can be refocused.

    > **Note:** The affected CI is displayed only if it is within the context of the selected CI.

  - **Affected Service.** The first BusinessService CI connected to the Incident CI through a membership link. If no such CI exists, the Affected Service header will not be displayed. Affected Service can be refocused.
- A direct link to the Service Manager system with the context of the selected incident is presented per each incident, if this link is configured. For instructions on how to configure this direct link to Service Manager, see "Configure a Direct Link to Service Manager for a Selected Problem,

Incident, or Change Request" on page 60.

- Each incident is separated from the others by empty space.

Monitoring Widget

The Monitoring widget displays the statuses of KPIs (received from the BSM) for the selected CI. KPI statuses can be one of the following: Ok, warning, minor, major, critical, info, no data, and downtime.

CI Overview mode displays the worst KPI status for the selected CI (where downtime is the worst status, and Ok is the best status). Widget Details mode shows all the details of all KPIs related to the selected CI.

The UCMDB Browser module comes with a BSM adapter that is deployed on the UCMDB server when the UCMDB Browser module first loads. For this widget to work, the UCMDB administrator must configure this adapter, as described in "Configure the BSM Health Indicator (for the Monitoring Widget)" on page 395.

> **Note:**
>
> - System time on the UCMDB server and BSM server should be synchronized, otherwise monitoring data in the UCMDB Browser module will be empty.
> - The BSM does not return KPIs for CI collections.
> - For the Monitoring Widget to properly display KPI statuses for the selected CI, ensure that all CIs monitored in the BSM have the attribute **Store KPI History For Over Time=true**.

Adding Another Data Source for Display in the Monitoring Widget

If you want to add another data source to be displayed in the Monitoring widget, you must add an additional integration point name to the **<data_stores>** tag in the **ucmdb_browser_config.xml** configuration file, as shown in the following example:

```
<bsm_configuration>
    <data_stores>
        <data_store>bsm_adapter</data_store>
       <data_store>second_adapter</data_store>
    </data_stores>
</bsm_configuration>
```

Policy Widget

The Policy widget is presented only if a live Configuration Manager (CM) system is deployed in the UCMDB environment. The terminology and icons used in both the CI Overview and Widget Details

modes are identical to what is used in CM. All Key Performance Indicators (KPIs) and related attributes are taken from CM (that is, no calculation is performed by the CMS UI).

> **Note:** To use the Policy widget, you must have CM version 9.30 or later installed, and CP10 or later installed on the UCMDB server.

CI Overview Mode

This mode displays the selected CI's overall policy KPI, taken from CM, as follows:

- Overall policy compliance status: whether it is satisfied or in breach
- Overall policy compliance value (in terms of percentage, graphically presented in a bar)
- KPI description, automatically generated by the CM

For business elements, the CI overview presents the overall business policy KPI (that is, a summary of all CIs linked to the Business CI, as opposed to the CI itself). A direct link to the CM system, with the context of the selected CI, is presented in the widget.

Notifications for changes in the Policy widget are displayed only in the Notifications tab and in the widget's CI Overview mode.

Widget Details Mode

This mode adds the following details, taken from CM:

- All policies linked to the selected CI. Each policy is separated from the others by an empty space.
- For each linked policy, the policy name, compliance status, and a description are displayed.

Problems Widget

The Problems widget presents the problems related to the selected CI, either according to their numbers (in CI Overview mode) or by their details (in Widget Details mode). A problem is considered related to a CI if it meets one of the following conditions:

- It is linked directly to the CI through a Membership link. Note that IT Service Manager connects a Problem to its affected Business Service in the same manner (that is, a Membership link connects the Problem CI with the Business Service CI).
- If the selected CI is a Model, all problems linked to all the contained CIs in that model (meaning, any other contained model or CI) are considered related to the selected CI.

- In all other cases, all problems linked to the selected CI's composition/membership connected CIs (probably a Node) are considered related to the selected CI.

> **Note:**
>
> - This widget appears only when it is enabled in UCMDB. For instructions on how enable this widget, see "Enable the Problems Widget" on the next page.
> - If you are connecting to a UCMDB Server that has Content Pack 10 or an older version installed, you must perform the instructions in the section "Problems Widget" on the previous page below so that the Problems widget functions properly.

All presented data is taken from UCMDB Federated Problems CI (and its relationships).

> **Note:** The Create Time for federated CIs will show the Open Time of the Problem in SM. Using non federated Problems CIs (populated with other integrations) will cause the Create Time to be the time when the Problem was created in UCMDB and not the time when the Problem was opened in the external data source.

CI Overview Mode

This mode presents the total number of Open problems, categorized by their Internal Priority. Open problems are all problems with a Status (a Service Manager attribute, federated to UCMDB) that is within a configured set of values. If a problem's Status does not belong to that set of values, it is not considered open.

Internal Priorities are a set of UCMDB Browser values (1-4), where each value has a configurable label and is mapped to a set of Service Manager Priorities (these are Service Manager attributes that are federated to UCMDB). For instance, a valid configuration could be four Internal Priorities (Urgent, Major, Minor, None), where each is mapped to a specific unique set of Service Manager Priority values.

Configuring the set of values to define when a Problem is open and configuring the four UCMDB Browser Internal Priorities should be performed only by the UCMDB administrator.

The UCMDB Browser's mapping between Internal Priorities and Service Manager priorities should be defined once and be used by all relevant Widgets (that is, the same configuration settings are used for both the Incidents and Problems Widgets). If a Problem's priority does not map to a UCMDB Browser Internal Priority, it is not counted in the CI overview or presented in the widget details.

For instructions on how to configure the UCMDB Browser Internal Priorities, see "Configure Browser Internal Priorities (for the Incidents and Problems Widgets)" on page 107.

Widget Details Mode

This mode displays all relevant problems according to their Internal Priority. The internal sort within each priority group is by alphabetic order. The following information is presented for each problem:

- **Problem ID:** This is a clickable field that refocuses on the Problem CI when selected. The ID is taken from the **reference_number** attribute.
- **Title:** Taken from the **name** attribute.
- **Status:** Taken from the **problem_status** attribute.
- **Impact:** Taken from the **impact_scope** attribute.
- **Urgency:** Taken from the **urgency** attribute.
- **Priority:** Taken from the **priority** attribute.
- **Affected CI:** Only a single CI is presented with a link to show all results. The CI presented is either the node to which the problem is linked (if it is not the current CI) or a Business CI affected by the problem (if the current CI is directly linked to the Problem CI). If there is a Business Service connected directly to the Problem, it should be displayed as an affected CI. Affected CIs can be refocused.
- **Affected Service:** The first BusinessService CI connected to the Problem CI through a membership link. If no such CI exists, the Affected Service header is not displayed. The Affected Service can be refocused.
- A direct link to the Service Manager system with the context of the selected problem is presented per each problem, if this link is configured. For instructions on how to configure this direct link to Service Manager, see "Configure a Direct Link to Service Manager for a Selected Problem, Incident, or Change Request" on page 60.

Enable the Problems Widget

To enable the Problems widget in UCMDB:

1. In UCMDB, go to **Administration > Infrastructure Settings Manager > UCMDB Browser settings**.
2. In the **Name** column, choose **Enable Problems widget**.
3. In the **Value** column, choose **True** from the drop-down list.
4. Click **Save**.

Properties Widget

The Properties widget is used to present the main, general properties of the selected CI, either by means of a search result or by refocusing it. The properties presented are customized and differ for each selected CI type. CI Overview mode presents the most important properties and Widget Details mode displays additional properties. The information presented in this widget is logically connected to the selected CI and not according to the UCMDB Data Model.

To specify the properties that are displayed by this widget, see "Configure Properties to be Displayed by the Properties Widget" on page 385.

To display attributes with empty values (by default, attributes with empty values are not displayed), see "Configure the Properties Widget to Show/Hide Empty Attributes" on page 385.

You can prevent a CI's location and owner from being displayed in the Properties widget by setting the **Show Location Details** and **Show Owner Details** settings in the Infrastructure Settings Manager in UCMDB to **False**. By default, these settings have the value **True**, and the location and owner are displayed.

If the UCMDB administrator has configured a property as **CMS Browser Editable**, an **Edit** button is displayed. Click this **Edit** button to edit the attributes of these properties. When you are finished, click **Save changes** or **Cancel**.

> **Note:**
>
> - For **Edit** mode to work, the logged-in user must have RUN_DISCOVERY_AND_ INTEGRATIONS permission. For details, see "Roles Manager Page" in the *Administer section of the UCMDB Help*.
> - To view the **Tenant Owner** and the **Consumer Tenant** attributes in the Properties widget , you need to have the **View Tenant Assignment** permission, and the attributes must be defined as **CMS Browser Visible** in UCMDB. To change the tenant association for a CI, you need to have the **Change Tenant Association** permission, and the CI's attribute must be defined as **CMS Browser Editable** in UCMDB.
> - To edit the **Tenant Owner** and the **Consumer Tenant** attributes in the UCMDB Browser module you need to have the **Reassign Tenant** and the **View Tenant Assignment** permissions, and the attributes must be defined as **CMS Browser Visible** and **CMS Browser Editable**in UCMDB.

CI Overview Mode

In this mode, for all CI types, a maximum of three properties are displayed for the selected CI. These properties are configured by the system administrator.

If an attribute value does not fit entirely in the panel (it is displayed truncated), a **Show All** link appears next to it. Clicking **Show All** displays the attribute value entirely in a pop-up window.

> **Note:** For details about the priorities that are displayed, see "Configure Properties to be Displayed by the Properties Widget" on page 385.

Widget Details Mode

In this mode, each property is presented on a separate line. The display is divided into three panels, as follows:

- **Core Properties.** This panel displays the most important and valuable properties of the selected CI. For example, for a node the displayed properties could include its OS name, serial number, memory size, etc.
- **Complementary Properties.** This panel displays other important properties for the selected CI. These properties are usually less important than the ones presented in the Core properties panel, but may still interest most UCMDB Browser users. All properties depicting the CI's discovery process are included in this panel.
- **Additional Properties.** This panel is configured entirely by the UCMDB administrator, and can include all other properties the Administrator thinks may interest UCMDB Browser's users. Attributes that are defined as **CMS Browser Visible** but do not appear in one of the other two panels are also displayed in this panel.

The panels are presented in consecutive order and labeled with the panel name. A panel with no properties is not presented. If an attribute value does not fit entirely in the panel (it is displayed truncated), a **Show All** link appears next to it. Clicking **Show All** displays the attribute value entirely in a pop-up window.

> **Note:** For instructions on how to assign the panel in which an attribute is displayed, see "Configure Properties to be Displayed by the Properties Widget" on page 385.

Security Widget

The Security widget displays security-related data for the selected CI. This widget appears only if a live ArcSight Enterprise View (EV) system is deployed with a valid integration between it and the logged-in

UCMDB.

> **Note:**
>
> - For this widget to work, the UCMDB administrator must configure the Enterprise View adapter, as described in "Configure the Enterprise View Adapter" on page 399.
> - For instructions on integrating Enterprise View with UCMDB, see "Configure Integration with Enterprise View" on page 396.

CI Overview Mode

In this mode, the following security-related data is presented for the selected CI (taken directly from ArcSight EV and not processed by the UCMDB Browser module):

- Overall security score (from 0-100, 0 is the best, 100 is the worst)
- Overall security status icon (uses the same icons as within ArcSight Enterprise Security Manager). The possible icon values are:
  - High
  - Medium
  - Low risk
  - No data
- A direct link to the ArcSight EV system asset summary

Widget Details Mode

In this mode, the following information is added to the summary displayed in CI Overview mode (taken from the ArcSight EV and not processed by the UCMDB Browser module):

- **Risk:**
  - Score: from 0-100, 0 is the best, 100 is the worst
  - Icon: Possible icon values are High, Medium, Low risk, and No data
- **Compliance:**
  - Score: from 0-100, 0 is the best, 100 is the worst
  - Icon: possible icon values are High, Medium, Low risk, and No data
  - Progress: shows the percentage of overall asset compliance with a policy

- **Maturity:**
  - Score: from 0-5, 0 is the worst, 5 is the best
  - Icon: possible icon values are High, Medium, Low risk, and No data
  - Progress: shows the percentage of the overall control maturity within a policy
- **Vulnerability:**
  - Score: from 0.00-10.00, 0.00 is the best, 10.00 is the worst
  - Icon: possible icon values are High, Medium, Low risk, and No data
- **Enterprise Security Manager Threat:**
  - Score: from 0.00-10.00, 0.00 is the best, 10.00 is the worst
  - Icon: possible icon values are High, Medium, Low risk, and No data

Stakeholder Widget

The Stakeholder widget displays data on the owner of the selected CI and also on owner(s) of CIs directly related to the selected CI. A stakeholder is defined as either the owner of the selected CI or the owner of a CI directly related to the selected CI.

> **Note:** If the type of the selected CI is **Person**, this widget is collapsed, disabled, and displays the following message: “This widget is not relevant for selected CI”.

CI Overview Mode

In this mode, if there is more than one owner for the selected CI this widget displays the total number of owners (called Direct Stakeholders in the user interface). If there are one or more owners of CIs directly related to the selected CI, this widget displays the total number of owners of those directly related CIs (called Other Stakeholders in the user interface). If the selected CI has no direct owner, the message “There is no direct stakeholder” is displayed in the center of widget.

This widget also displays the following information on the owner of the selected CI:

- Thumbnail picture (if it exists)
- Name
- Organization or Functional Group (if defined)
- Email address (if defined)

- Telephone number(s) (if defined). If there is more than one phone number for the owner, there is a button that expands the list of available phone numbers and indicates the type of phone of the owner.

> **Note:**
>
> - The owner can have one of the following CI types: Organization, Functional Group, or Person. If there are two or more direct owners of the selected CI, this widget displays the owner in CI Overview mode according to the following priority levels: Organization (highest priority), Functional Group, Person (lowest priority).
>
> If, according to the priority levels above, there are two or more direct owners with the same priority level to be displayed, this widget displays the owner that comes first according to alphabetical order.
>
> - For the Person CI Type, this widget displays the Person's name according to the following priority levels: user label (highest priority), name, name of type (lowest priority).
>
> Only if the user label does not exist, will the widget display the Person's name. And only if the user label and name do not exist, will the widget display the name of type.

Widget Details Mode

This mode displays the same information that is listed in CI Overview mode, but for every stakeholder of the selected CI, and also displays all CIs owned by the stakeholder, within the context of the selected CI.

> **Note:** The default source of the thumbnail pictures is the **gravatar.com** website; however, this source can be changed as described in "Change the Source of Thumbnails (for the Stakeholder Widget)" on page 382.

Storage Data Widget

This widget shows the paths between a server and the storage arrays that support the server's file systems. The path consists of the volumes that reside on the server and the matching volume that resides on the storage array.

> **Note:** In order to view the Storage widget in the UCMDB Browser module, it must be assigned to a role in UCMDB. The widget will only be listed in the Roles Manager after the CMS UI has been deployed. For details, see "Roles Manager Page" in the *Administer section of the UCMDB Help*.

This widget matches the data model that supports integration with Storage Essentials, but can serve for other integrations as well.

This widget is based on a dynamic widget and can be configured according to dynamic widget capabilities. For more information, see "Dynamic Widgets" on page 346.

Working with Widgets

Load Embeddable Widgets

The embeddable widgets feature allows loading only a single widget instead of the entire UCMDB Browser module. This enables other products to include widgets inside their own applications.

> - The Impact Simulation Widget and Get Related Widget can be directly embedded into Service Manager. For more details, see Service Manager documentation.
> - There is no search UI, only a single widget, meaning that when loading the widget, the user must know and set the CI ID.

If using LW-SSO, the user enters the URL of the CMS UI and adds to that URL certain parameters that tell the CMS UI which widget to show, how to show it, and which CI to show for that widget. The Embedded widget checks the LW-SSO cookie to verify that the current user is logged on. If there is no valid session, the login page is displayed.

If not using LW-SSO, the following options are available:

1. The user enters the URL of the UCMDB Browser module and certain parameters as mentioned above, which displays the login page.
2. The user enters the URL of the UCMDB Browser module and certain parameters as mentioned above, and adds to that a username and encrypted password.

   To generate the encrypted password:

   a. Go to **JMX console > UCMDB-UI:name=UCMDB Integration > getEncryptedPasswordForURL**.

   b. In the **user name** field, enter the **user name**.

   c. In the **password** field, enter the user's password.

   d. Click **Invoke**.

   > **Important:** For the embedded widgets to work when using the username and encrypted password in the URL, you need to enable the LW-SSO framework. To do this, in the **ucmdb_browser_lwsso_config.xml** file, make sure that the value for **enableLWSSOFramework** is **True**.

> **Note:** If the CMS UI is configured to work with multiple UCMDB Servers, you must specify the

> UCMDB server's name in the URL.

To load an embeddable widget:

For LW-SSO users, you load an embeddable widget by entering the base URL and other information as follows:

http://<CMS UI host>:< CMS UI port>/ucmdb-browser/ucmdb_widget.html#widget=<widget type>~<widget state>;refocus-selection (or global-id)=<CI ID>

This URL can be divided into the following parts:

- **Base URL:** This is the URL of the CMS UI. For example:

  http://<CMS UI host>:< CMS UI port>/ucmdb-browser/

- **Widget Entry Point:** This is a static value, will always be:

  ucmdb_widget.html#

- **Widget type:** This must be one of the possible widget types: AUTOMATION, BSM, <DYNAMIC WIDGETS>, DEFECTS, ENVIRONMENT, GET_RELATED, HISTORY, IMPACT, INCIDENTS, POLICY, PROBLEMS, PROPERTIES, RFC, SECURITY, or STAKEHOLDER.

  > **Note:** The dynamic widget's name must be used as **widget type**. For example, BUSINESS TOPOLOGY.

- **Mode:** This is the visualization mode of the widget: CI Overview mode or Widget Details mode. The Widget Details mode is displayed by default. To change the visualization mode to CI Overview mode, add the following information in the URL:

  mode=preview

  > **Note:** The CI Overview mode is available only for the History widget, Impact Simulation widget, and Get Related widget.

- **Widget State:** This is available only for Impact Simulation Widget and for Get Related Widget.
  - **Impact Simulation Widget:** You can specify the severity level and the bundles. For example:

    widget=IMPACT~severity=LOW&bundles=bundle1,bundle2

  - **Get Related Widget:** You can specify a TQL previously defined in the UCMDB, and use it to explore related CIs.

    To define a TQL Query in UCMDB, see the "How to Define a TQL Query" section in the *Modeling section of the UCMDB Help*.

    For example:

widget=GET_RELATED~tql=[query_name]

> - The Element Name of the first CI Type you select must be **root_node** and the second CI Type must be **related_node**.
> - If the TQL query from URL does not exist or does not contain root_node or related_node, the default TQL query is used.

In the CI Overview mode, the **Widget State** is available only for the Impact Simulation widget, and only the severity level can be specified.

- **CI ID:** The ID for the CI whose data will be displayed by the widget. For example, **123456789**.

> **Note:** You can add multiple CI IDs for Impact Simulation Widget. You can view the CI IDs that are not found in the UCMDB, in the left pane, under the **Not Found CIs** section.

Therefore, to load a widget with the examples given above, using LW-SSO, you would enter a URL of:

http://<*CMS UI host*>:<*CMS UI port*>/ucmdb-browser/ucmdb_widget.html#widget=environment;refocus-selection=123456789

And if not using LW-SSO, using the above example:

http://<*CMS UI host*>:<*CMS UI port*>/ucmdb-browser/ucmdb_widget.html?username=guest&password=<*encrypted_password*>#widget=environment;refocus-selection=123456789

Once logged on, the user sees the CI Overview and Widget Details modes of the widget and CI specified in the URL. Widget Details mode cannot be collapsed.

> **Important:** When using the embedded CMS UI, for the Impact Simulation Widget and Get Related Widget to work, perform the following steps:
>
> 1. Go to **JMX console > UCMDB:service=Settings Services > setGlobalSettingValue**.
> 2. In the **name** field enter **ui.framing.host**.
> 3. In the **value** field enter the desired host address (the Service Manager's IP address, or the FQDN).
> 4. Click **Invoke**.
> 5. Restart the UCMDB server.
>
> When using CMS UI standalone, for the Impact Simulation Widget and Get Related Widget to work, perform the following:

1. Open the **%WEB_SERVER_HOME%\webapps\ucmdb-browser\WEB-INF\web.xml** file.
2. Locate the following lines:

```
<filter>
    <filter-name>ClickjackingFilterSameOrigin</filter-name>
    <filter-class>com.hp.ucmdb_
browser.server.web.ClickjackingFilter</filter-class>
    <init-param>
        <param-name>mode</param-name>
        <param-value>SAMEORIGIN</param-value>
    </init-param>
</filter>
<filter-mapping>
        <filter-name>ClickjackingFilterSameOrigin</filter-name>
        <url-pattern>/*</url-pattern>
</filter-mapping>
```

3. In the section above, replace the following line:

```
<param-value>SAMEORIGIN</param-value>
```

with

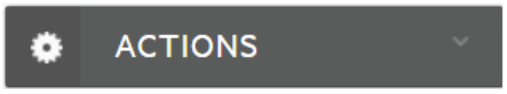
```
<param-value>ALLOW_FROM <Service Manager URL></param-value>
```

For example,

```
<param-value>ALLOW_FROM https://SMservername.domain.com</param-value>
```

4. Restart the CMS UI.

Show Additional Information on a Topology Map

1. Click 

and then click **Additional Info**.
2. Select one or more of the following checkboxes to see the specific information indicators:

History Changes	Displays changes on CIs that are in the model during the specified time period. **To display history changes:** a. Select **History Changes**. The number of history changes according to the current settings is displayed. b. Click **Change Settings** to select the beginning and ending dates for the changes.

	c. Click Run History to update the topology map.
Monitoring	Displays the number of KPIs on the CIs in the model. **Note:** This option is displayed only when you are using the Monitoring widget. Setup for the Monitoring widget is described in "Configure the BSM Health Indicator (for the Monitoring Widget)" on page 395.
Policy Status	Displays the number of policy results on CIs in the model. **Note:** ○ This option is displayed only when there is a live Configuration Manager (CM) system deployed in the UCMDB environment. ○ Policy indicators are counted for both the indicated CI and the service in which that CI is located.
Incidents	Displays incidents on CIs that are in the model during the specified time period. **To display incidents:** a. Select **Incidents**. The number of incidents according to the current settings is displayed. b. Click **Change Settings** to select the beginning and ending dates for the changes. c. Click Update Incidents to update the topology map.
Request for Changes	Displays change requests on CIs that are in the model during the specified time period. **To display change requests:** a. Select **Request for Changes**. The current number of change requests is displayed. b. Click **Change Settings** to select the time span for change requests. c. Click Update RFCs to update the topology map.
Problems	Displays the number of problems on CIs in the model.

Note: Your selections are saved for all the service models in your user preferences.

Specify the Appearance and Order of Widgets

You can specify which widgets appear in the UCMDB Browser module and in what order.

In the Infrastructure Settings Manager in UCMDB, you specify the list of widgets that you do not want to appear in the UCMDB Browser module with the **List of widgets to be removed from the application** setting and the order that the widgets appear with the **List of widget order in the application** setting. For details, see "Infrastructure Settings Manager" in the *Administer section of the UCMDB Help*.

In addition to specifying whether widgets (including dynamic widgets) and their order are visible for all users (as mentioned in the previous section), you can choose the widgets that you want to appear in the UCMDB Browser module only for a particular role by selecting them on the Resources tab of the Roles Manager in UCMDB. For details, see "Roles Manager" in the *Administer section of the UCMDB Help*.

Change CI Attributes

In the Properties widget, you can change the selected CI's attributes in the CI details pane. A CI attribute can be edited if the following conditions are met:

- The attribute is marked with UCMDB_BROWSER_EDITABLE_ATTRIBUTE qualifier. Even if the attribute does not appear in the CI details, if it is marked with this qualifier it appears when you click **Edit**. For instructions on how to mark an attribute with this qualifier, see "Mark an attribute as CMS Browser editable" on page 381.
- The attribute is not defined as read-only. Any one of the following qualifiers defines an attribute as read-only:
  - STATIC_ATTRIBUTE
  - READ_ONLY_ATTRIBUTE
  - ID_ATTRIBUTE
  - CALCULATED_ATTRIBUTE

> **Note:** CI attributes cannot be changed for federated CIs.

In addition to the standard CI types that can be defined for a CI in UCMDB, this widget also allows for editing location and owner attributes of the selected CI. The list of CI locations that you can choose from is derived from the list of available Locations CIs in UCMDB, and the list of owners that you can choose from is derived from the list of available Party CIs in UCMDB. The owner attribute can have

multiple instances. To change the location or owner, see "Change CI location and owner" on page 381. To add an additional owner to a CI, see "Add an additional owner" on page 381.

The following attribute types have unique editing features in the Properties widget:

- **Boolean.** If an attribute is defined as **boolean**, a drop-down box appears that allows you to choose True or False.
- **Date.** If an attribute is defined as **date number**, a date picker appears that allows you to pick the date according to day, month, and year.
- **xml.** If an attribute is defined as **xml**, a text editor appears that allows you to enter free text for this attribute.
- **bytes.** If an attribute is defined as **bytes**, a text editor appears that allows you to enter free text for this attribute. The difference between this attribute type and the xml attribute type is that the value of this attribute type is archived before it is saved to the database.
- **List of Integers.** If an attribute is defined with this type, you can add a list of integers to this attribute. For instructions on how do this, see "Add a list of Integers or Strings to an attribute" on the next page.
- **List of Strings.** If an attribute is defined with this type, you can add a list of strings to this attribute. For instructions on how do this, see "Add a list of Integers or Strings to an attribute" on the next page.

To define an attribute in UCMDB with one of the types above, follow the instructions in "Create a CI attribute with a unique type" on page 382.

> **Caution:** If you attempt to save input for string, xml, or byte attributes that is longer than the limit defined in the UCMDB CI Type Manager, the following error message appears: *"The following error occurred: Reconciliation DataIn general error. The changes were not saved."* If this happens, re-enter the input so that it is within the defined limit.

The following changes can be made:

- "Change a CI attribute" on the next page
- "Change a CI attribute with Enumeration type" on the next page
- "Add a list of Integers or Strings to an attribute" on the next page
- "Change CI location and owner" on page 381
- "Add an additional owner" on page 381
- "Mark an attribute as CMS Browser editable" on page 381
- "Create a CI attribute with a unique type" on page 382

> **Note:** This feature is only accessible to users with editing permissions on the selected CI.

Change a CI attribute

1. Ensure that Widget Details mode is displayed for the Properties widget, and click **Edit**.
2. Change the value of the CI attribute.
3. Click **Save Changes**.

> **Note:** For an attribute that appears in CI Overview mode, if you update it in Widget Details mode the updated value will appear if you return to CI Overview mode.

Change a CI attribute with Enumeration type

1. Ensure that Widget Details mode is displayed for the Properties widget, and click **Edit**.
2. By the location of the enumeration attribute, click the down arrow.
3. From the drop-down list, select the value that you want to assign to this attribute.
4. Click **Save Changes**.

Add a list of Integers or Strings to an attribute

If an attribute has been defined with the type

list of integers

or

list of strings

(as described in "Create a CI attribute with a unique type" on page 382), you can add a list of integers or strings to the attribute as follows:

1. Ensure that Widget Details mode is displayed for the Properties widget, and click **Edit**.
2. Go to an attribute that is defined as list of integer or list of strings, and click the **Edit** button.
3. In the input field that appears, enter a string or integer.
4. If you want to add an additional string or integer, click the **Add** button and enter the additional string or integer in the input field that appears.

5. Continue adding strings or integers in this manner until you have entered the data you want, and then click **Save Changes**.

Change CI location and owner

1. Ensure that Widget Details mode is displayed for the Properties widget, and click **Edit**..
2. By the Location or Owner field, click the **Edit** button. A drop-down list appears.
3. From the drop-down list, select a Location/Owner.

   > **Note:**
   > - If you have a long drop-down list, you can filter the list by typing the initial characters of the Location/Owner name at the top of the drop-down list.
   > - When a message specifying the number of results is displayed, you have to filter the list by typing the initial characters of the Location/Owner name at the top of the drop-down list. For example, if you type the letters 'Per' at the top of the Owner drop-down list, the list is filtered to show only Owner names that start with 'Per'.

4. Click OK in the drop-down list.

   > **Note:** After selecting a Location/Owner and clicking OK, you can remove your selection by clicking the 'X' button by the Location/Owner field.

5. Click **Save Changes**.

Add an additional owner

1. Ensure that Widget Details mode is displayed for the Properties widget, and click **Edit**.
2. To the right of the owner field, click the **Add** button. An additional owner appears.
3. In the new owner field, assign a value as described above.
4. Click **Save Changes**.

Mark an attribute as CMS Browser editable

1. In UCMDB, go to **Modeling > CI Type Manager** and select the **Attributes** tab.

2. Choose the desired CI Type.
3. Choose the attribute that you want to make "editable" from the displayed list, and click the **Edit** button .
4. In the **Edit Attribute** dialog box that appears, click the **Advanced** tab, check **CMS Browser Editable**, and click **OK**.
5. Save your changes to the CI type.

Create a CI attribute with a unique type

1. In UCMDB, go to **Modeling > CI Type Manager** and select the **Attributes** tab.
2. Choose the desired CI Type.
3. Click the **Add** button. The Add Attribute dialog box opens.
4. In the Attribute type section, select **Primitive**, and from the drop-down list select one of the following:
   - list of integers
   - list of strings
   - boolean
   - date number
   - xml
   - bytes
5. Save your changes to the CI type.

Change the Source of Thumbnails (for the Stakeholder Widget)

The default source for pictures of CI owners (both direct and indirect) presented in the Stakeholder widget is the **gravatar.com** website. This source location can be changed according to the following instructions.

1. In UCMDB, go to **Administration > Infrastructure Settings Manager > UCMDB Browser settings**.
2. In the Name column, choose **Stakeholder Image URL.**
3. In the **Value** column, enter the URL for the new source location. The URL should have a parameter (or parameters) in square brackets (as shown in the examples below), which is an

attribute name from the Party CIT, or from the Organization CIT or Person CIT which are children of the Party CIT. At runtime, the actual value of this attribute is set in the URL in order to receive the image.

Examples:

- To use an image from the gravatar site, enter:

  http://www.gravatar.com/avatar/[email]?s=42&d=mm

  where **[email]** is an attribute of the Person CIT and will be replaced by the actual email address of the Stakeholder at runtime.

- To use an image from Facebook image, enter:

  https://graph.facebook.com/[attr_name]/picture

  where **[attr_name]** is an any attribute that contains the Facebook User ID (this attribute should be added to Party CIT) and will be replaced by the actual Facebook User ID of the Stakeholder at runtime.

- To use an image from Google, enter:

  https://profiles.google.com/s2/photos/profile/[attr_name]?sz=42

  where **[attr_name]** is an any attribute that contains the Google User ID (this attribute should be added to Party CIT) and will be replaced by the actual Google User ID of the Stakeholder at runtime.

Change the History Widget 'From Date'

The History Widget uses a beginning date and end date to show changes in CI data that occurred during the period defined by those two dates. The default end date is the current date and time and the default beginning date is the current end date minus the **History Widget From Date** setting that is set in UCMDB. The default value for the **History Widget From Date** setting is 7, but this value can be changed by the UCMDB Administrator as explained below.

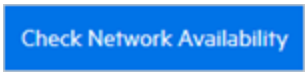
To change the History Widget 'From Date':

1. In UCMDB, go to **Administration > Infrastructure Settings Manager > UCMDB Browser settings**.
2. In the Name column, choose **History Widget From Date**.
3. In the Value column, enter the number of days that you want for the **From Date**.
4. Click **Save** .

5. Log out from the CMS UI, and then log in again (this loads the new setting).

> **Note:** The change takes effect according to the time set in one of the following settings:
>
> - **Time for which information in the Browser cache is valid**
> - **Time for which UCMDB Settings in the Browser cache is valid**
>
> For more information, see "Settings affecting overall system operation".

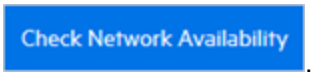
Check Network Availability from the Discovery Progress Widget

The new **Check Network Availability** 

button in the right pane of the Discovery Progress widget allows you to check the network availability for any of the IP addresses of a Node type CI from the UCMDB Browser module.

> **Note:** This feature is supported on UCMDB 10.22 CUP1 or later versions.

To check the network availability for any of the IP addresses of a Node CI:

1. In the right pane of the Discovery Progress widget, click 

.
2. From the **IP Address** drop-down list, select the IP address of your target node.

> **Note:**
>
> - The first IP address of the target node will be loaded by default in the **IP Address** field.
> - To manually add an IP address, click

and enter the IP address in the newly appeared text box. To go back to the automatically loaded IP address, click

.

3. From the **Probe** drop-down list, select a probe.

> **Note:** The first probe available will be loaded by default in the **Probe** field.

4. In the **Ping Times** field, select or enter the number of attempts for the selected probe to perform IP ping.

> **Note:** The default value is 4 and it will be automatically loaded in the **Ping Times** field.

5. In the **Timeout (ms)** field, select or enter the frequency (in milliseconds) that the selected probe shall try to perform IP ping.

> **Note:**
>
> - The default value is 60000 (ms) and it will be automatically loaded in the **Timeout** field.
> - The timeout increment is 5000 (ms).
> - The minimum timeout required is 10000 (ms) and the maximum timeout is 300000 (ms).

6. Click Ping to perform the network ping.
7. Click Back to List to go back to the jobs list.

Configure the Properties Widget to Show/Hide Empty Attributes

The Properties widget has a setting called **Show attributes that have no value**, which can be set to **True** or **False**. If this setting is **True**, any empty attribute (that is, an attribute with no value) for the selected CI is displayed with the value **N/A**, both in the CI Overview and the Widget Details modes. If this setting is set to **False**, any empty attribute for the selected CI is not displayed. The default value of this setting is **False**.

To set the **Show attributes that have no value** setting:

1. In UCMDB, go to **Administration > Infrastructure Settings Manager > UCMDB Browser settings**.
2. Set the value of **Show attributes that have no value** to the value that you want, either **True** or **False**.

Configure Properties to be Displayed by the Properties Widget

You can configure attributes of CI Types to be either displayed or not displayed by the Properties widget, and determine whether an attribute appears in CI Overview mode and in which properties group it appears in Widget Details mode, as follows:

1. In UCMDB, go to **Modeling > CI Type Manager**.
2. In the list of CI Types on the left, choose the CI Type with the attribute(s) that you want to configure.
3. Select the **Attributes** tab in the editor on the right.
4. In the list of attributes, double-click on the attribute that you want to configure.

   The Edit Attribute window appears.

5. In the Edit Attribute window, click the **UCMDB Browser Qualifiers** tab and do one of the following:
   - To hide an attribute:

     Select **Hide in Properties Widget**.

     > **Note:** If you select **Hide in Properties Widget**, make sure that **CMS Browser Visible** is not also selected. Otherwise, notifications may appear for attributes that are not visible.

   - To display an attribute:

     Select **CMS Browser Visible**.
6. If you checked **CMS Browser Visible** in the previous step, set the following properties:
   - **View in preview mode:** From the drop-down list, chose **True** if you want the attribute to appear in the CI overview, or **False** if you do not want it to appear in CI Overview mode.
   - **Properties group assignment:** From the drop-down list, choose the properties group (Core, Complementary or Additional) in which you want this attribute to appear in Widget Details mode.
7. Click **OK**.

CI Overview Mode

A maximum of three properties are displayed for the selected CI, according to the following priorities:

> **Note:** The order in which properties are presented is alphabetic and cannot be configured.

- **For Non-Star CIs:** The first three properties according to these priorities:
  a. Attributes with the CMS Browser Visible qualifier on concrete attributes or attributes that are inherited from Star CIs
  b. **Concrete** attributes (not inherited)
- **For Star CIs:**
  - Attributes with the CMS Browser Visible qualifier on concrete attributes or attributes that are inherited from Star CIs.
  - Special or calculated attributes

- For Node Star CI type:
  - Discovered Model
  - Discovered OS Name
  - Display Label from all connected IP Address (comma-separated)
  - Memory Size
- For Running Software CI type:
  - Discovered Product Name
  - Display Label from connected Node
  - Application Category
- For CI Collection type: the same attributes as for the Non-Star CI
- For Business Element Related CI type:
  - Business Criticality
  - Last Modified Time

- Concrete from the actual CI type or inherited from the Star CI.

The order in which properties are presented in CI Overview mode is alphabetic and cannot be configured.

Widget Details Mode

Properties are displayed in the three panels as follows:

1. Core Properties
   - Star CIs
     - Node
       - CMDB Object ID/Global ID
       - Discovered OS Name
       - Node Operating System Installation Type
       - Serial Number
       - Discovered OS Version
       - Discovered Vendor
       - Domain Name

        - Memory Size attribute from instance
        - CPU Type from connected CPU, if empty – Name from connected CPU
        - Calculated number of Core Number from all connected CPU CIs
        - Calculated total File System Size from all connected File System CIs
    - Running Software
        - CMDB Object ID/Global ID
        - Discovered Product Name
        - Version
        - Vendor
    - Business Element/CI Collection
        - CMDB Object ID/Global ID
        - Business Criticality (for Business Element)
    - Also:
        - All attributes with CMS Browser Visible qualifier set to true and the Properties Group data item set to **Core**.
  - Non-Star CIs
    - CMDB Object ID/Global ID
    - All attributes with CMS Browser Visible qualifier set to true and Properties Group data item set to **Core**.
2. Complementary Properties
  - Star CIs
    - Node
        - Last Modified Time
        - Updated By
        - Node Boot Time
        - Node Is Virtual
    - Running Software
        - Application Category
        - Application Installed Path

        - Application Version Description
        - Last Modified Time
        - Updated By
    - Business Element/CI Collection
        - Create Time
        - Created By
        - Last Modified Time
        - Updated By
    - Also:
        - Concatenation of Display Name (comma-separated) of all directly connected Party CIs. For example," John Doe, UCMDB UI, CMS" (divided into two labels, Owners for Person CIs and Organizations for Organization CIs).
        - Concatenation of Display Name (comma-separated) of all directly connected Location CIs. For example, "Room 301, 3rd floor, M1, Cupertino, California, World, Milky Way, Universe".
        - All attributes with the **CMS Browser Visible** qualifier set to true and Properties Group data item set to **Complementary**.
  - Non-Star CIs
    - Last Modified Time
    - Updated By
    - Concatenation of Display Name (comma-separated) of all directly connected Party CIs. For example," John Doe, UCMDB UI, CMS" (divided into two labels, Owners for Person CIs and Organizations for Organization CIs).
    - Concatenation of Display Name (comma-separated) of all directly connected Location CIs. For example, "Room 301, 3rd floor, M1, Cupertino, California, World, Milky Way, Universe".
    - All attributes with the CMS Browser Visible qualifier set to true and Properties Group data item set to **Complementary**.
3. Additional Properties
  - All attributes complying with the following rule and that were not displayed in any other panel:

    !Static && Have value && Visible && !Deprecated (excluding all attributes derived from Managed Object)

- All attributes with CMS Browser Visible qualifier set to true and Properties Group data item set to **Additional**.

Direct Links

A direct link provides the URL to addition information, or to the browser-generated content (for example, the content of a report or the result of a search).

The direct link icon is available in reports and some widgets.

> **Tip:** If you want to share what is currently displayed with others, you can always copy the URL from the address bar of the browser and then share the URL with others.

You can access a direct link with predefined username and encrypted password, by adding **&username=<username>&password=<passEncrypt>&isEncoded=true** to the URL, after the UCMDB server's name.

To generate the encrypted password:

1. Go to **JMX console > UCMDB-UI:name=UCMDB Integration > getEncryptedPasswordForURL**.
2. In the **user name** field, enter the **user name**.
3. In the **password** field, enter the user's password.
4. Click **Invoke**.

Direct Links in Reports

In a generated report, when you click the direct link icon , the following two options are available:

Copy URL: Copy the URL of the current generated report to the clipboard.

Email URL: Send the URL of the current generated report by using the default email application.

When you select a report or browse through the Reports module, a link is generated in the address bar of the browser. You can always copy the URL generated and then share it with others.

Other users can open the same report by using the URL, as long as they have **View Permissions** for that particular report.

Direct Links in Widgets

For some of the widgets displayed in the UCMDB Browser module, once you select a CI and its data is displayed in the UCMDB Browser module, it is possible to view additional data in the context of the selected CI and the displayed widget. A link icon ( ) appears on the far right side of the widgets that provides, among other things, a direct link to an external application. When you click this icon and select **Open Link**, you can launch an external application in the context of the selected CI, as follows:

Link	Description
Properties Widget	When you click the link icon in the Properties widget and select **Open Link**, the UCMDB server for the machine you selected in your initial search opens (you must log in first), and displays all the CI properties for the CI you selected in the UCMDB Browser module.
Environment Widget	When you click the link icon in the Environment widget and select **Open Link**, the UCMDB server for the machine you selected in your initial search opens (you must log in first), and displays a diagram of all CIs related to the CI you selected in the UCMDB Browser module.
Impact Simulation Widget	When you click the link icon in the Impact Simulation widget and select **Open Link**, the UCMDB server for the machine you selected in your initial search opens (you must log in first), and displays the impact analysis for the CI you selected in the UCMDB Browser module.
Policy Widget	When you click the link icon in the Policy widget and select **Open Link**, the Configuration Manager installation for the machine you selected in your initial search opens (you must log in first), and displays a view containing the defined policies for the CI you selected in the UCMDB Browser module(if a view that is managed by Configuration Manager exists that contains that CI). If the selected CI is present in more than one view, Configuration Manager displays a dialog box where the user can select which view to open.
Change Request Widget	In the Change Request widget, the link icon appears only in the widget details, and each Change Request listed has its own link icon. When you click the link icon for a Change Request and select **Open Link**, Service Manager opens (you must log in first), and displays a form containing more details on that Change Request.
Incidents Widget	In the Incidents widget, the link icon appears only in the widget details, and each Incident listed has its own link icon. When you click the link icon for an Incident and selecting Open Link, Service Manager opens (you must log in first), and displays the incident details. **Note:** The link icon appears only if the Incidents Widget is configured

Link	Description
	for a direct link that contains the tag: **{$INCIDENT_ID}** in the direct link URL.
Problems Widget	In the Problems widget, the link icon appears only in the widget details, and each Problem listed has its own link icon. When you click the link icon for a Problem and selecting Open Link, Service Manager opens (you must log in first), and displays the problems details.
Get Related Widget	When you click the link icon in the Get Related widget and select **Open Link**, the UCMDB server for the machine you selected in your initial search opens (you must log in first), and displays a diagram of all CIs related to the CI you selected in the UCMDB Browser module.

When you click , there is also an option to send a link to the CI in an email.

When entering a URL for a direct link from the UCMDB Browser module, you can also use a global ID. The highlighted section in the example below shows the syntax:

http://<*browser-home*>/ucmdb-browser?server=Default%20Client**#global-id=ca733b86bd6dc30ecd6e8a4467788cb7**; widget=properties

Export Widget Details

You have the ability to export the details for a selected CI in any of the supported widgets (Properties, Environment, Impact Simulation, History, and Stakeholder widgets).

To enable this functionality, in UCMDB, go to **Administration > Infrastructure Settings Manager > UCMDB Browser Settings** and set **Enable reports** to **True**. If this feature has not been enabled in UCMDB, the export icons do not appear in the UCMDB Browser module.

> **Note:** Generated reports that are older than one week are automatically deleted.

Export details for a specific widget

In CI Overview mode, click the icon on a supported widget and select one of the following options:

- Export to PDF
- Export to XLS
- Export to CSV

The details that are displayed in the selected widget are generated in a file which you can view immediately or save.

In the exported file, the **'** character is added in front of any CI attribute name that begins with one of the following characters: **@ + - =**.

> **Note:** The report generated from the History widget contains the history (changed attributes and related CIs) of the selected CI, and of the CIs contained in the selected CI's model, based on the specified time range. The same data will be exported from both Selected view and Model view.

Export details for all supported widgets

In CI Overview mode, click the icon at the top of the screen and select one of the following options:

- Export to PDF
- Export to XLS

The details that are displayed for all supported widgets are generated in a file which you can view immediately or save.

In the exported file, the **'** character is added in front of any CI attribute name that begins with one of the following characters: **@ + - =**.

Refocus Links

Certain CI properties displayed by widgets have refocus links, meaning that you can select the property and all the widgets reload, displaying information about the CI property that was selected.

For the Environment and Impact Simulation widgets, all displayed CIs have refocus links.

For the Properties widget, the following CI properties have refocus links:

- **In CI Overview mode**
  - For Nodes: connected IP addresses
  - For Running software: connected nodes
- **In Widget Details mode**
  - Connected Party (Owner) properties
  - Connected Person properties
  - Connected Locations

Rerun a Discovery from the Discovery Progress Widget

As a discovery administrator, you can rerun a particular discovery job from the Discovery Progress widget to reproduce the issue for troubleshooting purpose.

To rerun a discovery from the Discovery Progress widget:

1. In the right pane of the Discovery Progress widget, hover the mouse over a job, click the **Context Menu** and select **Rerun**.

   > **Note:** The **Rerun** option is available only for the job with **Success**, **Warning**, or **Error** status.

   Once you click **Rerun**, the selected job is dispatched, and as a result the job status changes.

   If you rerun the job from the completed job table, the job instance will be removed from the table immediately.

2. Click Refresh Job List to check the new status and wait for the job to complete running.

   > **Note:**
   > - It may take a while before the status is updated.
   > - If the job cannot be rerun for some reason (for example, the server is down, the session has expired, the job's status has changed), the following message appears: "Discovery job can't rerun".

3. Hover the mouse over the job that just completed running, click the **Context Menu** and select **Show details** to view detailed messages.

4. Click Back to List to go back to the jobs list.

Specify Impact Rules

The Impact Simulation and Dependent Services widgets run impact analysis that uses impact rules, in the same manner as UCMDB. These impact rules can be grouped into bundles. The default setting is to run the analysis using all available bundles, however you can choose to run the analysis using only certain bundles and not others.

To select bundles for impact analysis:

1. In UCMDB, go to **Administration > Infrastructure Settings Manager > UCMDB Browser settings**.
2. In the Name column, choose **List of impact rules bundles to be used**.
3. In the Value column, enter a comma-separated list of bundle names.

   > **Note:**
   > - Incorrect bundle names are ignored.
   > - A bundle name that contains a comma cannot be used.

4. Click **Save** .
5. Log out from the CMS UI, and then log in again (this loads the new bundle settings).

   > **Note:** The change takes effect according to the time set in one of the following settings:
   > - **Time for which information in the Browser cache is valid**
   > - **Time for which UCMDB Settings in the Browser cache is valid**
   >
   > For more information, see "Settings affecting overall system operation".

Configure the BSM Health Indicator (for the Monitoring Widget)

To use the Monitoring widget, you perform the following configurations:

1. Synchronize the CMS and BSM:
   a. In UCMDB, go to **Data Flow Management > Integration Studio**.
   b. Create a new integration point with the following settings:
      - **Integration name.** BSM synchronization
      - **Adapter.** BSM
      - **Hostname.** BSM hostname
      - **Port.** BSM host port
      - **Credentials.** Choose ‘generic protocol’
      - **Push Back IDs.** Choose ‘enabled’
   c. Save the integration point and invoke synchronization.
2. Create the BSM KPI Adapter Integration Point:

a. In UCMDB, go to **Data Flow Management > Integration Studio**.

b. Create a new integration point with the following settings

- **Integration name.** BSM Kpi Adapter
- **Adapter.** BSMKpiAdapter
- **Hostname.** BSM hostname (use only FQDN)
- **Port.** BSM host port
- **Credentials.** Choose 'generic protocol'
- **Customer ID.** Enter the Customer ID

c. Select the **Kpi** and **KpiObjective** checkboxes and save the integration point.

> **Note:** The BSM KPI Adapter is deployed on the UCMDB server upon initial login to the CMS UI. This triggers deployment of content and makes it available for configuration on the UCMDB server.

3. Specify Data Over Time settings:

a. In BSM, go to **Admin > Service Health**.

b. On the CI Indicators tab, select a view that contains one or more CIs with KPIs.

c. Select one or more CIs in the upper pane (that have the KPIs you want to view in the Monitoring widget).

d. In the CI Data pane at the bottom of the screen, select the **Save KPI data over time for the selected CIs** checkbox.

Configure Integration with Enterprise View

To enable the Enterprise View/UCMDB Integration, you must first install Enterprise View (EV) and BusinessObjects. Once these are installed, you must perform the following procedures:

- "Deploy a Universe for Integrating the UCMDB Browser module into BusinessObjects" on the next page
- "Deploy a Report Designed for UCMDB Browser module Integration into BusinessObjects" on page 399

Deploy a Universe for Integrating the UCMDB Browser module into BusinessObjects

1. **Verify that an EnterpriseView Universe exists with the correct description.**
   a. Open the **Central Management Console** (go to **Programs > Business Objects XI 3.1 > Business Objects Enterprise > BusinessObjects Enterprise Central Management Console**, or in a web browser, go to the URL: **http://<CMS host>:<CMS HTTP port>/CmcApp**).
   b. Log in with the user name and password that you defined in BusinessObjects installation.
   c. Go to **Universes**.
   d. Open the folder **EnterpriseView Universe**, and check that EnterpriseView Universe is there and that **version 0.52** appears in the Description field.
2. **Back up Existing Universe**
   a. Right-click on the universe **EnterpriseView Universe** and go to **Organize > Move To**.
   b. Choose the root folder **Universes** and click the right arrow to move the folder to the **Destinations** column.
   c. Click **Move**.
   d. Exit the Central Management Console and create a new file system folder.
   e. Copy the files **export.properties** and **export.bat** from the folder **ImportExportEVUniverse** located in the CMS UI content folder into the folder you created in the previous step.
   f. In the file **export.properties** in the folder you just created, change the following parameters to the correct username, password, host name, and port of the host where the BusinessObjects application is installed:
      - userName=<BO_user_name>
      - password=<BO_password>
      - CMS=<host_name>:<port>
   g. Run **export.bat** from the newly created folder where you copied **export.properties**.

   > **Note:** If you export from the original **ImportExportEVUniverse**, the universe you export overwrites the original file that contains the EV Universe for the UCMDB Browser module integration.
3. **Import the Universe for Integration with the UCMDB Browser module**

a. Open the folder **ImportExportEVUniverse** and in the file **import.properties**, change the following parameters to the correct username, password, host name, and port of the host where the BusinessObjects application is installed:

- userName=<BO_user_name>
- password=<BO_password>
- CMS=<host_name>:<port>

b. From the same folder (**ImportExportEVUniverse**), run **import.bat**.

c. In the CMS console, ensure that **EnterpriseView Universe** is still situated under the root folder **Universes**, and that the description field has changed to **version 0.52 a.**

d. Move the universe back to the folder **EnterpriseView Universe** (right-click the imported universe, select **Organize > Move To** and select the **EnterpriseView Universe** folder).

4. **Change the Database Connection for the Newly Imported Universe**

a. On the machine where the BusinessObjects application is installed, go to **Programs > Business Objects XI 3.1 > Business Objects Enterprise > Designer.**

b. Skip the Quick Design window.

c. Go to **File > Import**.

d. Select the folder **EnterpriseView Universe** and choose the universe **EnterpriseView_ Universe**.

e. Go to **Tools > Connections**.

f. Select **EnterpriseView Connection** and click **Edit**.

g. In the Edit dialog box, enter the details of the Oracle EnterpriseView user.

h. Click **Next** and enter the following for the Configuration Parameters:

- Pool timeout = 10 minutes
- Array fetch size = 1
- Array Bind size = 5
- Login timeout = 600 minutes

i. Click **Save**.

j. Go to **File > Export**, select the **EnterpriseView Universe** folder, and click **OK**.

Deploy a Report Designed for UCMDB Browser module Integration into BusinessObjects

1. On the machine where the BusinessObjects application is installed, go to **Programs > Business Objects XI 3.1 > Business Objects Enterprise > Web Intelligence Rich Client**.
2. Select **File > Open**, and open the file **UCMDB_Browser_Integration.wid,** located in the CMS UI content folder.
3. Select **File > Export to CMS**, and in the folders list, select **EnterpriseView Reports**.
4. Click **OK**.

Configure the Enterprise View Adapter

1. In UCMDB, go to **Data Flow Management > Integration Studio**.
2. Create a new integration point with the following settings:
   - **Integration name:** EnterpriseViewDataSource (required)
   - **Adapter:** EnterpriseViewAdapter (required)
   - **Hostname:** enter the Business Object's server hostname (required)
   - **Port:** enter the Business Object's host port (required). The default port is 6400.
   - **Credentials ID:** Choose Generic Protocol with your credentials

3. In the **Data Flow Probe** drop-down list, select a probe.

4. Save the integration point.

> **Note:** The EnterpriseViewAdapter adapter is deployed on the UCMDB server upon initial login to the CMS UI. This triggers deployment of content and makes it available for configuration on the UCMDB server.

For instructions on integrating Enterprise View with UCMDB, see "Configure Integration with Enterprise View" on page 396

Configure the Automation Flow Adapter (for the Automation Widget)

To use the Automation widget, you must create an Integration Point for the Automation Flow Adapter as follows:

1. In UCMDB, go to **Data Flow Management > Integration Studio**.
2. Create a new integration point with the following settings:
   - **Integration name.** Automation Flow Adapter (required)
   - **Adapter.** AutomationFlowAdapter (required)
   - **Protocol.** Https (required)
   - **Hostname.** Enter the OO server's hostname (required)
   - **Port.** Enter the OO host's port (required)
   - **Application Context.** /PAS/services/WSCentralService (optional)
   - **Use LW-SSO. True** or **False** (required)
   - **Credentials ID.** Choose **Generic Protocol** with your credentials (required if **Use LW-SSO=False**)

     > **Note:** If **Use LW-SSO=True**, the OO server and UCMDB server must both enable LW-SSO. LW-SSO configuration on the UCMDB server is described in the section "LW-SSO Authentication Overview" in the *Hardening section of the UCMDB Help*. LW-SSO configuration on OO is described in the *Micro Focus Operations Orchestration Administrator Guide*. A user who performs actions (run/view automation flows) on OO must exist as an external user on the OO server with the same user name that he has on the CMS UI and with the correct permissions.
     >
     > If **Use LW-SSO=False**, all users who performs actions on OO get the permissions of the integration user, which is defined in the **Credentials ID** field.
3. Save the integration point.
4. Log out and log in to UCMDB Server again for the change to take effect.

> **Note:** The Automation Flow Adapter is deployed on the UCMDB server upon initial CMS UI start up. This triggers deployment of content and makes it available for configuration on the UCMDB server.

Select and Define Automation Flows (for the Automation Widget)

1. In UCMDB, go to **Modeling > Modeling Studio**.
2. Select **New**, and from the drop-down list, select **Automation Flow Mapping**.

   The **New Automation Flow Mapping** dialog opens.

3. In the **New Automation Flow Mapping** dialog, choose **Create new query** or **Choose base query**.

   The **Automation Flow Mapping Editor** opens, with two tabs: **Query Definition** and **Automation Flows**.

4. In the **Query Definition** tab, define the Automation Flow mapping by defining a query with one node as the contact node.
5. In the **Automation Flows** tab, add flows by clicking the **Add Automation Flow** link.

   The **Select Automation Flow** window opens.

6. Enter text for a search in this window (the search is performed by name, domain, or category) and click the Search button.

   The search results appear.

7. Choose a flow from the list of search results.

   The flow name now appears in the **Automation Flows** tab window with its input fields. If the input field has a default value, it is set in the field.

8. Enter inputs in each field. Inputs can be added by typing free text in the field, by selecting an attribute from a TQL node, or by entering a complex expression containing both free text and an attribute from a TQL node. If default values exist, you can change them.
9. You can add more flows by repeating steps 5-8.

> **Note:** Automation Flow Mapping supports one contact node only.

Integrate with ALM (for the Defects Widget)

The following configuration procedures need to be performed to use the Defects widget in the UCMDB Browser module:

- "Set Up the Defects Adapter" on the next page
- "Create New Attribute and Severity Mapping Properties Files (optional)" on the next page
- "Create the DefectsFilter CI and Relate it to the Business Element" on page 404
- "Enable the Defects Widget in UCMDB" on page 404

Set Up the Defects Adapter

1. In UCMDB, go to **Data Flow Management > Integration Studio.**
2. Create a new integration point with the following settings:
   - **Integration Name.** Defects Adapter
   - **Adapter.** ALMAdapter
   - **Protocol.** must be http or https
   - **HostnameIP.** the name or IP address of the machine where ALM is installed
   - **Port.** the port number of the ALM server
   - **Domain.** the domain that is defined in ALM
   - **Credentials ID.** click the browse button and from the list that appears choose credentials for connecting to ALM, or create new credentials
3. **Optional:** Click **Test Connection** to ensure that a connection can be established with the ALM server.
4. Click OK.
5. Under the **Supported and Selected CI Types** panel, check the Defect CI type.
6. Click the **Save Integration Point** button.

Create New Attribute and Severity Mapping Properties Files (optional)

There are two out-of-the-box mapping properties files, one for attributes and one for severities. The attributes mapping properties files map between names of defect fields in ALM to names of attributes of the class type **Defect** in UCMDB. The severities mapping properties file maps between severity levels in ALM to the five severity levels in UCMDB, as defined in the **DefectSeverity** typedef in UCMDB. These files can be accessed by means of the Defects Adapter, by going to **Data Flow Management > Adapter Management > ALMAdapter > Configuration Files**. The files are called **sample.attribute.mappings.properties** and **sample.severity.mappings.properties**.

You may want to create your own customized attributes or severity mapping properties files. This could be necessary if the names of the fields in the out-of-the-box mapping properties files do not match the names in your ALM system, or could be useful if you want to add additional fields that do not exist in the out-of-the-box mapping properties files.

To create a new attribute or severity mapping properties file:

1. If you are creating an attribute mapping properties file:
   a. To retrieve the ALM defect attribute field names that you need to create the mapping, go to the following URL:

      http://<ALM server>:8080/qcbin/rest/domains/<domain>/projects/<project>/customization/entities/defect/fields?login-form-required=y

   b. In the ALM login page, enter your user credentials.
   c. In the XML file that appears there is a list of the defect's fields. Note the **Name** element in each field, you are going to map the value that appears for the Name element here to the names of attributes of the class type **Defect** in UCMDB.
2. In UCMDB, go to **Data Flow Management > Adapter Management.**
3. Click the **New** button and from the pop-up menu select **New Configuration File**.
4. Enter a name that starts with **ALMAdapter/**…, for example: **ALMAdapter/attribute.mappings.properties**.

   > **Note:** The custom attribute mappings file should be named **attribute.mappings.properties**, and the custom severity mappings file should be named **severity.mappings.properties**. If project-specific mappings files are required, they should be named **<project-name>.attribute.mappings.properties** and **<project-name>.severity.mappings.properties** for attributes or severities, accordingly.

5. Click the Browse button by the Package field, choose **ALMAdapter** from the list that appears, and click OK.
6. In the text editor, for attributes mapping each row should contain the name of the ALM field (attribute) on the left side and name of the equivalent CI attribute on the right side in the following manner:

   <ALM field name>=<CI attribute>

   For severities mapping, each row should contain the ALM severity on the left side and the equivalent UCMDB severity (as defined in the DefectSeverity typedef in UCMDB) on the right side, in the following manner:

   <ALM severity>=<UCMDB severity>

7. Click OK when you are finished editing the new mapping properties file.

> **Note:**

- The name of the CI attribute must exist in the class type **Defect**.
- For the severities file, if a severity in ALM has a space, a back slash must precede the space as follows: **Very\ High**.
- In the UCMDB Browser module, there are only 5 severity levels (Low, Medium, High, Very High, and Urgent), so all ALM severities must map to one of these 5 levels.
- The type of all custom UCMDB attributes must be String.

Create the DefectsFilter CI and Relate it to the Business Element

The Defects Filter CI that is related to a specific business element represents the ALM filter that is used to retrieve the relevant defects for that business element.

> **Note:** You can relate more than one DefectsFilter CI to a business element.

To create the DefectsFilter CI and relate it to the business element:

1. Create a filter in ALM (if one has not already been created).
2. Copy the filter's text.
3. In UCMDB, go to **Modeling > IT Universe Manager**.
4. In the **Browse Views** tab, click the **New CI** button.
5. From the CI type tree, select the **DefectsFilter** CI type.
6. Paste the filter text from the ALM filter into the FilterText attribute value.

   > **Note:** Currently there is a limitation of maximum 885 characters in the FilterText attribute value.

7. In ProjectGroup attribute, enter the ALM project name.
8. **Optional:** Give the filter a custom name by setting the Name attribute value.
9. Click Save.
10. Relate the DefectsFilter CI to the business element using a containment relationship from the Defects filter to the business element.

Enable the Defects Widget in UCMDB

Before connecting to the CMS UI, enable the Defects widget as follows:

1. Go to **Administration > Infrastructure Settings Manager > UCMDB Browser settings**.
2. Set the value of **Enable the Defects Widget** to True.

How to View Discovery Status and Errors for a Selected CI from the Discovery Progress Widget

Discovery administrators and data consumers can view warning or error indicators for discovery issues with discovery jobs in the Discovery Progress widget, they can also view summary and detailed discovery status, errors, and warnings for a selected CI in the Discovery Progress widget.

> **Note:** To use this feature, you need to have the **Run Discovery and Integration** or the **View Discovery Status and Error** permissions. The out-of-the-box **Discovery and Integrations Admin** role has all these permissions by default.
>
> You also need the **View** permission to the Discovery Progress widget.

This task includes the following steps:

- Prerequisites: Grant the Required Permissions
- View the Discovery Progress widget in the UCMDB Browser module

1. **Prerequisites: Grant the Required Permissions**

   > **Note:** This step is performed by the system administrator.

   To view the Discovery Progress widget from the UCMDB Browser module, your administrator needs to grant the following permissions to you:

   - **Run Discovery and Integrations** (for discovery administrators) or **View Discovery Status and Error** (for data consumers)
   - **Access to UCMDB Browser**

   a. Log in to UCMDB and go to **Security > Roles Manager > Roles**.

   b. Select the role to which you want to add the permission.

   Create a new role if you do not have such a role.

   > **Note:** The **View Discovery Status and Error** permission is not available for all out-of-the-box roles.

   c. Click the **General Actions** tab.

d. In the Data Flow Management Actions section, select the **Run Discovery and Integrations** or **View Discovery Status and Error** action in the Available Actions pane and move it to the Selected Actions pane.

e. In the System Access Actions section, select **Access to UCMDB Browser** in the Available Actions list and add it to the Selected Actions list.

2. **View discovery status, errors, and warnings for a selected CI in the Discovery Progress widget**

a. Launch the UCMDB Browser and access the Discovery Progress widget.

- **For discovery administrators, launch the Discovery Progress widget from the Discovered CIs dialog in UCMDB UI.**

  When performing job-based discovery troubleshooting in the Universal Discovery module, after drilling down to the Discovered CIs dialog (for example, by following the **Triggered CIs > Completed with Errors >** <Double-click an error message, and then right-click a detailed message> **> Show Results for Triggered CI >** <Select a CIT and click **Show Additional Data** > **> Discovered CIs**), you may want to find out more details about an affected CI.

  To do so,

  A. In the Discovered CIs dialog, right-click a discovered CI and select **Open UCMDB Browser** from the context menu.

     The UCMDB Browser launches, with the CI Details pane opening in the right side of the UCMDB Browser search page.

  B. In the CI details pane, click **DISCOVERY PROGRESS** or **Show All** in the Discovery Progress widget in CI Overview mode.

     The Discovery Progress widget opens to its widget details mode.

- **For data consumers, launch UCMDB Browser and open the Discovery Progress widget for a selected CI**

  A. log in to the UCMDB Browser, enter either of the following in a web browser:

     http://<server_name>:<8088>/ucmdb-browser

     https://<server_name>:<8443>/ucmdb-browser

     where <server_name> represents the fully qualified domain name (FQDN) of the UCMDB server.

  B. Search for the CI of your interest.

The returned search results page displays a list of all CIs. The discovery indicator (, , or) next to each returned CI gives you a straightforward discovery status of the CI.

C. On the returned search results page, click the CI of your interest.

The CI Details pane opens in the right side of the page.

D. Click **DISCOVERY PROGRESS** or **Show All** in the Discovery Progress widget in CI Overview mode.

The Discovery Progress widget opens to its widget details mode.

b. View discovery indicators, discovery status, errors, and warnings for a selected CI in the Discovery Progress widget.

For details about the Discovery Progress widget, see the *Discovery Progress Widget* section in the *Use section of the Universal CMDB Browser Online Help*.

Assign Color Categories

Color categories in the UCMDB Browser module help you with the navigation and searching of CIs. You may assign any of the available colors to any CI:

Gray (if no category is specified)	
Dark Steel	
Green	
Orange	
Purple	
Red	
Slate	
Turquoise	

Yellow	

You can view and change the color categories by:

- Clicking the colored icon in the upper right corner of each CI on the search results page (both in grid view and thumbnails view) and on the Most Visited page.
- Selecting **Choose Category** from the context menu for a selected CI.

To assign a color category, click the color icon in any of these locations, and select the color category that you want to apply to the CI. Changes are reflected in all places where categories are indicated.

After assigning colors, you can use the color categories to refine your search (for example, "all red Windows servers" or "all blue business applications located in Seattle".

> **Note:** When upgrading from UCMDB Browser to CMS UI 2018.08 or later versions, the colors assigned in the previous version will be updated to the new colors and names available in the CMS UI 2018.08 or later versions. If the default names for the colors have been changed in the previous version, only the colors will be updated, and the names will remain as they were defined before.

Enable color categories

1. In UCMDB, go to **Administration > Infrastructure Settings Manager > UCMDB Browser settings**.
2. Set the value of **Enable categories** to **True**.
3. Click **Save**.
4. Log out from the CMS UI, and then log in again (this loads the new setting).

   > **Note:** The change takes effect according to the time set in one of the following settings:
   >
   > - **Time for which information in the Browser cache is valid**
   > - **Time for which UCMDB Settings in the Browser cache is valid**
   >
   > For more information, see "Settings affecting overall system operation".

Manage color categories

1. Click the **Settings** button and select **Manage System Categories**.
2. Change the label for one or more of the available colors.
3. Click **OK**.

Assisted Modeling

> **Note:** Assisted Modeling is supported only with the Enhanced Search Engine enabled (the value of the **cmdb.search.enabled** JMX setting is **true**).
>
> If the Enhanced Search Engine is disabled (the value of the **cmdb.search.enabled** JMX setting is **false**), the value of the **ucmdb_browser.modeling_configuration.enable_validation** JMX setting must be **true**.

Assisted modeling in the UCMDB Browser module provides a more accessible interface for CI modeling than is available in UCMDB. Assisted modeling is designed for end-users who do not need the full modeling capabilities that the UCMDB provides for administrators. The UCMDB Browser module provides a very intuitive and straightforward user interface for creating CIs and relationships between CIs.

Assisted modeling is performed according to modeling templates. Best practice modeling templates are provided out-of-the-box. The best practices templates can be used out-of-the-box 'as is', or the UCMDB administrator can edit them according to your organization's needs. New modeling templates can also be created by the UCMDB administrator. For instructions on creating templates, see "Create Modeling Templates" on page 415.

To change the order in which modeling layers are displayed, see "Change the Modeling Layering Order" on page 416.

> **Note:** To use assisted modeling, users must have data-update permissions assigned in the Roles Manager in UCMDB, and View access to at least one of the modeling templates.

Get Started with Assisted Modeling

You can access Assisted Modeling in two ways, through the Service Modeling module:

- Click **Start Assisted Modeling**.

  or

- Hover your mouse over a CI in a service model map and select **Assisted Modeling** from the context menu .

When the modeling is completed, click Save.

The modeling topology map is displayed with the selected CI automatically loaded in the model. To see the related CIs, see "View a List of All CIs that are Related to the Selected CI" on page 412.

> **Note:**
>
> - The templates displayed in the drop-down list are according to the user's permissions on the query resource and also according to the selected CI type. To quickly locate a template, you can filter the list of templates by entering a text string in the drop-down list.
> - The selected template can be changed after you have started to make modeling changes. However, if you change the template all modeling changes made with the previous template are not saved.

Modeling Actions

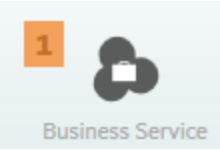
You can perform the following modeling actions:

- "Group the CIs in the Model by CI Type" on the next page
- "Edit the Properties for the Selected CI" on the next page
- "Remove the Selected CI from the Model" on page 412
- "View a List of All CIs that are Related to the Selected CI" on page 412
- "View only the CIs that are Directly Related to the Selected CI" on page 412
- "Add an Existing CI to the Model" on page 412
- "Create a New CI and Add It to the Model" on page 413
- "Create and Remove Relationships between the Selected CI and Other CIs in the Model" on page 414
- "Save Changes to the Model" on page 415
- "Create Modeling Templates" on page 415

- "Change the Modeling Layering Order" on page 416
- Navigate the Modeling Topology Map Using a Quick Navigation Map

Group the CIs in the Model by CI Type

To group the CIs in the model by CI Type, click the button in the model. The CIs are now grouped, and a number of grouped CIs is displayed.



To expand the grouped CIs, click the button.

Edit the Properties for the Selected CI

1. Ensure that a CI is selected in the map.
2. In the right pane, click **Edit CI**.

   > **Note:**
   >
   > - Similar to the Properties widget in the UCMDB Browser module, the CI properties are displayed in the right pane. In the Assisted Modeling window, mandatory properties are marked with an '*'. All of the mandatory fields must have a value to save changes you make to any of the CI properties.
   > - For a property to be edited, it must be defined as **CMS Browser Editable** in UCMDB, in the same manner as the Properties widget.
   > - If an attribute of a CI type has the **Hide in Modeling** qualifier selected, it is not displayed when editing the CI.

   > **Note:** Similar to the Properties widget in the UCMDB Browser module, the CI properties are displayed in the right pane. In the Assisted Modeling window, mandatory properties are marked with an '*'. All of the mandatory fields must have a value in order to save changes you make to any of the CI properties.

3. Edit the property values.
4. Click **Apply** at the bottom of the pane.

Remove the Selected CI from the Model

1. Ensure that the CI you want to remove is selected in the map.
2. In the right pane, click **Remove from Model**.

   The CI is removed from the model.

> **Note:**
>
> - If you create a model based on a particular CI, you cannot remove that CI from the model.
> - If you create a model based on an empty template, you can remove all CIs from the model.

View a List of All CIs that are Related to the Selected CI

You can view in the model all CIs related to the selected CI (as defined by the selected template) as follows:

In the right pane, click **Show All Connected CIs**. This loads, from UCMDB, all CIs related to the selected CI, as defined by the modeling template. The related CIs are displayed in the model.

View only the CIs that are Directly Related to the Selected CI

You can view in the model only the CIs directly related to the selected CI (as defined by the selected template) as follows:

In the right pane, click **Show One Level Connected CIs**. This loads, from UCMDB, only the CIs directly related to the selected CI, as defined by the modeling template. In the new panel that opens you can select the CIs that you want to be displayed in the model, and then click **Show on Map**. The selected CIs are displayed in the model.

> **Note:** Once the CIs that you have selected using the **Show One Level Connected CIs** option are displayed in the map, you can remove them from the model only by using the **Remove from Model** option. You cannot remove them by deselecting the checkboxes from the **Show One Level Connected CIs** option.

Add an Existing CI to the Model

You can add an existing CI to the model. When you do this, it is automatically connected to the selected CI in the model. This may not be the CI that started the model.

1. Do one of the following:
   - In the right pane, go to the section called **Add CIs** and click **Existing** under the CI type that you want.
   - Click **Plus** in one of the CI type sections in the model. Then, in the right pane, click **Add Existing <CI type>**.

   The search screen appears. By default, a list of all CIs with the CI type you selected in the previous step is displayed.

   You can view in the search screen only the results that respect the attribute condition and the cardinality condition defined for the TQLs in UCMDB, by changing the value of the **Force Assisted Modeling validation through TQL conditions** setting to **True** in the **UCMDB > Administration > Infrastructure Settings Manager > UCMDB Browser Settings**.
2. Locate the CI you want to add either by finding it in the displayed list or by searching for it in the search box and click **Add**, which appears when you hover over the CI.

   The CI is now added to the model, directly linked to the selected CI.
3. You can continue to add more CIs in this manner. When finished, click **Done** at the bottom of the right pane.

Create a New CI and Add It to the Model

You can create a new CI and add it to the model. When you do this, it is automatically connected to the selected CI in the model. This may not be the CI that started the model.

> **Note:**
>
> - Only CIs with a CI type that has been assigned the **MODELING_ENABLED** qualifier in UCMDB (by the system administrator) can be created in the Assisted Modeling module.
> - To edit the **Tenant Owner** and the **Consumer Tenant** attributes in the Assisted Modeling module you need to have the **Reassign Tenant** and the **View Tenant Assignment** permissions, and the attributes must be defined as **CMS Browser Visible** and **CMS Browser Editable** in UCMDB.

1. Do one of the following:
   - In the right pane, go to the section called **Add CIs** and click **New** under the CI type that you want.

- Click **Plus** in one of the CI type sections in the model. Then in the right pane, click **Create New <CI type>**.

  > **Note:**
  >
  > - Similar to the Properties widget in the UCMDB Browser module, the CI properties are displayed in the right pane. In the Assisted Modeling window, mandatory properties are marked with an '*'. All of the mandatory fields must have a value to save changes you make to any of the CI properties.
  > - For a property to be edited, it must be defined as **CMS Browser Editable** in UCMDB, in the same manner as the Properties widget.
  > - If an attribute of a CI type has the **Hide in Modeling** qualifier selected, it is not displayed when editing the CI.

  > **Note:** Similar to the Properties widget in the UCMDB Browser module, the CI properties are displayed in the right pane. In the Assisted Modeling window, mandatory properties are marked with an '*'. All of the mandatory fields must have a value to save changes you make to any of the CI properties.

2. Edit the property values.
3. Click **Apply** on the bottom of the pane.

   The CI is now added to the model, linked to the CI that was selected.

Create and Remove Relationships between the Selected CI and Other CIs in the Model

You can create relationships between CIs in the model and the selected CI, or remove existing relationships between CIs in the model and the selected CI.

1. In the right pane, go to the **Edit Connections** section and hover over the CI that you want to create a relationship with or remove the relationship from the selected CI.

   > **Note:** You can create relationships only with those CIs that are allowed by the template to have a relationship with the selected CI and only with those CIs that are displayed.

2. Click **Connect** or **Disconnect**.

Save Changes to the Model

Click **Save** at the top right of the Assisted Modeling window. When you click **Save**, all the changes you have made in the Assisted Modeling window are saved to UCMDB. Until you click **Save**, none of the changes you have made are saved.

It is possible that when you click **Save**, you will receive an error message(s) indicating what needs to be fixed. Also, if there are errors the invalid CI is marked with a red triangle on the upper left corner.

Create Modeling Templates

1. In UCMDB, go to **Modeling Studio** and click **New** .
2. From the drop-down list, select **Query**. The Query Definition editor opens.
3. Click **Query Definition Properties** . The Query Definition Properties dialog box opens.

   > **Note:** By default, the Type field in the Query Definition Properties dialog box is Integration. This value should not be changed.

4. Ensure that **Integration** is selected in the Type field (it should be selected by default).
5. In the Bundles field, click **Select Bundles** . The Select Bundles dialog box opens.
6. From the Bundles list, select **modeling** and click **OK**. If **modeling** does not appear in the list, enter modeling in the text field and click **Add New Bundle**.
7. In the Query Definition Properties dialog box, click **OK**.
8. Build the TQL query and save it to any location.

> **Note:**
>
> - A user must have permissions on the query resource in order to view the template in the UCMDB Browser module.
> - The following limitations exist on modeling templates:
> - Virtual links and compound links are not allowed.
> - The TQL query must not have circular dependency.

Change the Modeling Layering Order

If you are viewing the model in Layers mode, you can change the order in which the modeling layers are displayed

1. Click at the bottom of the Assisted Modeling window.
2. Under **Change Layout**, select **Layers**.
3. In UCMDB, go to **Administration > Infrastructure Settings Manager > UCMDB Browser settings**.
4. In the Name column, select **Layer ordering**.
5. In the Value field, change the layering order to the order that you want. Ensure that all layering names are separated by commas.
6. Click **Save**.
7. If the CMS UI is currently open, log off and then log on again to see the changes in the layering order. If the CMS UI is not open, you will see the changes in the layering order the next time you log on.

> **Note:** The change takes effect according to the time set in one of the following settings:
>
> - **Time for which information in the Browser cache is valid**
> - **Time for which UCMDB Settings in the Browser cache is valid**
>
> For more information, see "Settings affecting overall system operation".

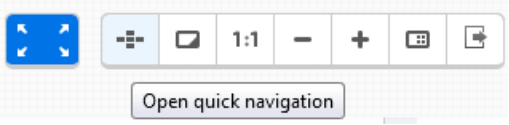
Navigate the Modeling Topology Map Using a Quick Navigation Map

You can navigate the modeling topology map easily by turning on the quick navigation map.

In the quick navigation map, the elements from the canvas are represented. You can drag and resize the selection in the map overview.

If the map is too large, a big overview of the map is available, which allows you to use the map overview navigator to jump directly to a particular part of the map.

A toggle button is available in the map to allow you to turn on/off the minimap. If the map is larger than 20 CIs, the state of the button is saved in your user preferences.



For more details about the Map Toolbar, see "Map Toolbar" on page 281.

Discovery Indicators

> **Note:** This feature is supported on UCMDB 10.21 CUP1 and later versions.

You can see different types of discovery indicators in the **Search**, **Advanced Search** and **Reports** modules in the UCMDB Browser module.

These indicators allow you to see a warning or an error flag on a discovered CI, if any of the discovery jobs have completed with warnings or errors.

To use this feature, you need to have the **Run Discovery and Integration** or **View Discovery Status and Error** permission.

By default, the Discovery indicators are disabled. To enable the Discovery indicators, go to **UCMDB Browser module > Settings > Manage Discovery Status** > select the **Display Discovered CIs Status** checkbox, and then click **OK**.

There are three types of discovery indicators:

1. A **warning indicator** shows on the CI in the UCMDB Browser module when there is at least one discovery job completed with warnings and there is no discovery job completed with errors.
2. An **error indicator** shows on the CI in the UCMDB Browser module when there is at least one discovery job completed with errors.
3. A **success indicator** shows on the CI in the UCMDB Browser module when all the discovery jobs completed successfully.

If a CI is not discovered (updated) by any of the discovery jobs, then no indicator will show on that CI.

> **Note:** In the UCMDB Browser module, discovery indicators:
>
> - Apply to discovery jobs only, including regular discovery jobs, management zone jobs, and Automated Service Modeling (ASM) jobs. Integration jobs are not supported in this release.
> - Do not show on a discovered CI when there is no relation between the CI and the job.

Notifications

> **Note:** If you log in to the CMS UI with the customer state of **Authorized**, the Notifications functionality is disabled automatically, even if it is enabled via settings.

Notifications in the UCMDB Browser module enable you to see which property (CI or attribute) has changed, been added, or been deleted since the last time notifications were generated. Notifications are sent according to values specified in the UCMDB settings.

After enabling notifications in UCMDB (as described in "Configure notifications" on the next page), select Select **Notifications** from the context menu for a selected CI to specify the widgets for which you want to see notifications. This icon appears on the search results page and on the Most Visited page.

A list of notifications appears in the Notifications tab in the UCMDB Browser module, marked with a (unread) or (read) indicator, as well as in the locations mentioned above. In the Notifications tab, you can choose to display all notifications or only unread notifications.

Clicking a notification opens the CI in CI Overview mode. Here, the widgets to which you have subscribed that contain changes are marked with a NEW indicator (the changes themselves are visible only in Widget Details mode). After entering Widget Details mode for any of the marked widgets, the icon in CI Overview mode changes to NEW. For widgets that contain changes, in Widget Details mode, notifications that are marked with an OLD indicator display their values inline. If Show old is displayed, click the indicator to see the older values in a pop-up window.

Indicators for changed values appear in the following widgets:

Properties widget	An indicator is displayed next to each changed attribute (simple or logical, such as owner, CPU, memory, and so on). For details, see "Properties Widget" on page 367.
Environment widget	An indicator is displayed for each newly added CI in the CI list. For details, see "Environment Widget" on page 349.
History widget	An indicator is displayed for the current CI and for CIs related to the current CI (up to five levels). For details, see "History Widget" on page 353.
Policy widget	An indicator is displayed on each new policy or on a change in the policy status. For details, see "Policy Widget" on page 363.
Stakeholder widget	An indicator is displayed for each CI in the list, as well as on the stakeholder's personal information (email address and phone numbers). For details, see "Stakeholder Widget" on page 370.

Widgets related to Service Manager: Change Request, Incidents, and Problems widgets	An indicator is displayed for each ticket, summarizing the changes in the ticket. Indicators appear for new and updated items (what changed in the affected CIs, phase, severity value, dates, and so on). **Note:** You may receive notifications for these widgets but not be able to view the corresponding widget details if: • The particular request from Service Manager is in a state that currently is not configured as being displayed in the UCMDB Browser module. To specify Service Manager request states to be displayed, in UCMDB, go to **Administration > Infrastructure Settings Manager > UCMDB Browser Settings** and specify the statuses that you want to be displayed. • The particular CI that was subscribed to notifications for these widgets from Service Manager is no longer affected by a request.
Dynamic widgets	An indicator is displayed next to each changed attribute (for attributes that are selected in the widget definition). **Note:** To receive notifications about changed attributes in dynamic widgets, you must configure the attributes in the dynamic widget configuration. For details, see "Create a dynamic widget" on page 347.

Note: In all widgets, for data that has been removed or deleted, a Removed Data OLD indicator appears next to the widget's title. Click the indicator to view a pop-up window containing all deleted CIs and attributes.

Configure notifications

- **To enable notifications:**
  a. In UCMDB, go to **Administration > Infrastructure Settings Manager > UCMDB Browser settings**.
  b. In the Name column, choose **Enable notifications**.
  c. In the Value column, set the value to **True**.
  d. Click **Save** .
  e. Log out from the CMS UI, and then log in again to load the new setting.

     Note: The change takes effect according to the time set in one of the following settings:

> - **Time for which information in the Browser cache is valid**
> - **Time for which UCMDB Settings in the Browser cache is valid**
>
> For more information, see "Settings affecting overall system operation".

f. In the UCMDB Browser module, click and specify the widgets for which you want to see notifications.

- **To specify persistency values for notifications:**

  The length of time that notifications are retained and how often they are generated are defined in the JMX console:

  a. Go to **JMX Console > UCMDB:service=Settings Services > setSettingValue**.

  b. To change each setting, follow these steps:

     i. In the **name** field, enter one of the strings listed below:

     - tql.tracker.queue.evaluation.initial.delay.in.min - the initial delay (in minutes) after startup, before a TQL query is calculated.
     - tql.tracker.queue.evaluation.period.in.min - the interval (in minutes) of how often a TQL query is scheduled to run.
     - tql.tracker.queue.max.single.run.time.in.min - the maximum length of time (in minutes) for the system to work on calculating changes on CIs or TQL queries during a single execution.
     - tql.tracker.min.time.between.tracker.runs.in.min - the minimum length of time between two runs of a TQL query.

     > **Note:** To find the default value for each setting, enter the required string in the **name** field of **getSettingDefaultValue** and click **Invoke**.

     ii. In the **value** field, enter the value you want to set.

     iii. Click **Invoke**.

  c. Restart the UCMDB server.

Schedule Notifications

You can configure the UCMDB Browser module to receive notifications by email.

You can schedule how often to receive notifications by email by clicking on the **Settings** button and selecting **Schedule Notifications**from the drop-down list.

The emails include the following for each CI with notifications:

- the name, type, and icon
- the widgets that contain the changes from the notifications
- a link back to the UCMDB Browser module in the context of the CI

You can choose to receive emails on an ad-hoc basis, or daily at a time that you specify. You must specify the email address to which the notifications will be sent.

- Ad-hoc emails

  Click the **Schedule ad-hoc email** checkbox to receive notification emails at the interval that has been specified by your system administrator.

  To specify this interval, set the tql.tracker.queue.evaluation.period.in.min setting as described in "Configure notifications" on page 419.

  The same notification will not be sent more than one time.

- Daily emails

  Click the **Schedule daily email** checkbox and select the time of day that you want to receive the emails.

  All unread notifications will be sent, whether or not they were sent previously.

> **Note:** After you change this setting, you must restart the CMS UI to apply the new value.

Export notifications

You can choose to export results for all notifications or only for unread notifications. On the Notifications tab, click **View: Unread** or **View: All** as required.

In addition to the attributes that you specify in the Infrastructure Settings Manager in UCMDB, the name of the widget in which the changed CI appears is also included in the results.

- **To specify the attributes to be exported:**

  a. In UCMDB, go to **Administration > Infrastructure Settings Manager > UCMDB Browser settings**.

b. Do the following:

- In the Name column, choose **Minimal export of search results** and choose **True** if you want to export only the display label, class name, CI ID, and Global ID attributes for each CI. Choose **False** if you want to export all attributes that are displayed in the Properties Widget.

  Additional attributes can be excluded if they are marked in the CI Type Manager in UCMDB. For details, see the description of the **Hide in Export Search Results** qualifier in the *Modeling section of the UCMDB Help*.

- In the Name column, choose **Remove logical attributes (owner, location) from export of search results** and choose **True** to remove the owner and location attributes from the exported search results.

If you set **Minimal export of search results** to False, the attributes displayed in the expanded mode of the Properties widget are exported.

- **To export notification results:**

a. Click **Export results** in the search results toolbar. The following options are available:

- Current page > XLS, XLSX, or CSV
- All pages > XLS, XLSX, or CSV

b. Click **Open**, **Save**, or **Cancel**.

The created file is named with the date and time that the export was performed.

> **Note:** In the exported file, the **'** character is added in front of any CI attribute name that begins with one of the following characters: **@ + - =**.

Universal Discovery Licensing Overview

To fit the changing IT world and to meet the increasing need for a more flexible and comprehensive licensing system, the Universal Discovery Licensing is improved and adjusted to follow the unit-based licensing model. Benefits of the new licensing system include the following:

- **Increased licensing flexibility.** The new unit-based model covers both UD Full and UD Inventory. There is no longer the need to worry that Universal Discovery will consume a more expensive UDF license when you run out of UDI licenses.

- **Extended license coverage** to cover servers, workstations, containers, network devices, and storage devices. No need to wait for the product team to build new and updated discovery of network and storage devices.
- **Alignment with ITOM licensing practices.** UD Full and UD Inventory are no longer licensed as separate products.

> **Note:** The unit-based licensing model requires UCMDB version 2018.08 and Content Pack version 26.00 or later.

What's Changed Compared to the UDI/UD Full Licensing Modeling

The new licensing model introduced since version 11.0 changes how some jobs charge for your discovery in 2018.08. Here is the list of changes:

- VMware virtualization will now consume an Advanced unit for each node (same with Hyper-V and Solaris Zones)
- If you discover running software on a server, it consumes an advanced unit for that server
- Workstations will never consume an Advanced license. UCMDB determines whether a compute device is a workstation or not by the operating system installed on it (for example, including but not limited to, Windows 7, Windows 10 or macOS)
- The two discovery jobs related to Netflow will now only consume a Basic unit
- It is now possible to capture Oracle LMS on servers without an additional license beyond the Advanced unit

Units Model of the Universal Discovery Licensing

In the new units model:

- 1 Unit = 1 UD Full license
- Everything else is a ratio of the UD Full License

The table below describes the conversion rates between UD Full, UD Basic, and Units:

Type	Server (Unit)	Workstation (Unit)	Network (Unit)	Storage (Unit)	Docker (Unit)
UD Full (Advanced Discovery)	1	0.1	0.1	0.1	0.1
UD Basic (Basic Discovery)	0.2	0.1	0.1	0.1	0.1

Note: The highlighted cells indicate adjustments.

In brief, a 10 units license pack of Universal Discovery 2018.08 Licensing contains the following:

Key Capabilities and Differentiation Between Basic Discovery and Advanced Discovery

The table below describes the capabilities available with Universal Discovery Basic Discovery and Advanced Discovery license types.

License Type	10 Units License Packs provide	Key Capabilities
Basic Discovery	50 Servers OSI 100 network / storage devices, containers, workstations, printers or mobile devices.	• Discover basic network, servers and their OSs • Capture software utilization and inventory, including network and storage devices, workstations, and containers • Utilize Smart Software Analytics (SSA) to customize software teaching • Understand which hardware and installed software you have. • Utilize zone-based and discovery job section to perform discovery • Credential Less Discovery (netflow)
Advanced Discovery	10 Servers OSI	• Everything from **Basic Discovery** • Discovery of software dependencies and topologies • In-depth application discovery

License Type	10 Units License Packs provide	Key Capabilities
		• Includes (but not limited to): Cloud and Virtualization, Clustering and Load Balancers, Detailed DB / Middleware / Enterprise Applications / multi-tier interdependencies discovery. • L2 discovery • Automated Service Modeling and Discovery to build service maps automatically • Customized discovery • Oracle LMS (free of charge) to capture audit details

The table below illustrates differentiation between UD Basic Discovery and UD Advanced Discovery.

License Type	Definition	Use Cases
Basic Discovery	A node will consume a Basic Discovery unit when information is collected that is within the context of the node being discovered: • Physical inventory • Installed software inventory • Users • Ports/LUNs	• Physical Asset Management • Software Asset Management* • Security Policy • Management Configuration Policy Management
Advanced Discovery	A node will consume an Advanced Discovery unit when information is collected about it running software, or how the node interact with other nodes or running software: • Running Software inventory (and its processes) • Server to Server links • Server to Running Software links • Running Software to Running Software links • Server to Storage links • Server to Network links • Virtual to Physical links	• Incident Management • Service Management • Change Management • Impact Analysis • Event Management • Event Correlation

License Type	Definition	Use Cases
		• Oracle Audit Preparations • Security Policy Management • Dependency Policy Management

Note: * Universal Discovery can collect software inventory to be used for the SAM use case by Asset Manager.

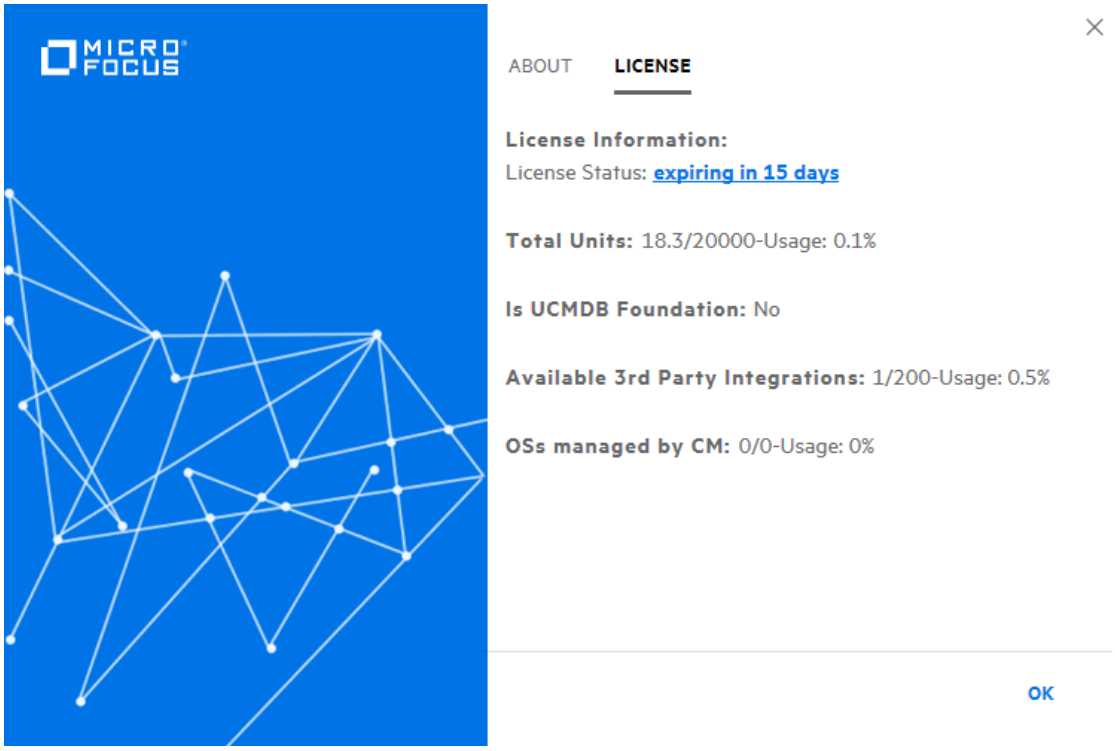
Access the new License Summary Report

1. Launch CMS UI as Admin user.
2. Click the **Help** button in the top right corner of the window, and then select **About**.

   The About window opens.
3. Go to the **LICENSE** tab.

   Check the license summary:

   - **License Status** - Is license status compliant, noncompliant, or expiring in a number of days.
   - **Total Units** - Provides data about units of licenses consumed and units available, as well as the units consumption rate.
   - **Is UCMDB Foundation** – Indicates whether you have Foundation license or not.
   - The Managed Data Repository (MDR) usage is displayed according to the **Available 3rd Party Integrations** you have in UCMDB.
   - **OSs managed by CM** usage displays the number of OSIs belonging to the results of the managed in CM views.

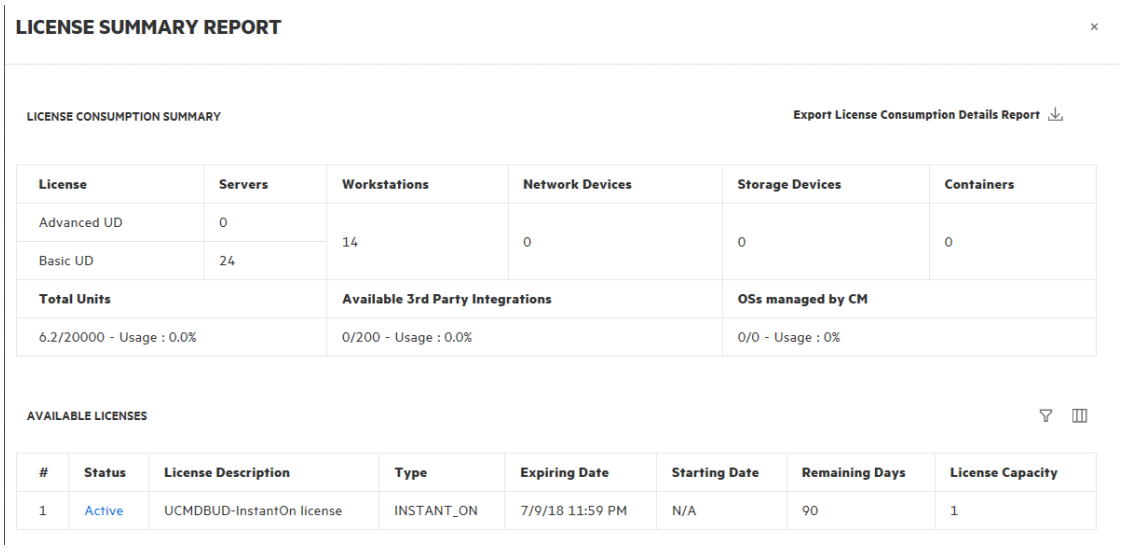


4. Click the link after **License Status**.

   The License Summary Report page opens.

5. Check the license summary report.

   - Only **Instant-On license** is listed even though you have had some licenses installed when you worked with the previous version. The license issued for previous versions are not compatible with UCMDB 2018.08 and they are not visible.
   - The **Advanced UD** license usage is not yet displayed even if there are discovered OSIs in your UCMDB.
   - **OSs managed by CM** usage displays the number of OSIs belonging to the results of the managed in CM views.
   - The Managed Data Repository (MDR) usage is displayed according to the **Available 3rd Party Integrations** you have in UCMDB.
   - **Total Units** usage provides data about units consumed and units available, as well as the units consumption rate.



LICENSE SUMMARY REPORT

LICENSE CONSUMPTION SUMMARY

Export License Consumption Details Report

License	Servers	Workstations	Network Devices	Storage Devices	Containers
Advanced UD	0	14	0	0	0
Basic UD	24				

Total Units	Available 3rd Party Integrations	OSs managed by CM
6.2/20000 - Usage : 0.0%	0/200 - Usage : 0.0%	0/0 - Usage : 0%

AVAILABLE LICENSES

#	Status	License Description	Type	Expiring Date	Starting Date	Remaining Days	License Capacity
1	Active	UCMDBUD-InstantOn license	INSTANT_ON	7/9/18 11:59 PM	N/A	90	1

In the Available Licenses section, you can click to select whether you want to display **All** licenses or licenses of **Active** or **Expired** status. You can also click to select columns you want to display. By default all columns are displayed.

6. Click **Export License Consumption Details Report** in the upper right corner of the page, then select one of the following options to export the detailed report in Excel format:
   - Unit Consumption Details
   - MDR Consumption Details

   Open the exported Excel report and review the details, for example, the device name that is identified.

   The table below describes each column in the exported Unit Consumption Details report:

Column	Description
instance_type	Instance type of the resource. Valid values include server, workstation, network, docker, and so on.
Units	Units consumed.
CI_type	CI type attribute value of the resource.
global_id	Global ID attribute value of the resource.
name	Name attribute value of the resource
node_role	Whether the resource is of node type, but not of network or storage device, and what node type the resource is: server or workstation. Value example: **[server, virtualized_system]** or **[virtualized_system]**

Column	Description
	for a server resource; **[desktop, virtualized_system]** for a workstation resource.
os_family	OS family of the resource: Windows, Linux, MacOS, or others.
discovered_os_ version	The discovered OS version of the resource (if applicable).
create_time	Time the record for the resource is created.
created_by	Indcates who created the record of the resource. Value example: **UCMDBDiscovery: Host Connection by Shell** indicates that the record is created by the Universal Discovery Host Connection by Shell job.
last_modified_time	Time the record of the resource was last updated.
data_updated_by	Indicates the discovery job that last updated the record of the resource. Value example: **UCMDBDiscovery: Host Connection by Shell**
root_ iscandidatefordeletion	Is the CI candidate for deletion or not. Default: FALSE

The table below describes each column in the exported MDR Consumption Details report:

Column	Description
Integration name	Name of the integration point.
Adapter name	Name of the adapter used in the integration point.
Is Free	Is the integration available free of charge or not.
Used MDR license:	Number of MDR licenses used.

Frequently Asked Questions

- **Q:** What must be prepared to upgrade the Universal Discovery Licensing to 2018.08?

  A: You must do all of the following:

  - Access the Support Entitlement Portal to convert any MDR and ACM licenses you own to the format required by 2018.08 or later. This can be done by you and does not require any help from Micro Focus teams.

  - Contact the Software Sales Assist team (sw_ssa@microfocus.com) before upgrading UCMDB to migrate your UD Full and UD Inventory licenses to units.
  - Install the converted MDR and ACM licenses into UCMDB, and also install the migrated Units into UCMDB.

- **Q:** Will I be able to use UCMDB 2018.08 without updated licenses?

  A: If 2018.08 license is not applied, you will be provided a limited time trial license. Production usage of UCMDB with this trial license is not allowed.

  The UCMDB splash screen contains a link to the JMX method that allows you to add the new license.

- **Q:** Will I be able to use the existing MDR licenses in UCMDB 2018.08?

  A: Yes. Your existing licenses will work fine in UCMDB 2018.08. You just need to “convert” them via the Support Entitlement portal so that they are compatible with UCMDB 2018.08.

- **Q:** How should I deal with the license upgrade from a previous version to UCMDB 2018.08?

  A: For detailed instructions, see "How to Deal with License Upgrade from a Previous Version to UCMDB 2018.08?" on page 1.

For more details about 2018.08 licensing, go to the CMS page on the Software Sales Portal and check the **Licensing** section on the **Resources** tab. Or, contact the Software Sales Assist team (sw_ssa@microfocus.com) directly.

Troubleshooting

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Troubleshooting CMS UI - Known Issues

Problem: "There is no data available for this report" message is displayed for individual default report widgets (such as Installed Software) on the Home module

- **Cause:** It could be one of the following:
  - It is true that there is no data available for the reports. Or,
  - The reports are querying over a large amount of data from the UCMDB server which exceeds the maximum number of elements allowed in view, and you may find "server view query over limit" error in log.
- **Solution:** In case of the second scenario, to resolve the display issue, go to **UCMDB UI > Administration > Infrastructure Settings Manager**, locate the **Maximum number of elements (nodes) in TQL result for view** setting (default value: 30000) and increase its value to meet your need.

Problem: Performance for the CMS UI is slow.

- **Possible Solution**: Add the variable **CATALINA_OPTS** to the Operating Systems environment variables with values:

  -Xms512M -Xmx4096M

Problem: The Tomcat log that contains requests to the CMS UI and their HTTPS codes becomes too large and is unreadable.

- **Solution:** Comment out the following lines in the **server.xml** file, located in **<*CMS_UI_installation_directory*>\webapps\release\conf**:

```
<Valve className="org.apache.catalina.valves.AccessLogValve" directory="logs"
prefix="localhost_access_log." suffix=".txt"
pattern="%h %l %u %t &quot;%r&quot; %s %b" />
```

Problem: Icons are not displayed when the Turn Off Data URI support setting is not disabled.

- **Solution:** Disable the **Turn Off Data URI support** setting on Windows as follows:
  a. Click **Start**, type **gpedit.msc** in the **Start Search** box, and then press **ENTER**.
  b. In the navigation pane of the Local Group Policy Editor window, expand **Computer Configuration > Administrative Templates > Windows Components > Internet Explorer > Security Features.**
  c. In the right pane, double-click **Turn Off Data URI support**.
  d. Select **Enabled**, click **Apply**, and then click **OK**.
  e. Go back to the navigation pane of the Local Group Policy Editor window, expand **User Configuration > Administrative Templates > Windows Components > Internet Explorer > Security Features.**
  f. Repeat step 3 and step 4.

Troubleshooting Service Modeling

Troubleshooting Automated Service Modeling (ASM) - General Guideline

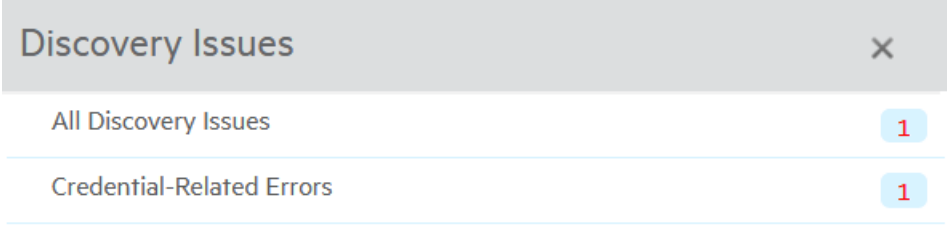
This chapter introduces the general troubleshooting guidelines for problems that may occur during the Service Modeling process.

When an error occurs with a particular CI in the topology map, an error icon appears on the CI.

The following steps demonstrate the basic troubleshooting procedure for such an error:

1. View the error message in the UCMDB Browser module.
   a. Click the error icon on the CI.

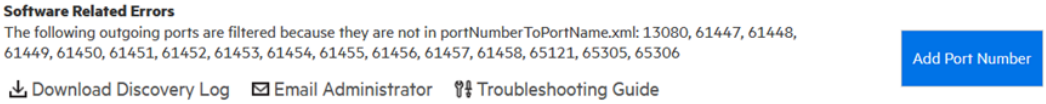
      The **Discovery Issues** pane appears and lists all the related discovery issues.

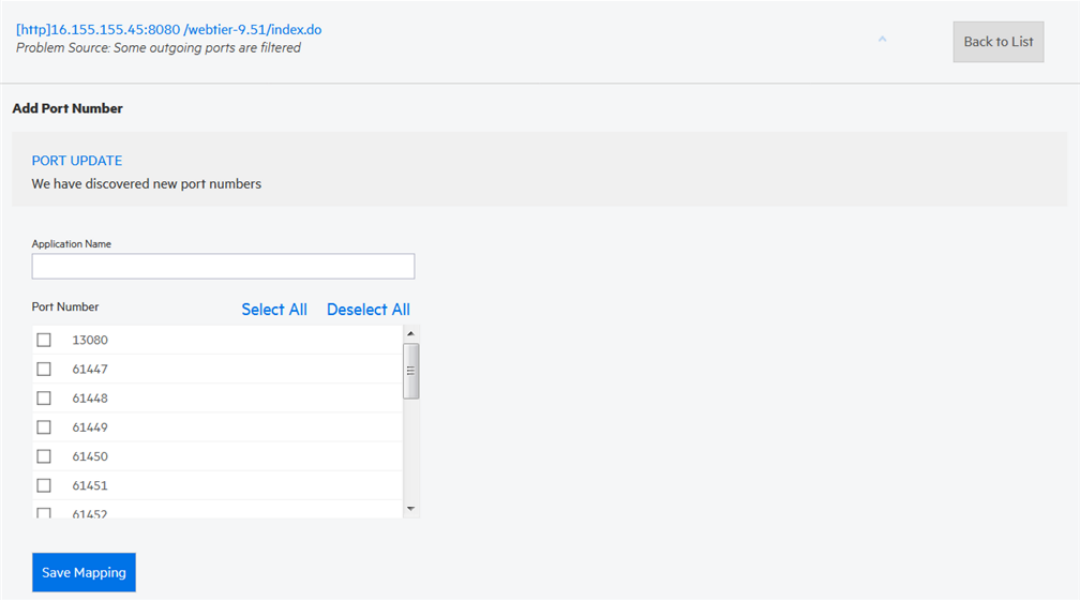
   b. Click one of the categories.

      A list of errors of the category appears.

   c. Click an error to view the detailed error message.

2. Perform one of the following actions when appropriate.
   - For some errors under **Software Related Errors**, you can directly provide some missing information in the UCMDB Browser module. As in the above example, if you click the **Add Port Number** button, you will be able to add the missing port numbers.



- Search the error message in this chapter, and try the suggested solutions.

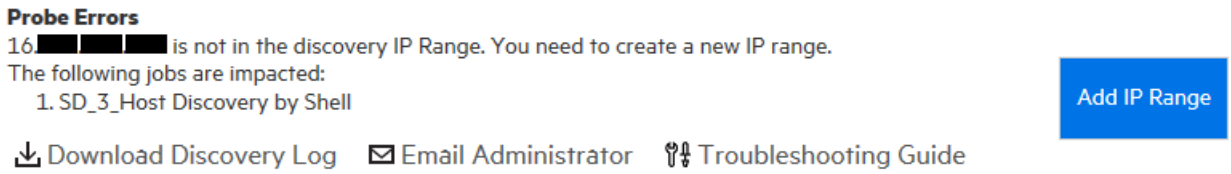
3. Rerun the Service Modeling task.

Troubleshooting ASM - Host Discovery by Shell job

This chapter describes the error messages you may receive from the Host Discovery by Shell job and provides suggested solutions.

Error Message: The IP address is not in the discovery IP Range

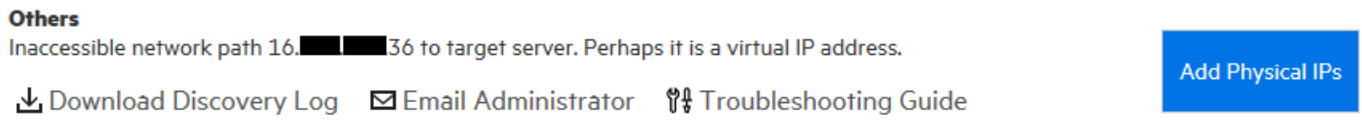
Error Category: Probe Errors



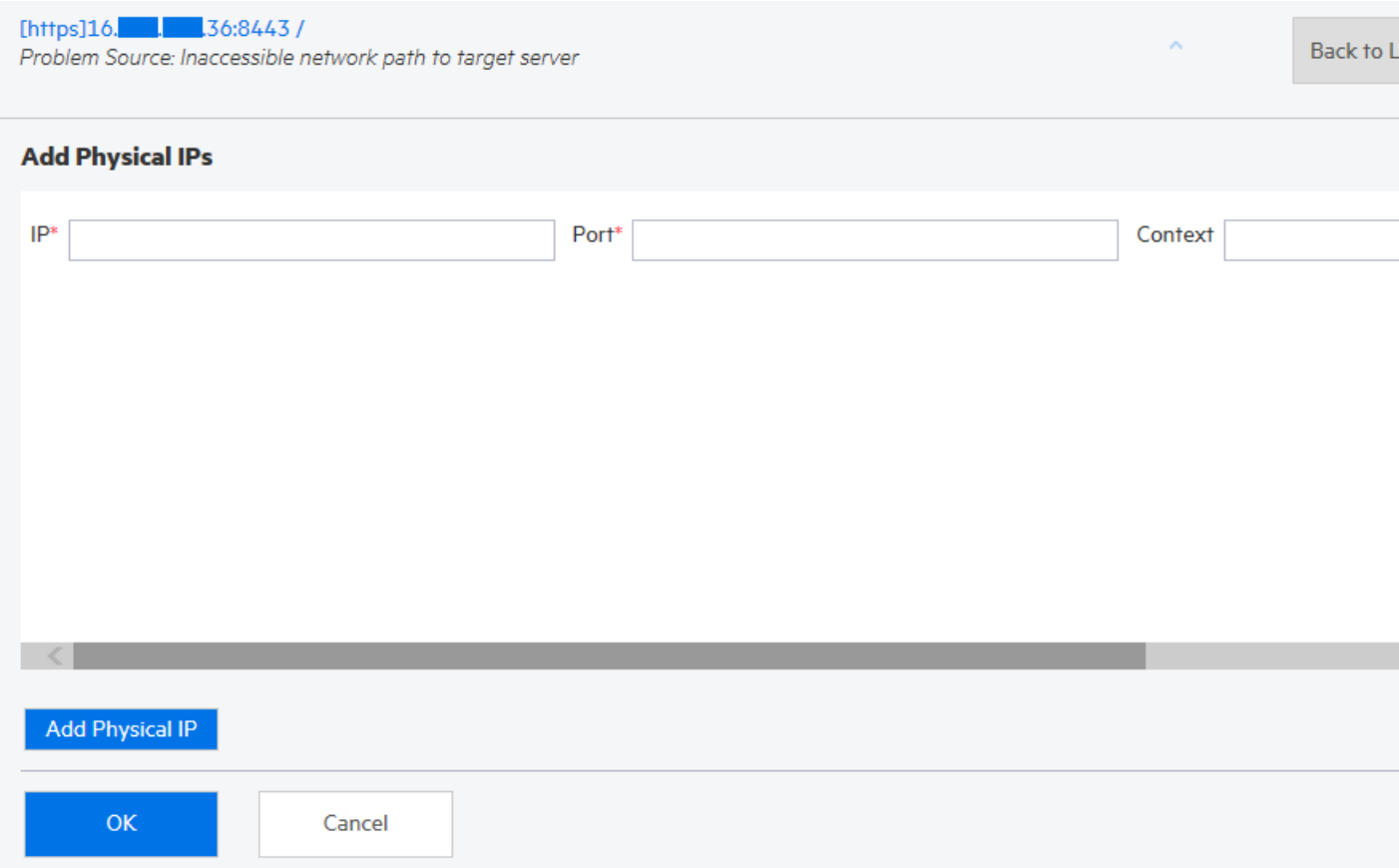
Solution: Add the IP address or range to the **Ranges** setting of the probe. For more details, see "Add an IP Range Manually" on page 264.

Error Message: Inaccessible network path to target server. Perhaps it is a virtual IP address.

Error Category: Connection Errors

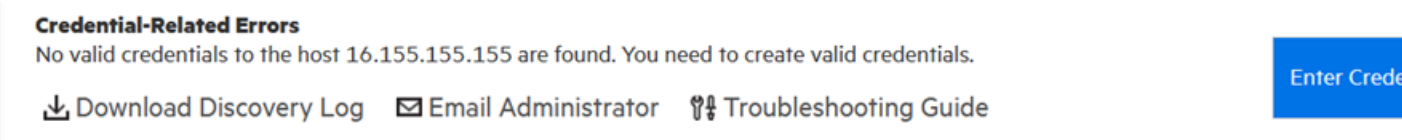


Solution: Add physical IPs as entry points of next hop

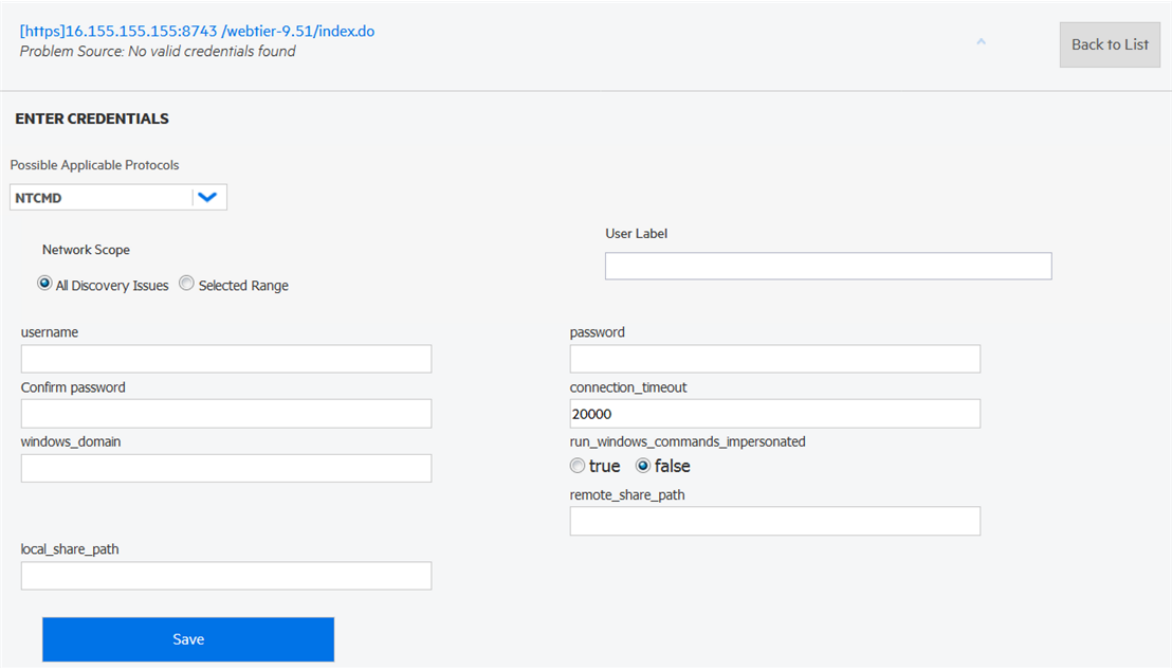


Error Message: Need credential to the host

Error Category: Credential-related Errors

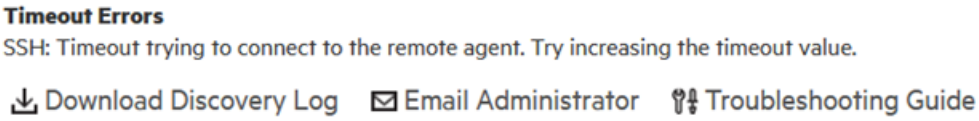


Solution: Add the valid credentials. For more information about how to do this, see "Add or Edit Credentials" on page 440.



Error Message: Connection timeout

Error Category: Timeout Errors



Solution:

- Increase the timeout value in protocol settings.
- For Windows machines, wait for a few minutes and then try again.

Error Message: The discovery job did not find any process listening on port: *<port_number>*

Error Category: Software Related Errors

Solution:

- Check if the configured account has sufficient privileges to run relevant commands. Specifically,
  - `ps -e`
  - `netstat -nap`

- `lsof`

  Elevate privilege for UNIX credentials.

- Verify if the service is still accessible.
- Check if **lsof** is installed on the target machine if it runs UNIX.

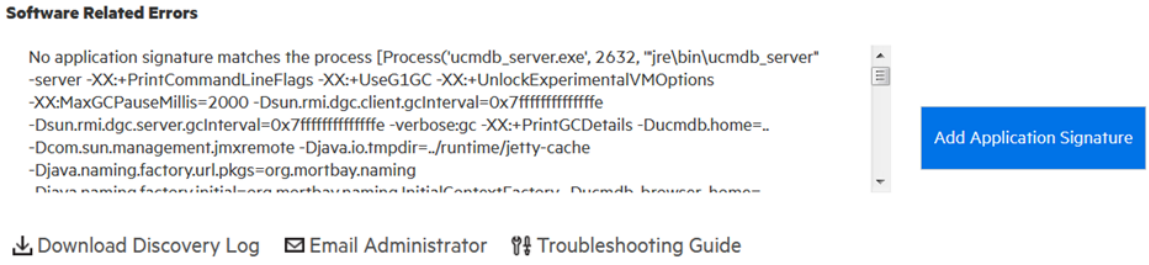
Error Message: No application signature matches the process *<process_info>* listening on port *<port_number>*

Error Category: Software Related Errors

Solution: Add the signature for the application. For more information about how to do this, see "Add or Edit Application Signatures" on page 441.

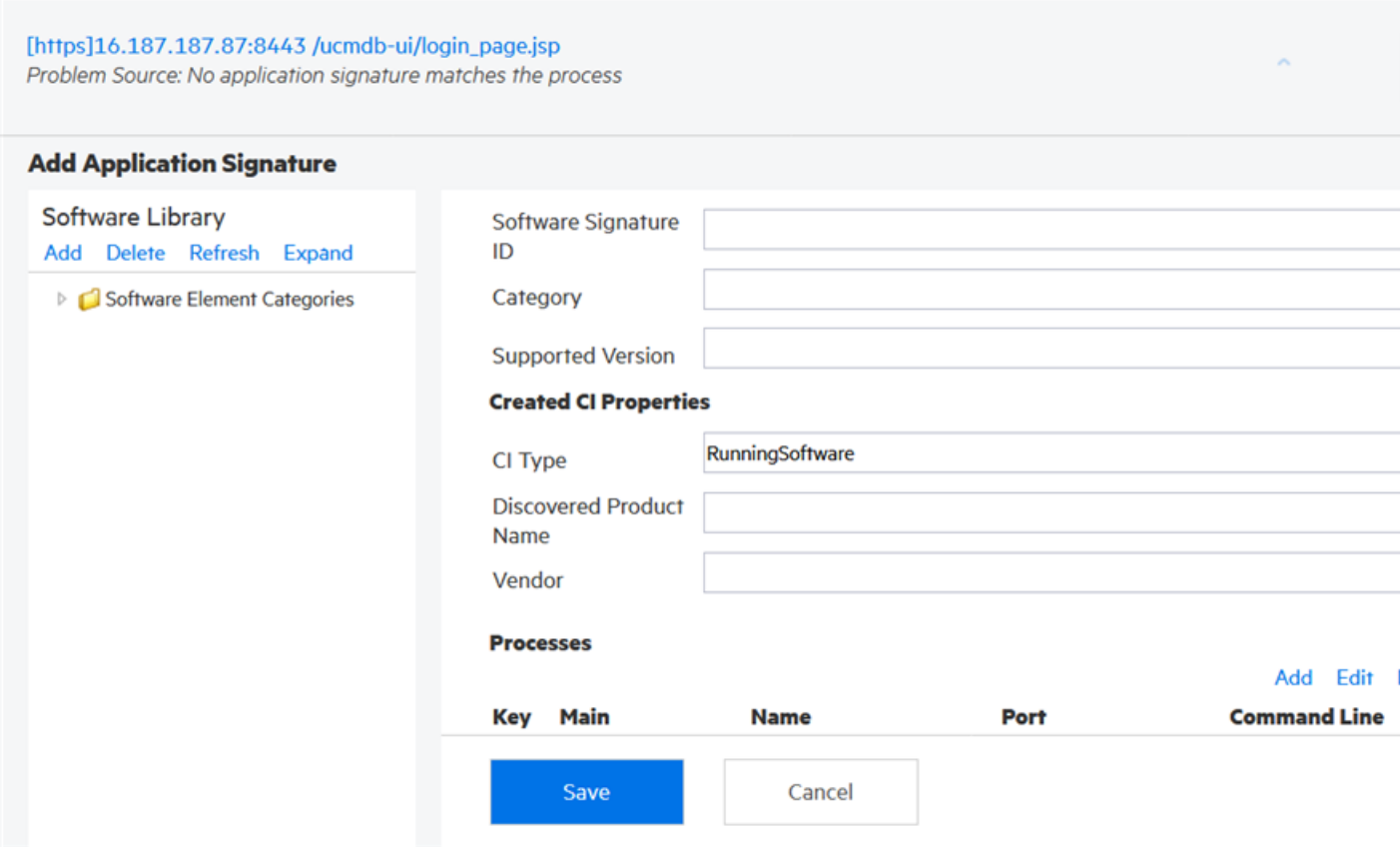
Error Message: The following outgoing ports are filtered because they are not in **portNumberToPortName.xml**

Error Category: Software Related Errors



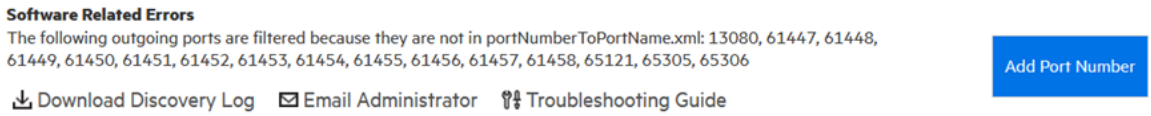
Solution: Add the port number to **portNumberToPortName.xml**.

To do this, click the **Application Signature** button in the error message and then follow the instructions. Alternatively, you can directly modify the **portNumberToPortName.xml** file to add the port number.



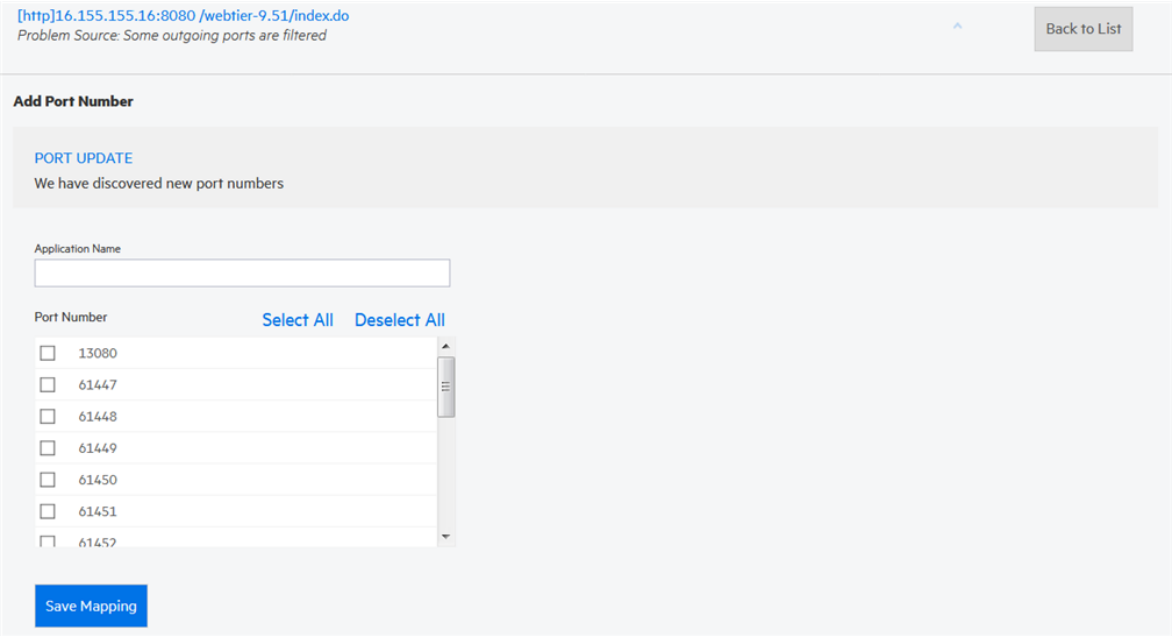
Error Message: The following outgoing ports are filtered because they are not in **portNumberToPortName.xml**.

Error Category: Software Related Errors



Solution: Add the port number to **portNumberToPortName.xml**.

To do this, click the **Add Port Number** button in the error message and then follow the instructions. Alternatively, you can directly modify the **portNumberToPortName.xml** file to add the port number.



Error Message: Failed to resolve host name to IP

Error Category: IP-related Errors

Solution: Check DNS server configuration.

Error Message: Need sudo permission

Error Category: Software Related Errors

Solution: Elevate privilege for UNIX credentials to run the relevant command.

Error Message: No lsof installed on the host

Error Category: Software Related Errors

Solution: Install lsof on the target machine.

Error Message: The host is a Solaris local zone

Error Category: Software Related Errors

Solution: None for this release. Currently Solaris local zone is not supported by ASM.

Error Message: No SCP reported from configuration signature.

Error Category: Others

Solution: No SCP reported from configuration signature for application <*Application Name*>. Check the **ConfigurationFileSignature.xml** file to make sure all parameter values for your application are correct.

Troubleshooting ASM - References

This chapter provides instructions for some of the solutions mentioned earlier.

Add an IP Range to the Ranges Setting

1. Go to **Data Flow Probe Setup** > **Domains and Probes** pane > **Domains and Probes** root node > a domain > **Data Flow Probes** > a Data Flow Probe.
2. In the **Ranges** pane, click **New Range** .
3. Provide the necessary information on the **New Ranges** dialog box, and then click **OK**.

Discover Load Balancers

1. Run the Host Connection by SNMP job.
2. Run one of the following jobs depending on the type of the load balancer:
   - F5 BIG-IP LTM by SNMP
   - Alteon application switch by SNMP
   - Cisco CSS by SNMP

Add or Edit Credentials

1. Go to **Data Flow Probe Setup** > **Domains and Probes** pane > **Domains and Probes** root node > a domain > Credentials > a protocol.
2. In the right pane, perform one of the following actions to add or edit an entry:

- To add a new connection detail, click **Create new connection details for selected protocol type** .
- To edit an existing credential, select the entry and then click **Edit connection details for selected protocol type** .

3. Provide the information on the dialog box that pops up, and then click **OK**.

Edit the portNumberToPortName.xml File

1. Go to **Data Flow Management > Adapter Management**.
2. Click the **Search** button , and then search for **portNumberToPortName.xml**.
3. Edit the **portNumberToPortName.xml** file, and then click **Save**.

Add or Edit Application Signatures

1. Go to **Data Flow Management > Adapter Management**.
2. In the Resources pane, select **Host_Resources_By_TTY > Adapters > TTY_HR_All**.
3. In the **Adapter Definition** tab > **Global Configuration Files** section, select **applicationsSignature.xml** and then click **Edit** .

Troubleshoot SAML Authentication

Errors in the CMS UI error log

[https-jsse-nio-8449-exec-1] SamlLoginUtils - Failed to get SAML configuration

If you are running CMS UI in standalone mode, check that the saml_configuration.properties file (in the <*CMS UI home*>/conf directory) is configured correctly.

If you are running CMS UI in embedded mode, check that the UCMDB server started successfully.

IDP Endpoint could not be null

If you are running CMS UI in standalone mode, check that the **mam.server.sso.saml.auth.idp** property in the saml_configuration.properties file (in the <*CMS UI home*>/conf directory) is configured correctly.

If you are running CMS UI in embedded mode, check that the **setIDPEndpointForSAMLAuthentication** method in JMX console is configured correctly.

Username claim type could not be null

If you are running CMS UI in standalone mode, check that the **mam.server.sso.saml.auth.username.claimtype** property in the saml_configuration.properties file (in the <*CMS UI home*>/conf directory) is configured correctly.

If you are running CMS UI in embedded mode, check that the **setSAMLClaimTypeContainingUserName** method in JMX console is configured correctly.

Request issuer could not be null

If you are running CMS UI in standalone mode, check that the **mam.server.sso.saml.auth.request.issuer** property in the saml_configuration.properties file (in the <*CMS UI home*>/conf directory) is configured correctly.

If you are running CMS UI in embedded mode, check that the **setAuthRequestIssuer** method in JMX console is configured correctly.

Response issuer could not be null

If you are running CMS UI in standalone mode, check that the **mam.server.sso.saml.response.issuer** property in the saml_configuration.properties file (in the <*CMS UI home*>/conf directory) is configured correctly.

If you are running CMS UI in embedded mode, check that the **setSamlResponseIssuer** method in JMX console is configured correctly.

UI Error Messages

"Could not extract IdP authenticated user from SAML Response. The assertion cannot be used before …" or "Could not extract IdP authenticated user from SAML Response. The assertion cannot be used after..."

This issue occurs when the system time on the AD FS server and on the UCMDB Server or CMS UI server is incorrectly skewed. The AD FS server system clock must be set to a time later than that of the UCMDB Server or CMS UI server. If this is not the case, you must set a time skew to offset the time difference. The time skew is measured in seconds.

You can set the time skew by using the **setSamlTimeSkew** method in JMX console and the **mam.server.sso.saml.time.skew** property in the saml_configuration.properties file (in the <*CMS UI home*>/conf directory).

By default, the time skew is 0.

For example, if the value of the **setSamlTimeSkew** method is 60, the AD FS server system clock can be up to 60 seconds earlier than the system clock on the UCMDB Server or CMD UI server.

Login Issues

I configured AD FS but the browser is redirected back to the AD FS login page when I try to log in

This issue occurs when you fail to log in to AD FS.

To resolve this issue, follow these steps:

1. Check whether the AD FS public key was imported to the <*CMS UI*>/conf/server.truststore file. The alias of this public key must be the same as that in the **setIdpCertificateAlias** method in JMX console and in the **mam.server.sso.saml.auth.certificate.alias** property in the saml_configuration.properties file (in the <*CMS UI home*>/conf directory).
2. Check the value in the **Relying party identifiers** field under the **Identifiers** tab of the Relying Trust Party in AD FS. This value must be the same as that in the **setAuthRequestIssuer** method in JMX console and in the **mam.server.sso.saml.auth.request.issuer** property in the saml_configuration.properties file (in the <*CMS UI home*>/conf directory).

> **Tip:** The values may not match due to an additional slash ("/") at the end of the identifier.

I configured AD FS but I receive a "no permission" error when I try to log in

This issue occurs when you do not have permission to log in to the UCMDB Server.

To resolve this issue, go to UCMDB Server and create a group for your user profile. The group ID should be set in the **setSamlUserDefaultGroup** method in JMX console and in the **mam.server.sso.saml.auth.default.group** property in the saml_configuration.properties file (in the <*CMS UI home*>/conf directory). The two value must be same.

You can also create a group with the same name as the group in AD FS. For example, you belong to a group named "Domain users" in ADFS, and the domain name is "samltest.com". In this situation, you would create a group named "samltest\Domain users". When you next log in, you will be added to the group.

> **Tip:** Do not forget to set a profile for the group.

I have logged in using the AD FS login page, but a blank page is displayed in UCMDB Server or CMS UI, and an external user named "NULL" is created in UCMDB Server

First, check the server.truststore file (in the <*CMS UI home*>/conf directory) to make sure that the IDP token_signing certificate was successfully imported.

Then, check the Claim Issuance Rules to make sure that all three rules (CommonName, Group, NameID) are configured correctly.

Logout Issues

I can log in with SAML authentication, but when I click the Logout button I am logged in again

This issue occurs when you fail to log out from AD FS.

To resolve this issue, follow these steps:

1. Check your UCMDB private key in the server.keystore file (in the <*CMS UI*>/conf/ directory). The private key alias must be the same as that in the **setSamlLogoutCertAlias** method in JMX console and in the **mam.server.sso.saml.logout.certificate.alias** property in the saml_

configuration.properties file (in the <*CMS UI home*>/conf directory).

2. Open the **Signature** tab of the Relying Trust Party in AD FS to check whether your UCMDB public key was imported.
3. Open the **Edit Claim Issuance Policy** window of the Relying Trust Party in AD FS to check that three rules are added.

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Feedback on CMS UI Guide (CMS UI 2018.08)

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