



Configuration Management System (CMS)

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Administration Guide

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Introduction

Chapter 1: Configuration Management Database (CMDB)

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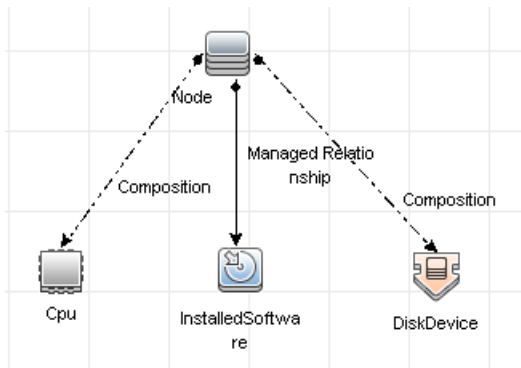
CMDB Overview

The CMDB is the central repository for the configuration information that is gathered from the Data Flow Management (DFM) process and the various third-party applications and tools.

The CMDB contains all the configuration items (CIs) and relationships created in Universal CMDB, whether created automatically from the DFM process or inserted manually. The CIs and relationships together represent a model of all the components of the IT Universe in which your business functions. The CMDB stores and handles the infrastructure data collected and updated by the DFM process. For more information about the DFM process, see the *Universal CMDB Discovery and Integrations Content Help*.

The IT Universe model can be very large, containing millions of CIs. To facilitate their management, you work with the CIs in a view that provides a subset of the overall components in the IT Universe world.

You use factory views or views defined in the Modeling Studio to display and manage the CIs and relationships in the CMDB. The views enable you to focus on specific IT areas and are available via the CI Selector. An example of a view is shown in the following figure:



The CMDB also contains the TQL query definitions that are used to query and retrieve data from the CMDB for presentation in the view, and the configuration item type (CIT) model, a repository for the CI types used to define the CIs and relationships. For information on TQL queries, see *Topology Query Language* in the *Modeling section of the UCMDB Help*.

IPv6 Support for UCMDB/Universal Discovery

Unless otherwise specified, UCMDB and Universal Discovery support the IPv6 protocol as follows:

- UCMDB Web UI (including Jetty Web Server and Java Applets) works over IPv6.
- The JMX interface as well as pure Web UI (such as the login screen) support IPv6.
- Data Flow Probe to UCMDB server communications can be done via IPv6.
- Probe clustering supports IPv6 communication.
- UCMDB Server can connect to the MS SQL/Oracle/PostgreSQL databases over IPv6.
- High-availability clusters (at the JGroups level) can communicate work over IPv6.
- The CMS UI supports IPv6.
- IP ranges for Data Flow Probes and Management Zones can be defined in the UCMDB user interface in IPv6 format. For details, see *New/Edit Range Dialog Box* in the *Data Flow Management section of the UCMDB Help*.
- Some of the discoveries and integrations provided out-of-the-box with the UCMDB work over IPv6. Among those supported are:

- Basic network discovery:
 - Ping sweeps can be done over IPv6 ranges
 - The IP/MAC Address Harvesting job was extended to read IPv6 specific ARP cache tables.
- Inventory Discovery and its various components are IPv6 enabled:
 - Inventory Scanners (off-site scan file saving)
 - Scanner Scheduler (download of scanners and configuration)
 - Store and Forward Server
 - UD Agent (Communication and Call Home)
 - Inventory Discovery by Scanners job
 - Inventory Discovery by Manual Scanner Deployment

Note: For a complete list of discovery jobs and integrations that support IPv6, see "Universal Discovery IPv6 Support" in the *Supported Content section of the Content Help*.

- The UCMDB SDK API works over IPv6.

The SDK can be accessed via IPv6. APIs that take IP addresses can accept IPv6 addresses (e.g. for Discovery ranges).

- Web services work over IPv6.

Configuration Items (CIs)

A configuration item (CI) is a component of the CMDB that represents a physical or logical entity in the system, for example, hardware, software, services, business processes, and customers. The CIs are part of the IT Universe model in the CMDB, where they are organized into a hierarchical format based on the interdependencies in your organization's IT environment. The interdependencies in Universal CMDB are called relationships.

Each CI belongs to a configuration item type (CIT). The CIT defines a category of CIs used in Universal CMDB. The CITs provide templates for creating the CIs and associated properties in each category. You view and manage the CIs in the CMDB using views. Each view shines a spotlight on part of the IT Universe model.

For further details on working with CIs in Universal CMDB, see "Working with CIs" in the *Modeling section of the UCMDB Help*.

Query Nodes and Relationships

Query nodes are the components from which TQL queries are built in Enrichment Manager, Impact Analysis Manager, and the Modeling Studio. For details, see "Creating TQL Queries in the UCMDB Managers" in the *Modeling section of the UCMDB Help*.

Note: When working in views, query nodes are called **view nodes** in the Universal CMDB user interface.

Relationships are connections defined between CIs. Relationships are defined one at a time for each pair of query nodes in a TQL query. For details on working with relationships, see "Working with Relationships" in the *Modeling section of the UCMDB Help*.

Unified Resource Manager (URM)

The Unified Resource Manager (URM) is an XML-based repository for CMDB resources. A resource is defined as all CMDB data other than CIs. Examples of resources include TQL queries, views, users, and the class model, as well as discovery resources such as discovery scripts, integration and discovery adapters, discovery jobs, and so on.

The URM can be accessed using the JMX console only. From the JMX console page, click **UCMDB:service=URM Services** to open the JMX page with the relevant methods.

For more information, see How to View Discovery Resource History in the *Data Flow Management section of the UCMDB Help*.

Caution: Never change a resource from the URM.

Users are stored using the URM type **Auth_USER**. A user's password is stored in hashed format in the **password** attribute of the XML file representing that user in the URM.

Chapter 2: Logging In to UCMDB

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How to Log In to UCMDB

1. In the Web browser, enter the URL of the Universal CMDB Server, for example:

`https://<server name or IP address>.<domain name>:8443`

where **<server name or IP address>.<domain name>** represents the fully qualified domain name (FQDN) of the Universal CMDB Server.

Note:

- The FQDN or URL used to access UCMDB components should not contain UCMDB reserved names like the ones described in the High Availability section of the interactive *Universal CMDB Deployment Guide*. For example, **mam-collectors**, **ucmdb-ui**, **ucmdb-browser**, and **jmx-console**.
- By default the HTTPS protocol is enabled for UCMDB server, with the HTTP protocol being disabled and UCMDB server no longer accessible with the HTTP protocol. However, if necessary, you can still enable HTTP communication for UCMDB server. For instructions, see "[How to Enable HTTP Communication for UCMDB Server](#)" on page 93.

- To access the UCMDB UI application from Chrome 43+, Firefox 48+, or other web browsers without support for NPAPI plugins, see ["How to Launch UCMDB UI from Chrome 43+, Firefox 48+, Microsoft Edge, or Safari 10+" on page 24.](#)

If Universal CMDB is set up to work through a reverse proxy, enter **https://<proxy_server_name>:443** where **proxy_server_name** is the name or IP address of the proxy server.

If the correct Java version is not installed on your machine, you can choose to download the version from **sun.com** or from the UCMDB server. (If you log in without installing Java, you will not be able to view pages that need a Java applet to display correctly.)

The UCMDB splash screen displays the following options:

- **UCMDB.** Opens the login page. After logging in, the module you had open at the end of your last session opens. If your user preferences are deleted, the IT Universe Manager is opened by default.
- **UCMDB SAML Login.** Opens to the default UCMDB module page directly if SAML authentication is enabled.

Note: This option is available only when SAML authentication is enabled.

- **Download UCMDB Local Client (Windows, MacOS).** Downloads the UCMDB Local Client installer for the Windows or MacOS platform. For more information, see ["UCMDB Local Client" on page 28.](#)
- **User Management.** Opens the login page. After logging in, you are taken directly to the Users and Groups module where you can manage your UCMDB users.
- **UCMDB Configuration Manager.** Opens the Configuration Manager application. For the link to be active, Configuration Manager must be running and the infrastructure setting Configuration Manager URL must contain the application's URL.
- **CMS UI.** Opens the CMS UI. The CMS UI is a web-based tool for displaying UCMDB information quickly and easily. For the link to be active, CMS UI must be running and the infrastructure setting **UCMDB Browser URL** must contain the application's URL.

Note: A user who has not been granted access to the CMS UI (by setting the infrastructure setting **Access to UCMDB Browser**) will not be able to log in.

- **UCMDB Class Model.** Opens the UCMDB Class Model Reference, which contains information on all packages, CI types, and relationships in the class model.
- **Server Status.** Opens the Server Status page.

- **JMX Console.** Enables you to perform operations on the CMDB through the JMX console interface.
- **API Connection Test.** Displays information about the Universal CMDB Server for you to use when running an API to the CMDB.
- **API Client Download.** Downloads the UCMDB API jar file.
- **API Reference.** Opens the UCMDB API Reference documentation.

Note: You must have a valid license to access UCMDB, UCMDB Configuration Manager, and CMS UI. If your license has expired, you will be unable to log in to any application. If the number of days remaining until your license will expire is lower than the **Expiring license notification period** setting in the Infrastructure Settings Manager (the default is 30 days), a warning message is displayed.

2. Click **UCMDB** or **User Management**.

Tip: To go straight to the login page, enter: **https://<server name or IP address>.<domain name>:8443/ucmdb-ui**

3. Enter your login parameters.
4. If Universal CMDB is installed in a multiple customer or multiple state environment (for example, Universal CMDB Configuration Manager), a **Customer** field is displayed. Choose the Customer name from the list.
5. (Optional) **Remember me on this machine.** Select for automatic login so that the next time you log in to UCMDB, you do not need to enter your user name and password.

Note: If you log in to UCMDB with this option selected, when you log out by clicking the **Logout** button, only your user name is remembered. For more information about automatic login, see ["How to Enable Logging In to UCMDB Automatically" on the next page](#).

6. Click **Login**. After logging in, your user name appears at the top right of the screen.

Note: Universal CMDB Configuration Manager Users: The Data Flow Management modules are available only when you are logged in to UCMDB in Actual state.

How to Enable Logging In to UCMDB Automatically

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

When automatic login is enabled from the login page, and when you close the browser tab without using the **Logout** button at the top of the Universal CMDB page, the next time you enter this URL to access Universal CMDB (<https://<server name or IP address>.<domain name>:8443/ucmdb-ui>) or access the URL of the Universal CMDB Server (<https://<server name or IP address>.<domain name>:8443>) to get to the splash screen and then click **UCMDB**, 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 Universal CMDB login page, select the option **Remember me on this machine**.
2. When completing your session, do not click **Logout** at the top of the page, but close the browser tab.

When you open a new browser tab and navigate to link <https://<server name or IP address>.<domain name>:8443> and then click **UCMDB**, the login page should be skipped.

Guidelines for Using Automatic Login

Using the **Logout** option at the top of the Universal CMDB page, the **Remember me on this machine** option is still enabled with your user name remembered. If you log out using the Logout button, the next time you try to log in, the Login page opens with your login name pre-filled, you only need to enter your password manually.

The **Remember me on this machine** option can only be manually canceled by the user when he/she logs in next time.

How to Log In to UCMDB Local Installation Mode

Local installation mode is a method of loading UCMDB which reduces the applet loading time significantly. When using local installation mode, the applet files (.JAR files) are loaded to a local folder

called **UcmdbAppletJars**. The classes are loaded using a customized class loader which works faster, but does not verify the signature of the signed jars. Local installation mode is thus considered an unsecured mode.

Note: By default, the **UcmdbAppletJars** folder is under the environment's temporary directory. You can specify a different directory for the **UcmdbAppletJars** folder in the Infrastructure Settings Manager. For details, see ["How to Customize the UCMDB Applet Files Directory" on page 36](#).

To select local installation mode:

1. **Prerequisite:** In the Infrastructure Settings Manager, ensure that the **Local installation mode permission** setting is set to **True**.
2. When logging in, select the **Enable local installation mode** check box on the login screen.

Note: You can set the default status of the check box using the **Local installation mode initial status** setting. When the setting is set to **True**, the check box is selected by default. When it is set to **False**, the check box is cleared by default.

If you select the **Remember me on this machine** check box at login, the status of the **Enable local installation mode** check box remains the same for the next login, regardless of the infrastructure setting.

For HPE Software-as-a-Service customers, the installation settings are on a per-customer basis.

How to Launch UCMDB UI from Chrome 43+, Firefox 48+, Microsoft Edge, or Safari 10+

With the introduction of the JNLP feature and the JMX setting **mam.web.is.jnlp.enabled**, it is possible to launch UCMDB UI application from web browsers without support for NPAPI plugins, including Chrome 43+, Firefox 48~51, Microsoft Edge, and Safari 10+.

The JNLP feature allows users who use web browsers without support for NPAPI plugins to launch the UCMDB UI application. Instead of running it in the internet web through the Java plug-in, a JNLP file is saved on the client machine. After launching the JNLP file, it runs in a separate Java process and loads the UCMDB UI as a desktop application.

The following web browsers are supported for accessing UCMDB UI using JNLP:

- Chrome version 43 or later
- Firefox versions 48 to 51
- Microsoft Edge
- Safari version 10 or later

The following scenarios are not supported:

- Login through LW-SSO
- CAC login
- FIPS mode
- LDAP is configured

How to launch UCMDB UI from web browsers without support for NPAPI plugins

Note: Most of the configurations here are one-time operation only.

To do so, perform the following:

1. Prerequisites

- Oracle JRE is installed on the client machine (the latest version recommended)
- Make sure you have enabled JNLP from JMX console

Otherwise follow the instructions below to enable JNLP:

- Access the UCMDB server JMX console: Launch a Web browser and enter the following address: **https://<UCMDB machine name or IP address>:8443/jmx-console**. You may have to log in with a user name and password. (default username: sysadmin)
- Locate the **UCMDB:service=Settings Services > setGlobalSettingValue** operation.
- To enable JNLP, provide values for the following parameters for the **setGlobalSettingValue** method:
 - **name:** **mam.web.is.jnlp.enabled**
 - **value:** **true**

The default value of the **mam.web.is.jnlp.enabled** setting is **false**.

- Click **Invoke**. The setting takes effect immediately.

2. Export the UCMDB server certificate and import it to your client

Note: This is needed only when you do not have a certificate provided by a Certificate Authority.

- a. Export the UCMDB server certificate (for example, **ucmdb.cer**) and save it to your machine.

Taking Windows and Chrome as an example,

- i. In the client web browser, enter **https://<UCMDB machine name or IP address>:8443/**.

- ii. Click the lock icon  in the address bar.

- iii. Click the **Details** link right under the site address.

The Details pane opens to the Overview tab page in the right side

- iv. Click **View Certificate**.

- v. In the Certificate dialog box, go to the Details tab, find the certificate which **CN = HPE Universal CMDB**, and click **Copy to File**.

The Certificate Export Wizard opens.

- vi. Click **Next**.

- vii. On the Export File Format page, select **DER encoded binary X.509 (.CER)**, and click **Next**.

- viii. On the File to Export page, enter a file name (for example, **ucmdb**) and click **Next**.

- ix. Click **Finish**.

- b. Import the certificate by executing the following command:

```
keytool -importcert -alias ucmdb -file <filepath>\ucmdb.cer -keystore  
<JRE_HOME>\lib\security\cacerts
```

For example,

```
keytool -importcert -alias ucmdb -file  
C:\Users\Administrator\Desktop\ucmdb.cer -keystore "C:\Program Files  
(x86)\Java\jre1.8.0_101\lib\security\cacerts"
```

- c. You may need to enter the default password **changeit**, and enter **yes** when prompted "Trust this certificate?".
- d. (Optional) Restart the UCMDB Server.

3. Launch UCMDB UI as a desktop application

- a. In the Web browser, enter the URL of the Universal CMDB Server, for example:

https://<server name or IP address>.<domain name>:8443

where **<server name or IP address>.<domain name>** represents the fully qualified domain name (FQDN) of the Universal CMDB Server.

For details about the options available on the UCMDB splash screen, see ["How to Log In to UCMDB" on page 20](#).

Tip: In case you see a message like "Your connection is not secure", go to the Advanced settings and add a security exception. For example, on Firefox, click **Advanced > Add Exception**, and then in the Add Security Exception dialog box that pops up, click **Confirm Security Exception**.

- b. Click **UCMDB** or **User Management**.

- c. Click **Run as Java Web Start app**.

- On Chrome, a **UCMDB.jnlp** file is downloaded to your local machine automatically. Double-click the downloaded **UCMDB.jnlp** file to launch it.
- On Firefox, the Opening UCMDB.jnlp dialog box pops up.
 - Select **Open with Java(TM) Web Start Launcher (default)** and click **OK** if you want to launch UCMDB UI directly.
 - Select **Save File** and click **OK** if you would like to save the file and launch UCMDB UI later. Double-click the downloaded **UCMDB.jnlp** file to launch it.

- d. In the **Do you want to run this application?** dialog box, click **Run**.

The **UCMDB.jnlp** file runs in a separate Java process and loads the UCMDB UI as a desktop application.

- e. In the **HPE Universal CMDB** dialog box that pops up, enter your UCMDB server login parameters.

- f. Click **Login**.

Universal CMDB launches as a desktop application.

To exit Universal CMDB, click the **Close**  button at the top right corner of the application window.

4. (Optional) Configure the JNLP memory size

If necessary, you may want to increase the JNLP memory size.

- a. On the UCMDB server machine, open the **<UCMDB_Server_Home>/deploy/ucmdb-ui/jnlp-generate.jsp** file using a text editor.
- b. Locate the following line:

```
<j2se version="1.5+" initial-heap-size="512M" max-heap-size="1024M"/>
```

- c. Modify the value of the **initial-heap-size** or **max-heap-size** setting to meet your needs, and save the file.
- d. Delete the **UCMDB.jnlp** file you downloaded in [step 3.c](#), and re-download the **UCMDB.jnlp** file by refreshing the web page and clicking the **Run as Java Web Start app** button from the web browser.

Note: For more details about the JNLP configuration, see [JNLP File Syntax](#).

Tip: To access the same Universal CMDB server from one of the above mentioned web browsers, simply launch the downloaded **UCMDB.jnlp** file.

UCMDB Local Client

The UCMDB Local Client tool enables you to launch the administrative GUI (UCMDB UI) of a target UCMDB server as a desktop application from the UCMDB local client tool, without the need for the Oracle JVM installed on that desktop. It also allows you to manage login configurations for multiple UCMDB servers easily from a central place.

This section contains the following:

- [UCMDB Local Client Support Matrix](#)
- [Launch UCMDB Server Admin UI as a desktop application from UCMDB Local Client](#)
- [Export the OOTB UCMDB server certificate and import it to the UCMDB Local Client tool](#)
- [Reuse the UCMDB server configuration information on a different machine](#)
- [Modify the location for storing the **config.json** file](#)
- [How to validate the jar file contained in UCMDB_Local_Client.zip is properly signed](#)

UCMDB Local Client Support Matrix

This release of the UCMDB Local Client tool supports the following:

- **Supported UCMDB versions**

The UCMDB Local Client tool supports UCMDB version 10.20 and later versions up to 2018.08.

It also supports Micro Focus ITOM suites (SMA, OpsB, and APM) that contain UCMDB version 10.20 or later versions up to 2018.08.

Note: The UCMDB Local Client tool supports UCMDB versions 10.20 up to the latest version released together with the UCMDB Local Client. Forward compatibility is not supported.

- **Supported platforms**

- Windows
- macOS

- **Supported Authentication Modes**

- LDAP authentication
- Basic Authentication. This refers to support for basic authentication with IBM Security Access Manager for Web WebSEAL version 8.0 .



Launch UCMDB Server Admin UI as a desktop application from UCMDB Local Client

1. Download the UCMDB Local Client tool.

You can download the UCMDB Local Client tool from one of the following locations:

- [Micro Focus Self-Solve Knowledge Search \(SSO\) site](#)
- Download the tool from UCMDB Server version 2018.08 or later when the server is up and running.
 - On the UCMDB server machine, go to the **<UCMDB_Server>\tools** directory and copy the **UCMDB_Local_Client.zip** file to a location of your choice.

- On the UCMDB splash screen, click **Windows** or **macOS** in the **Download UCMDB Local Client (Windows, macOS)** option to download the tool for your operating system (access UCMDB Server version 2018.08 or later using the following URL: **https://<server name or IP address>.<domain name>:8443**).
2. Launch the UCMDB Local Client tool.
 - a. Extract the **UCMDB_Local_Client.zip** package to a location of your choice, for example, the desktop.
 - b. Double-click **UCMDB Local Client.cmd**.

The UCMDB Local Client window opens.
 3. Add or edit login configuration for the target UCMDB servers that you want to access.
 - a. Click **Add**  or **Edit** .

The Add/Edit Configuration dialog opens.

- b. Provide or edit values for the fields as described in the table below.

UI Element	Description	Valid Values
Host/IP	Server name or IP address of the target UCMDB server that you want to access.	Example: <host name or IP address>
Label	Specify a label for the UCMDB server. If you leave it blank, the field will be populated with the host value.	
HTTPS	Select the checkbox to use HTTPS communication.	Default: Selected
Port	Specify the port number of the target UCMDB server that you want to access.	Default: 8443
Min Memory	Define the minimum memory, in megabytes (MB), to be allocated on the local machine for launching the target UCMDB server admin UI.	Default: 512
Max Memory	Define the maximum memory, in megabytes (MB), to be allocated on the local machine for launching the target UCMDB server admin UI.	Default: 1024
Language	Select the language that you want the target UCMDB server UI to be displayed in. Supported languages include: <ul style="list-style-type: none"> • English • Japanese • Korean • Chinese • French • German • Spanish • Italian • Russian • Portuguese 	Default: English
Context	Specify the root context for the target UCMDB server. Leave the field as is if you want to use the default root context value /. Note: If you configured the infrastructure setting Root context value in the Infrastructure Settings	Default: /

UI Element	Description	Valid Values
	Manager module, make sure you copy the value to the Context field, so that this Context setting and the infrastructure setting Root context use the same value. For instructions about how to configure the root context, see "How to Change the Root Context for UCMDB Components" in the AdministerAdminister section of the CMS help.	
Target Env.	Select the environment that the target UCMDB/RTSM server belongs to. The following options are available: <ul style="list-style-type: none"> • CMS • SMA • OpsB • APM 	Default: CMS

c. Click **OK**.

4. Launch UCMDB server Admin UI from the UCMDB Local Client window.

a. In the UCMDB Local Client window, click the Label value for the UCMDB server that you want to access.

The Log In dialog opens.

Note: If any warning message related to the certificate issue pops up, import the UCMDB server certificate by following instructions in ["Export the OOTB UCMDB server certificate and import it to the UCMDB Local Client tool" on the next page](#).

b. In the Log In dialog, enter your login parameters.

Note: When LW-SSO is not enabled, "Basic Authentication" displays as the header of the Log In dialog.

In Basic Authentication mode, you would need to log in twice, the first time for basic authentication, and the second time for logging into the target UCMDB server.

c. Click **Login**.

The UCMDB server Admin UI opens in a new window.

To log out the UCMDB session, simply click .


Export the OOTB UCMDB server certificate and import it to the UCMDB Local Client tool

To export the out-of-the-box UCMDB server certificate and import it to the UCMDB Local Client tool, do the following:

Note: This is needed only when you do not have a certificate provided by a Certificate Authority.

1. Export the UCMDB server certificate (for example, **ucmdb.cer**) and save it to your machine.

Taking Windows and Chrome as an example,

- a. In the client web browser, enter **https://<UCMDB machine name or IP address>:8443/**.
- b. Click the lock icon  in the address bar.
- c. Click the **Details** link right under the site address.

The Details pane opens to the Overview tab page in the right side

- d. Click **View Certificate**.
- e. In the Certificate dialog box, go to the Details tab, find the certificate which contains **CN = HP Universal CMDB**, and click **Copy to File**.

The Certificate Export Wizard opens.

- f. Click **Next**.
 - g. On the Export File Format page, select **DER encoded binary X.509 (.CER)**, and click **Next**.
 - h. On the File to Export page, enter a file name (for example, **ucmdb**) and click **Next**.
 - i. Click **Finish**.
2. Copy the exported **ucmdb.cer** file to the **<UCMDB_Local_Client_dir>** directory.
 3. Import the certificate by executing the following command:

```
<UCMDB_Local_Client_dir>\jre\bin\keytool.exe -importcert -alias ucmdb -  
file <UCMDB_Local_Client_dir>\ucmdb.cer -keystore <UCMDB_Local_Client_  
dir>\jre\lib\cacerts
```

4. You may need to enter the default password **changeit**, and enter **yes** when prompted "Trust this certificate?".
5. (Optional) Restart the UCMDB Server.

Reuse the UCMDB server configuration information on a different machine

The UCMDB server configuration information you added in UCMDB Local Client are stored in the **config.json** file. To import or reuse the UCMDB server configuration information on a different machine, you can just copy and paste the **config.json**.

To do so,

1. Download and extract the **UCMDB_Local_Client.zip** package to the target machine.
2. On the source machine, go to the the following folder to copy the **config.json** file.

Windows: %APPDATA%\Micro Focus\CMS\UCMDB Local Client

macOS: /Users/\$USER/Library/Application Support/CMS/UCMDB Local Client/

Note: This is the default location for storing the **config.json** file.

To change the default location, see ["Modify the location for storing the config.json file" below](#).

3. Go to the target machine, paste the **config.json** file to the following folder to replace the existing one:

Windows: %APPDATA%\Micro Focus\CMS\UCMDB Local Client

macOS: /Users/\$USER/Library/Application Support/CMS/UCMDB Local Client/

Modify the location for storing the **config.json** file

By default, the **config.json** file is stored in the %APPDATA%\Micro Focus\CMS\UCMDB Local Client (Windows) or /Users/\$USER/Library/Application Support/CMS/UCMDB Local Client/ (macOS) folder. If necessary, you can configure a different location to store the **config.json** file. To do so,

1. In the **UCMDB Local Client** folder, open the **UCMDB Local Client.cmd** file using a text editor.
2. Locate the `CMS_CLIENT_CONFIG` parameter, which specifies the default location for storing the **config.json** file as follows:

Windows:

```
CMS_CLIENT_CONFIG=%APPDATA%\Micro Focus\CMS\UCMDB Local Client
```

macOS:

```
CMS_CLIENT_CONFIG=/Users/$USER/Library/Application Support/CMS/UCMDB Local Client/
```

3. Modify the `CMS_CLIENT_CONFIG` parameter value, so that it points to a location of your choice.
4. Save the file.

How to validate the jar file contained in UCMDB_Local_Client.zip is properly signed

To do so,

1. Locate the **jarsigner** tool contained in the **bin** folder of your JDK package.
2. Run the following command:

```
jarsigner -verify -verbose -certs UCMDB_Local_Client.jar
```

3. Check the returned result.

There should be some hundreds entries containing the following text:

```
...entry was signed on ... CN=Micro Focus Group Limited, OU=Micro Focus  
Cyber Security, O=Micro Focus Group Limited, ...
```

This means that the jarsigner tool verifies each signed entry in the jar file, and the jar file is properly signed by Micro Focus.

How to Customize the UCMDB Applet Files Directory

The UCMDB applet files (.JAR files) are loaded to a folder called **UcmdbAppletJars**, which is by default under the following directory:

C:\Users\<username>\AppData\Local\Temp

You can specify a different location for the **UcmdbAppletJars** folder. To do this, follow these steps:

1. Select **Administration > Infrastructure Settings Manager > General Settings**.
2. Locate the **Jar files directory** setting, and then specify the directory in the **Value** field.

Note: The directory must be a valid system directory, for example, **D:\UCMDB\Applet jars**.

This setting takes effect after you refresh the browser or in your next login, and the UCMDB applet files are then loaded to the **<specified_directory>\UcmdbAppletJars** folder.

How to Change the Default Time Limit for User Inactivity Log Out

Universal CMDDB includes an automatic logout feature which logs out when the system is inactive for a set time period. The default period is 1440 minutes (24 hours). After that time, a message appears with a 30-second countdown until logout.

This task describes how to adjust the time limit UCMDB stays open without any user input before automatically logging out.

To change the default logout time:

1. Select **Administration > Infrastructure Settings > General Settings category > Inactive allowed time** setting.
2. In the **Value** column, enter a new time interval in minutes. All values for inactive allowed time are located in the Properties window (right-click **Inactive Allowed Time > Properties** or double-click the **Inactive Allowed Time** setting).

How to Enable Localized Online Help

To enable a localized online help, do the following:

1. Download the localized online help from the [Self-Solve Knowledge Search](#) site.
2. Extract the package, and replace the files under the `<UCMDB_Server>\deploy\ucmdb-docs\docs\eng\doc_lib` folder with the localized version.
3. Clear your web browser cache.
4. Restart the UCMDB server.

Troubleshooting – Logging In to UCMDB

Use the following information to troubleshoot possible causes of failure to log in to UCMDB.

This section includes the following:

- ["Possible Causes for Failure to Log In to UCMDB" below](#)
- ["Java Not Installed on Client Machine" on page 39](#)

Possible Causes for Failure to Log In to UCMDB

Use the following information to troubleshoot possible causes of failure to log into Universal CMDB.

Problem/Possible Causes	Solutions
Universal CMDB is not started successfully. Indication: The <code>startup.log</code> file does not include the following line: **** All components started ****	Solution 1: Verify that the Universal CMDB Server is up and running by accessing the Web console <code>https://<Server name>:8443/web-console</code> where <code><server name></code> is the name of the Universal CMDB Server to which you are connecting. Solution 2: Check the database connection: To check that the database server is up and running: <ol style="list-style-type: none">1. Launch the Web browser and navigate to: <code>https://localhost:8443/jmx-console</code>.2. Under UCMDB, click UCMDB:service=Dal Services to open the JMX MBean View.

Problem/Possible Causes	Solutions
	<p>3. Invoke the function getDbContext with a customerID parameter value of 1.</p> <p>4. Check that the operation result shows no problems.</p> <p>Solution 3: Check that the database connection parameters are correct. Ensure that you can log into the database server using the credentials you provided during the configuration procedure.</p> <p>Solution 4: Use the cmdb.dal.log file to verify the database connections. The cmdb.dal.log file can be found in the following directory:</p> <ul style="list-style-type: none"> Windows: C:\UCMDB\UCMDBServer\runtime\log Linux: /opt/UCMDB/UCMDBServer/runtime/log <p>Solution 5: To verify that the database connection is valid, in the Windows command interpreter (cmd.exe), type sqlplus cmdb/cmdb@skaza1.</p>
The CMDB is corrupted (for example, a user record may have been deleted accidentally from the CMDB).	<p>Import a previously backed up database file. For details, see the <i>Database section of UCMDB Help</i>.</p> <p>Important: The Universal CMDB server must be down while importing the database.</p> <p>Note: When you import a previously backed up database file, you lose all data previously existing in the system.</p>
The Universal CMDB login fails. This may be due to an incorrect login name/password combination.	<p>Solution 1: Ensure that you enter a correct login user name/password combination.</p> <p>Solution 2: Restore the default</p>
Universal CMDB login fails due to unexpected errors.	<p>Solution 1: Select Start > All Programs > UCMDB > Universal CMDB Server Status and ensure that the service is running.</p> <p>Solution 2: Look for errors in the following log files:</p> <ul style="list-style-type: none"> C:\UCMDB\UCMDBServer\runtime\log\error.log C:\UCMDB\UCMDBServer\runtime\log\ui-server.log <p>If you find errors that are unfamiliar to you, contact Micro Focus Software Support.</p>
Universal CMDB fails to start, even though the password was successfully changed.	<p>Restore the default passwords:</p> <ol style="list-style-type: none"> 1. Overwrite the existing file by copying the Basic_

Problem/Possible Causes	Solutions
	<p>Authorization.zip file from the following folder:</p> <ul style="list-style-type: none"> Windows: C:\UCMDB\UCMDBServer\content\backup Linux: /opt/UCMDB/UCMDBServer/content/backup <p>to the following folder:</p> <ul style="list-style-type: none"> Windows: C:\UCMDB\UCMDBServer\content/basic_packages Linux: /opt/UCMDB/UCMDBServer/content/basic_packages <ol style="list-style-type: none"> Log into the the JMX Console and locate the UCMDB-UI:name=UCMDB Integration service. Run setCMDBSuperIntegrationUser by using the credentials of UISysadmin. Stop the UCMDB Server. Create a new schema. Restart the UCMDB Server.
After upgrading UCMDB from version 10.30 (or earlier) to 10.31 (or later), LDAP authentication fails and users cannot log in to UCMDB.	For more details about the problematic scenario, possible cause and solutions, see "Troubleshooting Hybrid User Management - LDAP authentication" on page 1 .

Java Not Installed on Client Machine

If Java is not installed on your machine or you have a version older than Java 8, during login a message is displayed asking you to install the correct Java Runtime Environment version. JRE is needed to view Universal CMDB applets.

Click the relevant button to allow Universal CMDB to install Java from either oracle.com or the Universal CMDB Server.

Chapter 3: Navigating Universal CMDB

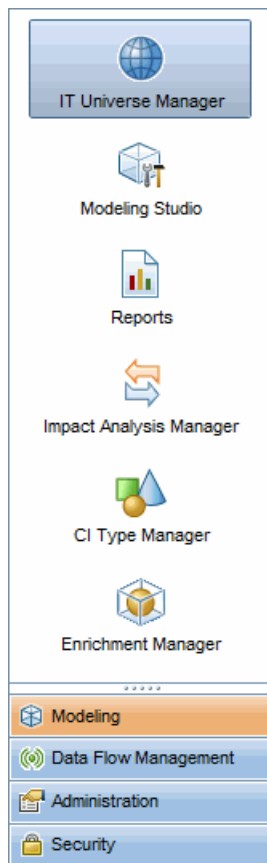
This chapter includes:

Navigating the Universal CMDB User Interface	40
Menus and Options	43
Status Bar	45
Annotation Tool	46

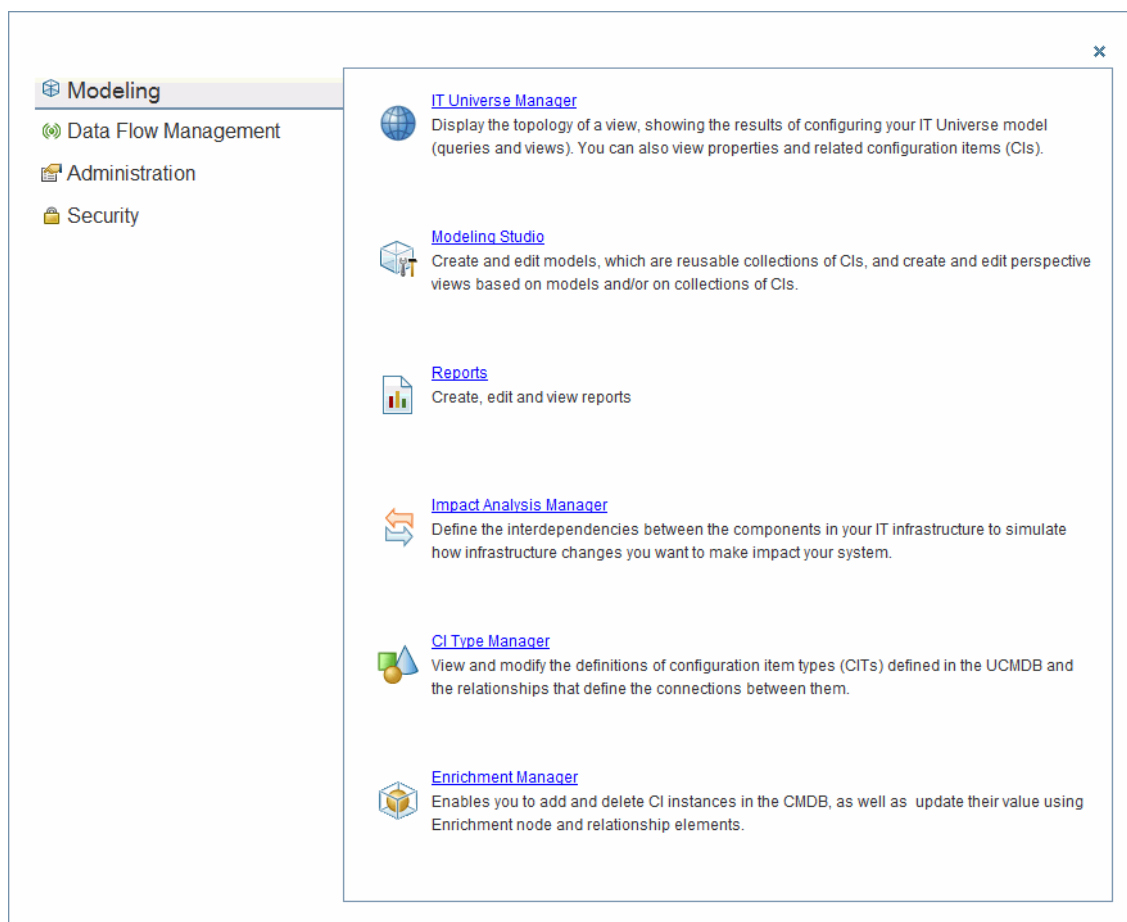
Navigating the Universal CMDB User Interface

Universal CMDB runs in a Web browser. You move around Universal CMDB using the following navigation functions:

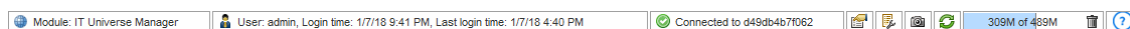
- **Navigation Bar.** Enable quick navigation between modules. Click the category in the lower part of the bar and select the module from the icons in the upper part of the bar.



- **Orientation Map.** For each category, you can display a map with brief descriptions of each of the modules included by selecting **Managers > Orientation Map**.



- **Status Bar.** Provides information on the CMDB application and enables you to configure certain aspects of your interface.



- **Collapse/Expand Arrows.** Enable collapsing and expanding of panes with a single click.



Note: The Web browser **Back** function is not supported in Universal CMDB. Using the **Back** function does not always revert the current context to the previous context. To navigate to a previous context, use the breadcrumb function.

Cancel Feature for Extended Operations

If an operation involving a request to the server, such as searching for CIs, is taking a long time to complete, you can click the **Cancel** button that appears while the operation is executing. Canceling the operation restores the user interface, enabling you to continue working. The Cancel feature is available for the following operations:

- Previewing a query, view, or model in the Modeling Studio
- Calculating the query result count in the Modeling Studio
- Searching for CIs in the CI Selector
- Displaying related CIs in IT Universe Manager
- Displaying Element Instances in the Modeling Studio and the CIT Manager

Suggested Values in Dialog Boxes

When working in a multi-tenancy environment, the suggested values are only taken from CIs that the user has permission to view (at least one tenant associated with the View CIs permission assignment for the user is included among the CI's owner tenant or consumer tenants).

In some dialog box text fields in Universal CMDB, such as the New CI dialog box and the Query Node Properties dialog box, suggested attribute values for entered data are automatically provided when you begin to enter an attribute value. The suggested values match the text entered up to this point and are taken from existing values for the same attribute for the selected CIT or any of its children. The values are sorted alphabetically and a number appears next to each suggested value indicating the number of occurrences of that value. If the number of suggested values exceeds a set maximum limit, no suggestions are displayed. You can set the maximum by changing the **Maximum CI Count for Attribute Value Suggestions** setting in the Infrastructure Settings Manager.

Note: This feature is only relevant for the following attribute types: string, integer, long, double, and float.

Menus and Options

The following categories are available in the lower part of the Navigation Bar:

Category	Description
Modeling	Click to open the Modeling menu, where you build and manage a model of your IT universe in the CMDB. For details, see "Modeling" in the <i>Modeling section of the UCMDb Help</i> .
Data Flow Management	Click to open the Data Flow Management (DFM) menu, where you set up and run the DFM process to populate the IT Universe model with configuration items (CIs), and where you work with Integration Studio. For details, see the <i>Data Flow Management section of the UCMDb Help</i> . For details on DFM content, see the <i>Universal CMDB Discovery and Integrations Content Help</i> .
Administration	Click to open the Administration menu, where you configure infrastructure settings, recipients, and schedules and work with the Package Manager and CI Lifecycle.
Security	Click to open the Security menu, where you define and manage users, user groups, tenants, roles, and resource groups.

Help Menu

You access the following online resources from the Universal CMDB Help menu:

- **Help on this page.** Opens the UCMDb Help to the topic that describes the current page or context.
- **UCMDb Help.** Opens the UCMDb Help Center home page. The home page provides quick links to the main help topics.

You may need to log in with a user name and password. (Default user name is **UISysadmin**)

If you need to enable a localized UCMDb Help, see "[How to Enable Localized Online Help](#)" on [page 37](#).

- **Troubleshooting & Knowledge Base.** Opens the Micro Focus Software Support website directly to the Micro Focus Software Self-Solve Knowledge Search landing page. The URL for this website is <https://softwaresupport.softwaregrp.com/group/softwaresupport>.
- **Software Support.** Opens the Micro Focus Software Support website. This site enables you to browse the knowledge base and add your own articles, post to and search user discussion forums, submit support requests, download patches and updated documentation, and more. The URL for this website is <https://softwaresupport.softwaregrp.com>.
- **Software Web Site.** Opens the Micro Focus Software website, which contains information and resources about Micro Focus software products and services. The URL for this website is

<https://microfocus.com/>.

- **What's New?** Opens the What's New document, which describes the new features and enhancements of the version.
- **Discovery and Integrations Content Help.** Describes the default, out-of-the-box content: what is being discovered, the credentials required in discovery, how to troubleshoot the discovery results, and how to work with integration adapters.
- **UCMDB Best Practices.** Opens the CMS Best Practices Library that is available online. The URL for this website is <https://docs.microfocus.com/UCMDB/CMSBP/index.html>.
- **UCMDB Class Model.** Opens the UCMDB Class Model Reference, which contains information on all packages, CI types and relationships in the class model.

Note: A more detailed UCMDB Class Model specific to a Content Pack version running on a specific UCMDB version is accessible from the Content Pack documentation. For more details, see "[Universal Data Model \(UDM\) Overview](#)" on page 1.

- **About Universal CMDB.** Opens the About Universal CMDB dialog box, which provides version, license, patch, copyright, and third-party notice information.


When accessing the third-party notice information, you may need to provide a user name and password. (Default user name: **UISysadmin**)







Status Bar

This feature provides information on the CMDB application and enables you to configure certain aspects of your interface.

To access	Appears at the bottom of the screen on all pages in Universal CMDB.
------------------	---



User interface elements are described below (unlabeled elements are shown in angle brackets>):

UI Element	Description
Module	Indicates the manager currently selected. Click this item to display a page with descriptions for all of the managers.
 User	Indicates the name of the current user and the login time. Click to edit the user profile.
<Server	Indicates the current status of the server. Click to display a balloon with the server

UI Element	Description
status>	availability, time zone and time. Note: If the hidden setting hide.backend.server.name is set to true , the Server status displays Server is available , rather than displaying the name of the server. This setting is set to false by default, and can only be accessed via the JMX console. Go to Settings Services and invoke the setGlobalSettingValue method.
	Configure User Preferences. Opens the User Preferences dialog box, which enables you to reset system preferences.
	Log Level Configuration. Opens the Log Configuration dialog box, which enables you to set the log level for a selected log.
	Run Screen Capture Tool. Runs the Annotation tool which enables you to take a screen capture of the application. The tool also enables you to annotate the screen capture, and save or print it. For details, see " Annotation Tool " below.
	Force refresh the user's authentication. Refreshes the authentication of the user logged in.
<Total heap size>	Indicates the amount of memory that the application is using.
	Run the Garbage Collector. Enables you to manually clean the memory (it runs automatically on a periodic basis).
	Help on Status Bar. Opens the Universal CMDB Online Help for the Status Bar.

Annotation Tool











This tool enables you to annotate a snapshot of the screen you are viewing, to highlight important areas. It is available across all components of the system.


To access	Click the Run Screen Capture Tool  button in the Status bar or select Tools > Screen Capture... from the main menu.
Important information	<ul style="list-style-type: none"> The annotation options are located on the left side of the annotation window. When saving the annotation: <ul style="list-style-type: none"> The snapshot is saved in .png format. You cannot select the New Folder  button when saving in the My Documents directory or any of its subdirectories.

Annotation Options

The following elements enable you to annotate your snapshot.

User interface elements are described below:


UI Element (A–Z)	Description
	Pan Tool. Click to navigate the snapshot.
	Select Tool. Click and drag to select a specific area of the snapshot.
	<p>Shape Tool. Click and drag to add a shape to the snapshot. Clicking the shape tool button enables the following shape buttons:</p> <ul style="list-style-type: none"> Rectangle. Click and drag to mark an area of the snapshot with a rectangle. Filled Rectangle. Click and drag to mark an area of the snapshot with a filled rectangle. Oval. Click and drag to mark an area of the snapshot with an oval. Filled Oval. Click and drag to mark an area of the snapshot with a filled oval. Rounded Rectangle. Click and drag to mark an area of the snapshot with a round rectangle. Filled Rounded Rectangle. Click and drag to mark an area of the snapshot with a filled round rectangle. <p>Customization. After clicking this button, you can customize your line appearance through the following parts of the interface:</p> <ul style="list-style-type: none">Line Type. Choose the type of line you want to add. Options include:<ul style="list-style-type: none">Solid LineJagged LineLine Width. Select the width of the line, in pixels, in the annotation.
	<p>Line Tool. Click and drag to enable the line tool, which marks the selected area of the snapshot with a line.</p> <p>Customization. After clicking this button, you can customize your line appearance through the following parts of the interface:</p> <ul style="list-style-type: none">Line Style. Choose the style of line you want to add. Options include:<ul style="list-style-type: none">Regular line

UI Element (A–Z)	Description
	<ul style="list-style-type: none"> Line with endpoints Line with arrows Line Type. Choose the type of line you want to add. Options include: <ul style="list-style-type: none"> Solid Line Jagged Line Line Width. Select the width of the line, in pixels, in the annotation.
	<p>Text Tool. Click and drag to open a box where you can add text to the snapshot.</p> <p>Example: Add the syntax: <code>This is the problematic item</code> above a line marking an area of the snapshot.</p>
Border and Fill Colors	<p>Select the relevant square to choose the color of the border and fill of your annotations. The available squares are:</p> <ul style="list-style-type: none"> Upper Square. Click to choose the color of lines, as generated by the line tool and displayed in unfilled shapes. Lower Square. Click to choose the color to fill shapes. <p>Clicking either of the squares generates a dialog box with the following tabs where you choose the color:</p> <ul style="list-style-type: none"> Swatches HSB RGB
Opacity	<p>Slide the opacity bar to choose the darkness level of the selected shape line, text line, or shape color in the annotation.</p> <p>Note:</p> <ul style="list-style-type: none"> A higher opacity percentage means that the selection appears darker. A lower opacity percentage means that the selection appears lighter. This field is enabled when either the shape tool, line tool, or text tool button is selected.


















Menu Bar




The following elements enable you to perform selected actions on your snapshot.

Important	The menu bar contains elements which enable you to:
------------------	---

information	<ul style="list-style-type: none"> • Change the appearance of the snapshot. • Customize the appearance of text annotated onto your snapshot. These elements are enabled only when the Text Tool  button is selected.
--------------------	---

User interface elements are described below (unlabeled elements are shown in angle brackets>):

UI Element (A–Z)	Description
	Save. Saves the snapshot on your local machine. Note: <ul style="list-style-type: none"> • The snapshot is saved in .png format. • You cannot select the New Folder  button when saving in the My Documents directory or any of its subdirectories.
	Select All. Selects all of the annotations added to your snapshot.
	Clear Selected. Clears all annotations.
	Undo. Rolls back the most recent action performed on the snapshot.
	Redo. Cancels the roll back of the most recent action performed on the snapshot.
	Zoom In. Brings the snapshot view closer.
	Zoom Out. Sets the snapshot view further away.
	Restore original size. Restores the snapshot to its original size.
	Print. Prints the snapshot.
	Bold. Bolds the text. Note: This field is enabled only when selecting the Text Tool  button .
	Italic. Italicizes the text. Note: This field is enabled only when selecting the Text Tool  button.
	Underline. Underlines the text. Note: This field is enabled only when selecting the Text Tool  button .
	Anti-aliasing. Adjusts the pixel reading of text or annotation lines so that they appear

UI Element (A–Z)	Description
	<p>smoother.</p> <p>Note: This field is only enabled when selecting the Text Tool  button.</p>
	<p>Select the font for the text in the report.</p> <p>Note: This field is only enabled when selecting the Text Tool  button .</p>
	<p>Select the size of the font in the report.</p> <p>Note: This field is only enabled when selecting the Text Tool  button .</p>

Chapter 4: CMS UI

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UCMDB Browser Module Overview

The UCMDB Browser module is a lightweight web-based client to access UCMDB data. 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.

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 Preview mode, with the option to view more comprehensive data in an Expanded 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 the UCMDB UI), and no upgrades are needed when updating to a newer version.

To grant a user access to the CMS UI > UCMDB Browser module, in the Roles Manager, click the General Actions tab and add the **Access to UCMDB Browser** permission (in the System Access Actions group) to the selected role.

You can access the UCMDB Browser module from UCMDB by right-clicking a CI and selecting **Open UCMDB Browser**. To disable this option, go to the Infrastructure Settings Manager and set the value of the **Enable Open UCMDB Browser Option** setting to **False**. When the option is disabled, you can still access the UCMDB Browser module from CMS UI.

The UCMDB Browser module is HTML-based and runs on most of the latest mainstream browsers on Windows, OS X, and iOS. For detailed information, refer to the *Support Matrix section of the Universal CMDB Browser Help*.

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.

Note: If you upgrade your UCMDB Browser to CMS UI version 2018.08, refer to the updated documentation provided with the CMS UI installation for the latest information.

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:

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

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

For details, see ["How to Grant Access to the CMS UI" below](#).

- **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" on page 318](#).

- **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 ["How to Authorize Access to CIs" on the next page](#).

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.

How to Grant Access to the CMS UI

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

1. 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** .


How to 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. 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" on page 281](#).

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, 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 Case: 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.

Use Case: 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.

Use Case: 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.

How to Change the UCMDB Integration User Credentials

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

The 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 ["How to Configure Multiple UCMDB Servers" on page 60](#)), 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.

How to Configure the UCMDB-UI 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.

How to 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_lwssso_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_lwssso_config.xml** file in the **\conf** folder, and replace the following lines:

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

with:

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

How to 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.

How to 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.

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_lwssso_config.xml` file are used for all UCMDB configurations.

How to Specify Data Stores Used for Data Loading

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.

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.

How to 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.

How to 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**.

How to 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, copy the **setenv.bat** file to the **bin** folder.
 - If you installed the CMS UI with Preconfigured Apache Tomcat Server on Linux, copy the **setenv.sh** file to the **bin** folder.
 - If you installed the CMS UI with Preconfigured Apache Tomcat Server on Windows, 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.

How to 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**.

How to 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 presence and the order of CIs in the search results. This means that, if a CI type is not present in the ranking configuration, it will not be present in the search results even if it is present in the indexer configuration and it is displayed in the suggestions list.

Currently, out-of-the-box the following CI types are present in the ranking configuration: **running_software**, **ci_collection**, **node**, **location**, **party**, **business_element**, and **configuration_document**. So all CIs of these types or a descendant of these types will be present in the search result without having to make any changes. If users need to see other types of CIs in the result, they need to make sure that the corresponding CI type is present in both indexer and ranking configurations.

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.

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 setting, follow these steps:

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 ["How to Specify Data Stores Used for Data Loading" on page 62](#).

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" on page 208](#).

```
<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>

```



```
</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 UCMDDB 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 the next page](#).

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 your 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 as 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

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 68](#) 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 ["How to Configure the Enhanced Search Engine" on page 67](#).
- 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 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 cmdblid a6693cd46cfd1b4fab0c3551bac9289e. This uses Solr/Lucene syntax.

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 UI 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 UI.

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 UCMDB 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 UI, 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 UI 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 67](#)

How to 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	<div>The URL of the image that will appear on the landing page of the UCMDB Browser module.</div> <div>Note: For the best visual effect, use a graphic with a transparent background.</div>
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 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.

General Administration

Chapter 5: UCMDB Server Administration

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Basic Administration Tasks

This section provides a checklist for basic administration and configuration tasks. You use this checklist to review the basic administration tasks required to set up the Universal CMDB system.

Set up Data Flow Management

Licensed Universal Discovery users can run the discovery process to identify IT resources in the network infrastructure. For details, see ["Data Flow Management"](#).

When setting up Data Flow Management, request the following from the system administrator:

- Operating system credentials
- Network protocol credentials
- Application credentials

Set up users and roles

Define users and roles and assign roles to users to grant permissions for views, TQL queries and other components. For details, see ["User Permissions Workflow" on page 280](#) for a single tenant environment and ["Multi-Tenancy Workflow" on page 294](#) for a multi-tenancy environment.

Configure recipients of scheduled reports, including method of delivery

For details, see "Reports" in the *Modeling section of the UCMDB Help*.

Manually build your IT universe model by defining configuration items (CIs) and CI relationships in the model

Divide the model into views that represent logical subsets of the overall model. Add CIs based on discovered network resources or manually define infrastructure components.

For details, see:

- "IT Universe Manager" in the *Modeling section of the UCMDB Help*
- "Modeling Studio" in the *Modeling section of the UCMDB Help*

How to Enable HTTP Communication for UCMDB Server

Starting with version 10.30, by default the HTTPS protocol is enabled for UCMDB server, with the HTTP protocol being disabled.

Micro Focus encourages you to use HTTPS instead of HTTP. If, for some reason, you also need HTTP communication, you can enable HTTP communication for UCMDB server when necessary.

To do this, follow these steps:

1. Enable HTTP for UCMDB Jetty server. To do this, follow these steps:
 - a. Open the **settings.override.properties** file (in the **<UCMDB_Server_Home>\conf** directory) using a text editor.
 - b. Override the OOTB configuration by adding the following line to the file:

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

- c. Save the file.
2. Enable HTTP for the Data Flow Probe connector in UCMDB Server. To do this, follow these steps:

Note: The probe connection is already hardened out-of-the-box. The steps below allow you to enable HTTP communication.

- a. Access the UCMDB JMX console: In your Web browser, enter the following URL:
https://<ucmdb machine name or IP address>:8443/jmx-console. You may have to log in with a user name and password.
- b. Select the service: **Ports Management Services**.
- c. Invoke the **HTTPSetEnable** method.
- d. Invoke the **PortsDetails** method, and ensure that the value in the **Is Enabled** column for the HTTP protocol is **True**.

- e. Return to **Ports Management Services**.
- f. To map the Data Flow Probe connector to server authentication mode, invoke the **mapComponentToConnectors** method with the following parameters:
 - **componentName**: mam-collectors
 - **isHTTP**: true
 - **All other flags**: false

The following message is displayed:

```
Operation succeeded. Component mam-collectors is now mapped to: HTTP
ports.
```

Note: If you want to use multiple authentication methods, make sure you check the ports used by each of them and set them to **true** (when mapping both cm and mam-collectors).

- g. Return to **Ports Management Services**.
- h. To map the Confidential Manager connector to server authentication mode, invoke the **mapComponentToConnectors** method with the following parameters:
 - **componentName**: cm
 - **isHTTP**: true
 - **All other flags**: false

The following message is displayed:

```
Operation succeeded. Component cm is now mapped to: HTTP ports.
```

Note: If you want to use multiple authentication methods, make sure you check the ports used by each of them and set them to **true** (when mapping both cm and mam-collectors).

- i. Restart the UCMDB server.
3. Enable HTTP for Data Flow Probe. To do this, follow these steps:
 - a. Go to the **C:\UCMDB\DataFlowProbe\conf** directory.
 - b. Open the **DataFlowProbe.properties** file using a text editor, and change the value for the **appilog.agent.probe.protocol** setting to **HTTP**.
 - c. Save the file.
 - d. Open the **DataFlowProbeOverride.properties** file (if exists) using a text editor, and change

the value for the **appilog.agent.probe.protocol** setting to **HTTP**.

- e. Save the file.
 - f. Restart the Data Flow Probe.
4. Access UCMDB Server using HTTP protocol and port 8080. To do this, follow these steps:

In the Web browser, enter the URL of the Universal CMDB Server with HTTP protocol and port 8080, for example:

http://<server name or IP address>.<domain name>:8080

where **<server name or IP address>.<domain name>** represents the fully qualified domain name (FQDN) of the Universal CMDB Server.

How to Access the JMX Console

Many UCMDB actions can be performed from the JMX console.

UCMDB JMX Console

1. On the UCMDB server, launch the Web browser and enter the following address:

https://localhost:8443/jmx-console.

Note: Access to the JMX console is restricted to localhost only. If you need to access the JMX console remotely, see "How to Enable Remote Access to the JMX Console" in the *Administer section of the UCMDB Help*.

2. Enter the JMX console authentication credentials (Login name = **sysadmin**).

The UCMDB JMX Quick Search page opens. There are three ways to access a JMX operation from the JMX home page.

- **Use the JMX quick search**

The JMX quick search feature provides the ability to:

- Search for a service. This is useful when you know that an operation is in a certain service category, but you do not know the name of the operation.
- Search for a JMX operation based on a keyword

- Keywords can be an operation name, the description of the operation, or even the parameters used by the operation.
- When typing, a suggestion list is displayed, providing links to quickly access suggested methods.
- Search and access a UCMDB server log from the JMX console
 - Typing the word **log**: in the search text displays a suggestion list with all the logs that contain the search word.
 - Clicking one of the suggested logs redirects to a new page displaying the full content of the log.
- **Use the UCMDB JMX link**

Do the following:

 - i. Click the UCMDB JMX link to open the console.
 - ii. Locate the required service and click the link to open the operations page.
 - iii. Select the required operation.
- **Use the JMX Operations Index link**

Do the following:

 - i. Click the UCMDB JMX Operations Index link to open the console operation index.
 - ii. Go directly to the required method and select it.

Note: It is recommended to change the JMX password. For details, see ["Change the JMX Console Password" on the next page](#).

Data Flow Probe JMX Console

1. On the probe machine, launch the Web browser and enter the following address:
https://localhost:8453.

Note:

- Starting with version 10.31, the HTTPS port 8453 is enabled by default for the Probe JMX console. For more information, see "Using HTTPS Port 8453 as Default for Data Flow Probe" in the *Hardening section of the UCMDB Help*.


- In FIPS mode, you may not be able to log in to the Data Flow Probe JMX Console using some of the latest versions of Internet Explorer 11, Microsoft Edge, or Firefox. And when using these browsers you may get “Unsupported Cipher” error message. For workaround, see "Troubleshooting - FIPS Deployment" in the *Universal CMDB FIPS Deployment Guide*.
2. Enter the JMX console authentication credentials (default username **sysadmin**):

The Data Flow Probe JMX Quick Search page opens.

To search for a JMX method, enter a method name or part of a method name in the search box. The search results display all methods containing the search phrase.
 3. Click the **Data Flow Probe JMX** link to open the console. Locate the required service and click the link to open the operations page. Select the required operation.
 4. Click the **Data Flow Probe Operations Index** link to open the console operation index. Go directly to the required method and select it.

Note: It is recommended to change the JMX password. For details, see ["Change the JMX Console Password" below](#).

Change the JMX Console Password

1. Log in to UCMDB with an administrator account and go to **Security > Users and Groups**.
2. Select the user for the JMX Console login (by default, **sysadmin**) and click the **Reset Password**  button.
3. In the Reset Password dialog box, enter the new password and confirm it. Click **OK**.

Note: 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. Log out of UCMDb and log in to the JMX Console using the new password.

Configuration Manager JMX Console

There is a separate JMX console for Configuration Manager.

On the Configuration Manager server, enter the following address: **http://<server name>:<application_port>/cnc/jmx-console**. The port is the port configured during the installation of Configuration Manager.

For details, see the interactive *Universal CMDB Deployment Guide*.

For details on accessing the Configuration Manager JMX Console, see "Configuration Manager JMX Methods" in the *JMX Reference* section of the UCMDb help.

Related Topics

["CMDB Overview"](#)

How to Enable Remote Access to the JMX Console

Starting from version 10.30, the JMX console is secured by restricting access to it to server localhost only. Also, the JMX Console is no longer accessible through HTTP protocol, even if it is specifically re-enabled.

Administrators attempting to access the JMX console from a remote machine may encounter all remote access attempts being redirected with no error.

The following message will be shown: "Please wait, you will be redirected in a moment."

However, you can still enable remote access to JMX console when necessary.

To enable remote access to the JMX console, follow these steps:

Note: This configuration affects both the UCMDb server JMX console and the probe JMX console.

1. On the UCMDB server, launch the Web browser and enter the following address:

https://localhost:8443/jmx-console

You may have to log in with a user name and password.

2. Locate **UCMDB:service=Settings Services** and click the link to jump to the Operations table.
3. Locate the **setGlobalSettingValue** operation.
4. Provide the following parameter values:

name: restrict.jmx.to.localhost

value: false

Note: Starting from UCMDB version 10.30, the default value is **true**, which disables remote access to the JMX console, you can only access the JMX console from localhost.

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

The change takes effect and affects both the UCMDB server JMX console and the probe JMX console.

How to Manage UCMDB Licenses Using the JMX Console

You can manage the product licenses from the JMX Console. This task describes how to install a license.

1. On the UCMDB server, launch the Web browser and enter the following address:

https://localhost:8443/jmx-console

You may have to log in with a user name and password.

2. Click **UCMDB:service=Licensing Services** to open the JMX MBEAN View page.
3. Locate the **addLicense** method.
4. Enter your customer ID and the license key.
5. Click **Invoke**.

There are additional JMX methods available on the same page for the following functions:

- Installing a license from a file
- Displaying all active licenses
- Displaying all licenses (including expired licenses)
- Displaying a summary of active licenses
- Removing all licenses

How to Access Support Using the JMX Console

Universal CMDB provides Supportability JMX methods to help Micro Focus Support diagnose problems in your system. The methods use handlers for each category, which gather information relevant to that category from your system. When you run a handler for a category, it downloads a zip file of the information gathered for that category. Generally, Micro Focus Software Support runs the Supportability methods to help provide a solution for the issue raised.

To access the Supportability methods, follow these steps:

1. On the UCMDB server, launch the Web browser and enter the following address:
`https://localhost:8443/jmx-console`

You may have to log in with a user name and password.
2. Click **UCMDB:service=Supportability Services** to open the JMX MBEAN View page.
3. The **listSupportCategories** method displays all the support categories:
 - To run all the handlers, invoke the **runSupportHandlersForAllCategories** method.
 - To run specific handlers, invoke the **selectAndRunSupportHandlers** method and select the handlers you want to run.
 - Alternatively, you can run specific handlers using the **runSupportHandlersForSpecificCategories** method. In the **categories** field, enter all the required handlers separated by commas, and click **Invoke**.

Supportability Handlers

The following handlers are available:

- **Basic.**
 - **Hardware.** Records all the hardware information about the target physical or virtual machine in the **Environment.properties** file.
 - **Basic Database.** Records basic properties of the UCMDB connection with the database in the **Basic Database.properties** file.
 - **Basic History.** Records the last date that the baseline process ran for each CI type in the **Basic History.properties** file.
 - **Model Update.** Records the following data in the **Basic Model Update.properties** file:
 - Number of CIs per CI type (only for CIs with instances)
 - Number of CIs connected to a **Node** CI type or one of its descendants
 - **URM Counters.** Records each of the registered URM types and the number of instances of each one in the **Basic URM Counters.properties** file.
 - **Changed Settings.** Records the changed infrastructure settings and their values for this customer in the **Changed_Settings_Customer <customerID>.properties** file.
 - **Integrations Audit.** Shows a summary of all the existing integration points in the **Integrations Audit.txt** file.
 - **Integrations Configuration.** Shows detailed information of all the existing integration points in the **Integrations Configuration.txt** file.
 - **LWSSO Settings.** Stores the output of JMX methods **retrieveConfiguration** and **retrieveConfigurationFromSettings** to the **LWSSO_Settings.properties** file.
 - **Memory and Thread Count Info.** Records the UCMDB memory usage and thread count in the **MemoryAndThreadInfo.html** file. The information is displayed in color: green, orange, and red. If the color is not green, it requires attention.

Note: LDAP authentication can generate many idle threads. Until these threads are closed, it can temporarily lead to a high thread number which may cause performance issues.
 - **Settings.** Records the infrastructure settings and their values for this customer in the **Settings Customer <customerID>.properties** file.

- **Support Handlers.** Shows the supportability handlers invoked and contained in the zip package generated by running the **Basic** handler in the **Support Handlers.txt** file. All the supportability handlers can be viewed by using the JMX method **listSupportCategories**.
- **SystemInfo.** Stores the output of the JMX method **viewSystemInformation** in the **SystemInfo.properties** file, and shows basic information of UCMDB deployment, including version, probes, and database type.
- **TQL.** Records the following data in the **TQL.properties** file:
 - Number of TQL queries
 - Number of active TQL queries
 - Number of active persistent TQL queries
 - Number of non-active TQL queries
 - It also creates the **Failed TQLs.txt** file, containing the list of failed active TQL queries
- **View.** Records the following data in the **VIEW.properties** file:
 - Number of views
 - Number of views with a hierarchy definition
 - Number of views with a rule based hierarchy definition
 - Number of template based views
 - Number of perspective based views
 - Number of templates
 - Number of perspectives
 - Number of views of unknown type (this value should always be 0)
- **ViewArchive.** Records the following data in the **ViewArchive.properties** file:
 - Total number of archives
 - Total number of views with archives
- **Snapshots.** Records the following data in the **Snapshots.properties** file:
 - Total number of snapshots
- **Modeling.** Records the following data in the **Modeling.properties** file:

- Number of business CIs
- Number of models with content (models containing CIs)
- Number of pattern based models
- Number of instance based models
- **Enrichment.** Records the following data in the **Enrichment.properties** file:
 - Number of Enrichment rules
 - Number of all active Enrichment rules
 - Number of non-active Enrichment rules
 - Number of Enrichment business views
 - Number of all active Enrichment business views
 - Number of non-active Enrichment business views
- **High Availability.** Gathers the High Availability information from all of the servers in the cluster:
 - The High Availability cluster information is recorded in **HA.properties**:
 - **Is_ha_enabled**
 - Cluster name (if high availability is enabled)
 - Cluster nodes number (if high availability is enabled)
 - Cluster nodes names (if high availability is enabled)
 - The values for the High Availability settings (starting with **ha.**) are recorded in **HA settings.properties**
- **Domains.** Gathers IP range information and records in the **DomainsConfiguration Customer <CustomerID>.xml** file.
- **Integrations.** Gathers integrations related information.
 - **ApiAdapter.zip.** Exports the UCMDB API adapter which allows defining Reconciliation Priority for API Data In flows.
 - **CmdbHistoryAdapter.zip.** Exports the UCMDB history adapter which is used to federate data from UCMDB's History.
- **Management Zones.** Gathers rank, name, range definition, discovery activities, activity jobs, and scheduling information for management zones. Records this information in the **MngZonesConfiguration Customer <CustomerID>.xml** file.

- **Authorization.** Records all the roles, users, user groups and role assignments in the **Authorization.properties** file. In a multi-tenancy environment, it records the tenant association of each role assignment.
- **History.** Records the number of history events in the current history table for each CI type in the **History.properties** file (only for CI types with history events)
- **Class Model.** Records the class model as an XML file, **Class Model.xml**. In a multi-customer environment, it records the number of different class models and their differences at the SDK level in the **Class Model.properties** file. (In a single-customer environment, this file contains only the information for the single customer.)
- **Reconciliation.** Records data processing statistics read from the **cmdb.reconciliation.log** file. It records the data in Excel format, in the **DiscoveryProcessingStatistics.xls** file. Data that might require attention is highlighted in yellow and red. These thresholds are selected based on data collected for UCMDB version 10.xx medium and large deployments.

The following Excel sheets are created:

- **dailyRates.** Records daily statistics. The following items are explained:
 - **Total Model time.** Time needed to insert, update, or delete CIs to DB. A higher value might show a DB slowness and require DBA involvement.
 - **Total Identify time.** Time required in building TQL queries, calculating TQL queries, matching between bulk and what was brought with TQL queries from the UCMDB server.
 - **Total DataIN time.** Time required for merge operations and recursive merge operations.
 - **Daily Usage(% from 24h).** Amount of time in a day the server is busy with data in processing. If this field is highlighted in yellow or red, the server might be overloaded or there is a performance slowness.
- **Jobs Throughput Rates Detailed.** Data recorded per discovery/integration job from the time the data is analysed. (First timestamp recorded in the logs.)
- **dailyRatesPerJob.** Data recorded per discovery/integration job from the time the data is analyzed but breakdown per day.
- **dailyRatesPerDataSource.** Data recorded per source type and display by day.
- **FailedBulksInfo.** Number of bulks that failed to be recorded by the discovery job. It shows the number of bulks that failed and the time spent. At the end a summary is made for all failed bulks.
- **RemoveByIDStats.** Records data for the CIs that are marked by the probe as candidates for deletion or CIs to be deleted.

- **dailyRatesPerProbe.** Records data per day for each probe that reports data. Also it fetches all data that are not created through probe as 'Not through Probe'.
- **Jobs Throughput Rates Per Probe.** Records data reported by every probe from the time the data is analyzed. (First timestamp recorded in the logs.)
- **General Info.** Shows the timeframe analyzed and recorded in the Excel file. Also records time spent for successful and failed processed bulks . **Number of data in bulks ignored from log file** shows the number of bulks that were ignored. Possible reasons are that data was not properly read or that the reconciliation bulk was not logged properly in the log (every bulk must have two lines: entry line and summary line logged in consecutive rows in the log file).

Note:

- The data is read from the **cmdb.reconciliation.log** file based on regex. If the log4j layout is changed for the **cmdb.reconciliation.log** file, the data cannot be parsed.
 - A job might show a performance degradation if the total time is higher than 600 seconds.
- **Data In.** Records actual deletion period and deletion candidate period information of the root CI type that was overwritten by the settings for child CI types in the **Data In.properties** file. It also checks for inconsistency in the database (objects or links that exist in the root CIT's table but not in the subtype's table or the other way around). The inconsistent objects are recorded in the **inconsistencyInModel.txt** file and the inconsistent links are recorded in the **inconsistencyLinks.txt** file.

How to Configure High Availability

The following infrastructure settings can be configured for a high availability environment.

Infrastructure Setting	Description	Value
ha.tp.port	Enables you to change the TCP port.	Default: 7800
ha.ports.range	Enables you to change number of TCP port that should be defined for connection. If ha.ports.range=0 , and the port defined in ha.tp.port is occupied, the connection will fail.	Default: 0 (no range)
ha.writer.suggestion.period.threshold	In the JMX Console, you can invoke the High Availability Services >	Default: 240 secs

Infrastructure Setting	Description	Value
	<p>suggestNewWriterServer method where you can suggest which server (serverID) should replace the Writer server.</p> <p>This parameter enables you define how long the server should keep trying to select the suggested server. After this threshold has be reached, the suggestion is canceled.</p>	
ha.writer.inactivity.period.threshold	<p>Defines how long to wait after the Writer server stops responding, before selecting a new Writer server.</p> <p>Note: Changing this time also affects the time it takes to select the new Writer after restarting the previous Writer server.</p>	Default: 120 secs
ha.load balancer.force.close.connection	<p>When this setting is set to true, the UCMDB SDK clients add a Connection:close header to each authentication request and class download request sent to the server. This way the load balancer will think this is a first request in a connection and add the session cookie to the response.</p> <p>If the load balancer you are using already adds a session cookie to every request sent, then this parameter should be set to false to prevent a decline in system performance.</p>	Default: false

How to Set Master Keys

You can use the JMX console to change the master key that is used to encrypt all UCMDB keys.

Change the master key for a cluster

This method assumes that your UCMDB environment is deployed in a high-availability setup.

Caution:

- This method involves a restart of the entire cluster, so plan accordingly. It is recommended to change the master key of the cluster when there is little or no load on the servers. For example, you should avoid using this method during data-in operations.
- Do not change any settings in the time period between changing the master key and restarting the server. Not following this instruction may result in a failure to start the server.
- Machines that are not up or that will be added later to the cluster will need to be configured manually. Until they are configured, at most they can run as reader machines; trying to run them as writer machines will fail.

1. Back up the **C:\UCMDB\UCMDBServer\conf\cmdb.conf** file and the values for the following settings:
 - ha.cluster.authentication.keystore.password
 - ha.cluster.authentication.shared.secret
 - ha.cluster.message.encryption.keystore.password
 - ssl.server.keystore.password
 - ssl.server.truststore.password
2. Make sure all the servers in the cluster are up and running.
3. On the writer machine, launch the Web browser and enter the following address to log in to the JMX console: **https://localhost:8443/jmx-console**.

Note: If a load balancer is present, you must bypass it and not log on to the writer machine through a load balancer.

4. Do one of the following:
 - Search for **changeMasterKeyForCluster**.
 - Click **UCMDB:service=Security Services > changeMasterKeyForCluster**.
5. Enter and confirm the master key, and click **Invoke**. The master key will be changed first on the writer machine and then on all reader machines.

Note:

The master key must contain exactly 32 characters and include at least one of each of the following four types of characters:

- Uppercase alphabetic characters
 - Lowercase alphabetic characters
 - Numeric characters
 - Special characters: `:/._+-[]`
6. Restart all the machines in the cluster. You can use the JMX method **High Availability Services** `> restartCluster` to do this.

Note: Restart the cluster immediately after changing the master key. If you do not, future database connections may fail.

Change the master key for a new machine in a cluster

If at least one of the following settings was changed, use Method A; otherwise, use Method B:

- `ha.cluster.authentication.keystore.password`
- `ha.cluster.authentication.shared.secret`
- `ha.cluster.message.encryption.keystore.password`
- `ssl.server.keystore.password`
- `ssl.server.truststore.password`

Method A

This method assumes that you already have properly configured a master key for the writer machine that is up and running in the cluster. If not, follow the instructions in ["Change the master key for a cluster" on page 106](#).

1. Copy the `C:\UCMDB\UCMDBServer\bin\wrapper.conf` file from the writer machine to the same location on the new (reader) machine.
2. Restart the server.

Method B

1. Back up the `C:\UCMDB\UCMDBServer\conf\cmdb.conf` file.
2. On the writer machine, launch the Web browser and enter the following address to log in to the

JMX console: **<https://localhost:8443/jmx-console>**.

3. Do one of the following:
 - Search for **changeMasterKey**.
 - Click **UCMDB:service=Security Services > changeMasterKey**.
4. Enter and confirm the master key, and click **Invoke**.

Note: The master key must contain exactly 32 characters and include at least one of each of the following four types of characters:

- Uppercase alphabetic characters
- Lowercase alphabetic characters
- Numeric characters
- Special characters: `:/._+-[]`

5. Restart the machine.

Note: Restart the cluster immediately after changing the master key. If you do not, future database connections may fail.

Revert the master key for a cluster to its default value

This procedure resets the master key for an entire cluster.

1. Make sure all the servers in the cluster are up and running.
2. On the writer machine, launch the Web browser and enter the following address to log in to the JMX console: **<https://localhost:8443/jmx-console>**.

Note: If a load balancer is present, you must bypass it and not log on to the writer machine through a load balancer.

3. Do one of the following:
 - Search for **restoreMasterKeyForCluster**.
 - Click **UCMDB:service=Security Services > restoreMasterKeyForCluster**.
4. Click **Invoke**. The master key will be changed first on the writer machine and then on all reader machines.
5. Restart all the machines in the cluster. You can use the JMX method **High Availability Services**

> **restartCluster** to do this.

Note: Restart the cluster immediately after changing the master key. If you do not, future database connections may fail.

Revert the master key for a machine that was down when master key was reverted for whole cluster

1. Back up the **C:\UCMDB\UCMDBServer\conf\cmdb.conf** file.
2. On the writer machine, launch the Web browser and enter the following address to log in to the JMX console: **https://localhost:8443/jmx-console**.
3. Do one of the following:
 - Search for **restoreMasterKey**.
 - Click **UCMDB:service=Security Services > restoreMasterKey**.
4. Click **Invoke**.
5. Restart the machine.

Note: Restart the cluster immediately after changing the master key. If you do not, future database connections may fail.

How to Set Master Key for Password Encryption on Data Flow Probe

This section explains how to set a master key for password encryption on Data Flow Probe. This key is updated with a new pass. The updated pass is stored in the **DataFlowProbe.properties** file.

To set the master key for password encryption on Data Flow Probe,

1. Access the Data Flow Probe JMX console. On the probe machine, launch a Web browser and enter the following address: **https://localhost:8453**.

You may have to log in with a user name and password.

Note: If you have not created a user, use the default user name sysadmin to log in.

2. Locate the **type=MainProbe** service and click the link to open the Operations page.
3. Locate the **changeMasterKey** operation.
4. In the **pass** field, enter the new pass to change master key.
5. In the **repass** field, enter the new pass again to double confirm.
6. Click **Invoke**.

The result of the invocation is a message like the following:

The key is changed successfully.

Note: For Data Flow Probes installed in separate mode, you need to change the master key on both probe gateway and probe manager.

How to Configure the UCMDB Mail Server

1. Configure UCMDB mail server

- a. In UCMDB, go to **Administration > Infrastructure Settings > Mail Settings**.
- b. Configure mail settings as described in the table below:

Mail Setting	Description
Activate TLS/SSL connection	If SMTP server requires the secure connection via TLS/SSL, the value should be True , and make sure that you proceed to 2. Configure UCMDB client to configure the communication protocol. 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.

Mail Setting	Description
Email sender	Enter the name to appear in reports that Universal CMDB sends.
Sender editability	Setting this value to True enables users to change the Email sender name inside the form that sends mail. Otherwise, leave its value as False .

- c. As a backup for the main SMTP server, you can provide information about an alternative server. Configure the following settings:

Mail Setting	Description
Alternate SMTP server	Enter the address of the alternate SMTP server.
Alternate SMTP server port	Enter the alternate SMTP server port.
Alternate SMTP server username	Enter the user name of the alternate SMTP server. If no authentication is required, leave this field empty.
Alternate SMTP server password	Enter the password of the alternate SMTP server. If no authentication is required, leave this field empty.

Note: It is strongly recommended to set both the **SMTP server** and **Alternate SMTP server**. In case the SMTP server is not available, the alternative SMTP server will be used by the UCMDB server when sending emails.

2. Configure UCMDB client

Note: This step is required only when **Activate TLS/SSL connection** is set to **True**.

After configuring the mail server with a certificate, to benefit from secure communication and secure authentication option, you must transfer the certificate to UCMDB server truststores.

- a. Retrieve UCMDB JRE path.

Example: **C:\UCMDB\UCMDBServer\bin\jre**

- b. Retrieve your certificate path.

Example: **C:\Users\Administrator.SMTP\Desktop\certs\Keypublic.pem** (the file extension could be anything, not just **pem**)

- c. Retrieve UCMDB server truststore path.

Examples:

C:\UCMDB\UCMDBServer\conf\security\server.truststore, or

C:\UCMDB\UCMDBServer\conf\security\server-fips.truststore (for FIPS mode)

- d. Retrieve UCMDB JRE truststore path.

Example: **C:\UCMDB\UCMDBServer\bin\jre\lib\security\cacerts**

- e. Navigate to the **C:\UCMDB\UCMDBServer\bin\jre\bin** folder, and open the command prompt.
- f. Run the following commands using keytool to import the certificate to UCMDB server truststore and UCMDB JRE truststore:

Note: Default truststore passwords are used in the following commands : **changeit** and **hpass**. If you configured a specific password for your truststore, just replace **hpass** or **changeit** with your password. Also, paths provided in the examples above are used. Make sure you replace them with your specific paths.

Command for importing the certificate to UCMDB JRE truststore:

```
keytool -import -file  
"C:\Users\Administrator.SMT\p\Desktop\certs\Keypublic.pem" -keystore  
"C:\UCMDB\UCMDBServer\bin\jre\lib\security\cacerts" -alias "give  
certificate a name" -storepass changeit
```

Command for importing the certificate to UCMDB server truststore:

- For non-FIPS mode:

```
keytool -import -file  
"C:\Users\Administrator.SMT\p\Desktop\certs\Keypublic.pem" -keystore  
"C:\UCMDB\UCMDBServer\conf\security\server.truststore" -alias "give  
certificate a name" -storepass hpass
```

- For FIPS mode:

```
keytool -import -file  
"C:\Users\Administrator.SMT\p\Desktop\certs\Keypublic.pem" -keystore  
"C:\UCMDB\UCMDBServer\conf\security\server-fips.truststore" -alias  
"give certificate a name" -storetype PKCS12 -providername JsageJCE -  
storepass hpass
```

How to Change the Root Context for UCMDB Components

The default root context for all Universal CMDB components is /. This root context can be configured in the Infrastructure Settings Manager.

To change the root context:

1. Go to **Administration > Infrastructure Settings Manager** and select the **Root context** setting under **General Settings**.
2. Edit the setting and save your changes.
3. Restart Universal CMDB.

One application of this feature is the ability to access multiple UCMDB servers using one reverse proxy server. Each UCMDB server can be configured with its own root context.

Caution: After changing the root context from its default value, all UCMDB components are only available using the new root context. For example, if the new root context is /ucmdb1, the user interface will be accessible from the following url: **https://<server name or IP address>.<domain name>:8443/ucmdb1/ucmdb-ui**.

For Configuration Manager users: If you change the root context, you must update the UCMDB access URL field in Configuration Manager accordingly (**Administration > Settings > Integrations > UCMDB Foundation**).

How to Customize the Application Title

You can customize the title that appears on the UCMDB home page and the login page. This can help you to easily distinguish between production and testing environments.

To customize the application title, follow these steps:

1. In Infrastructure Settings Manager, locate the **UCMDB Custom Title** setting.
2. In the **Value** field, enter the text to append to the application title.

Note: The maximum number of characters that are displayed in the customized title is 30. If you enter more than 30 characters in the **Value** field, only the first 30, followed by ..., appear in the customized title.

3. Save your changes.
4. When you next access UCMDB, the home page and login page display the customized application title after the UCMDB product version.

How to Use the Database Tool

Universal CMDB provides a tool for modifying the database directly without accessing the user interface.

Caution: Do not use the Database tool to modify the database unless instructed to do so by Software Support.

To run the Database tool, follow these steps:

1. Make sure that the UCMDB Server is down.
2. Run the following batch file from the command line:
C:\UCMDB\UCMDBServer\tools\dbscripts\newDbTool.bat
3. At the prompt, run the required command.

The Database tool operates in the following modes.

Consistency Mode

The Consistency mode of the tool enables you to check the consistency of the database. Run the command **newDbTool.bat consistency**. You can add **--showsql** at the end of the command to display the SQL commands that are running.

Deletion Mode

The Deletion mode of the tool enables you to delete CIs and relationships from the database via one of the following methods:

- **Running the Aging mechanism.** Use the command **newDbTool.bat aging**. When you run the Aging mechanism, CIs and relationships that are candidates for deletion are removed. For details, see ["The Aging Mechanism Overview" on page 266](#).
- **Deleting selected CIs by type.** You can delete all CIs of a specific type by running the command **newDbTool.bat type type_1, type_2** where **type_1** and **type_2** represent the CI types to delete.
- **Deleting selected CIs by SQL query.** You can delete the CIs selected by running an SQL query. Run the command **newDbTool.bat sql <query_name>** where **<query_name>** is the name of the SQL query you have defined.

The following is an example of an SQL query that returns all node CIs with a display label starting with **vm**:

```
select CMDB_ID from cdm_node_1 where a_display_label like 'VM%'
```

Note: The SQL query must return a single column which is the CMDB_ID.

Preview Mode

The Preview mode of the tool enables you to preview the changes that the consistency mode will introduce before executing them. Run the command **newDbTool.bat consistency --preview**.

How to Deploy Hotfixes and Track Hotfixes Applied on UCMDB Server

Overview

Packaging of hotfix files was improved to enable easy deployment and management. The JMX method **showAllBinariesApplied** allows you to easily view and track all information about the hotfixes you deployed, and the JMX method **viewSystemInformation** allows you to view IDs of hotfixes applied in addition to other system information.

When you deploy hotfixes, you are actually deploying each of them separately in a different folder under the **classes** folder. Path examples for different hotfix types are as follows:

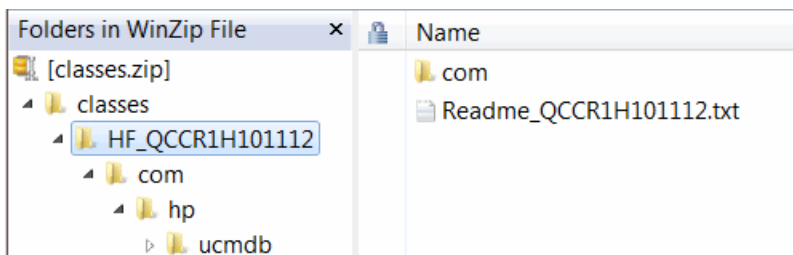
Server side hotfix type	Path format
Server backend	<UCMDB_Install_Dir>/classes/HF_QCCR1HXXXXX/com/hp/ucmdb/
UI - Server	<UCMDB_Install_Dir>/deploy/ucmdb-ui/WEB-INF/classes/HF_QCCR1HXXXXX/com/hp
UI - Applet	<UCMDB_Install_Dir>/deploy/ucmdb-ui/static/appletPatches/YYYY_MM_DD_QCCR1HXXXXX.jar

The hotfix folder name where the classes are loaded follows the format of **HF_QCCR1H<ID>**. If the hotfix folder name does not start with the **HF_** prefix, the classes for the hotfix will not be loaded.

The logging binaries follow this format: **HF_LOGGING**.

For applet logs, the logging filename format is an exception, which follows the format **YYYY_MM_DD_QCCR1H<id>**.

UI - Server and **Server backend** hotfixes have the **Readme** file directly inside the hotfix folder. For example, for **HF_QCCR1H101112**, the readme file is located in the folder **..HF_QCCR1H101112/Readme_QCCR1H101112.txt**, as shown in the screenshot below. If it has a different name and/or placed in a different location it will not be read.



For applet hotfixes, the readme file will not be read, because it is not an executable.

After deployment, the hotfixes are loaded at server startup, and messages similar to the following are added to the **startup.log** file:

- Before jetty starts:

```
Loading extra classpath C:\HP\UCMDB\UCMDBServer\bin\..\
```

- After the server is up:

```
[Controller] - Hotfixes Applied: QCCR1H12313 QCCR1H11244 QCCR1H23211 LOGGING
QCCR1H102233 QCCR1H101112 QCCR1H1121233
```

- Warning if there are duplicate files for different hotfixes:

[Controller] - The server has binaries/hotfixes applied which overlap. Contact Micro Focus engineers to make sure there is no inconsistency. Invoke Jmx showAllBinariesApplied to check the classes

Note:

- Hotfixes are loaded at UCMDB server startup. If a new hotfix is deployed, it will not be displayed until the UCMDB server restarts.
- Every hotfix has a unique QCCR ID, which will be added to the hotfix folder name after the **HF_** prefix.
- The recommended approach for hotfix deployment is manual deployment. UCMDB administrators should manually unzip the hotfix files to the UCMDB server machine and deploy the hotfix files. For high availability (HA) deployments, this should be done on each UCMDB server.

Another approach may be to use the **copyClassesFolderToOtherServers** JMX method. Depending on network latency, this approach can take longer, also some classes might be lost.

- When multiple hotfixes are deployed, class files from hotfixes will be loaded in the sequential order of QCCR IDs of the hotfixes. For example, if hotfixes **HF_QCCR1H101112** and **HF_QCCR1H123122** are deployed, the class files from **HF_QCCR1H101112** will be loaded first. This is important to know in the corner case when a class file is deployed on the server side by two hotfixes.

How to deploy server backend and UI - Server hotfixes

1. Stop the UCMDB server.
2. Extract **classes.zip**.
3. Copy the **classes** folder of the zip into the following directory, depending on the hotfix type:

Hotfix type	Target folder	
Server backend	<UCMDB_Install_Dir>/	
UI - Server	<UCMDB_Install_Dir>/deploy/ucmdb-ui/WEB-INF/	

If there already exists a **classes** folder, back up the folder first, and then copy the **classes** folder of the zip into the above folder to replace the existing one.

After deployment, the hotfix path looks like the following:

Hotfix type	Path example	
Server backend	<UCMDB_Install_Dir>/classes/HF_QCCR1HXXXXX/com/hp/ucmdb/	
UI - Server	<UCMDB_Install_Dir>/deploy/ucmdb-ui/WEB-INF/classes/HF_QCCR1HXXXXX/com/hp	

4. For HA deployments, repeat step 2 and step 3 on each UCMDB server.
5. Restart the UCMDB server(s).
6. Check server startup log or invoke JMX method **showAllBinariesApplied** to make sure the binary/hotfix was properly deployed.

How to deploy applet hotfixes

1. Stop the UCMDB server.
2. Extract **appletPatches.zip**.
3. Copy the **appletPatches** folder of the zip into the following directory: **<UCMDB_Install_Dir>\deploy\ucmdb-ui\static**

If there already exists an **appletPatches** folder, back up the folder first, and then copy the **appletPatches** folder of the zip into the above folder to replace the existing one.

After deployment, the hotfix path looks like the following:

<UCMDB_Install_Dir>/deploy/ucmdb-ui/static/appletPatches/YYYY_MM_DD_QCCR1HXXXXX.jar

4. For HA deployments, repeat step 2 and step 3 on each UCMDB server.
5. Restart the UCMDB server(s).
6. Check server startup log or invoke JMX method **showAllBinariesApplied** to make sure the binary/hotfix was properly deployed.

How to view and track hotfixes deployed on UCMDB Server

To view and track hotfixes deployed on UCMDB server,

1. On the UCMDB server, launch the Web browser and enter the following address:
https://localhost:8443/jmx-console
2. Enter the JMX console authentication credentials (Login name = **sysadmin**).
3. Locate the following operations in the **UCMDB:service=Server Services** category:
 - To view IDs of hotfixes applied only, locate the **viewSystemInformation** operation.
 - To view and track detailed information about hotfixes deployed, locate the **showAllBinariesApplied** operation.
4. Click **Invoke**.
 - The result page of the **viewSystemInformation** operation displays the system information of the UCMDB server, including the IDs of hotfixes deployed on the server. This is also saved in the supportability JMX general category output.
 - The result page of the **showAllBinariesApplied** operation displays detailed information about the hotfixes deployed, including hotfix type (server backend, UI server, or applet), readme file, if there're any overlapping files, and if there are any wrongly placed files. See the screenshot below for an example.

Mbean: UCMDB:service=Server Services. Method: showAllBinariesApplied

```
The following Server backend hotfixes/binaries are applied
ID: HF_QCCR1M12313      Readme File not available.
ID: HF_QCCR1M1244      PROBLEM DESCRIPTION Trace is activated on the callhome servlet port 80
ID: HF_QCCR1H23211      Readme File not available.

The following UI-Server hotfixes/binaries are applied
ID: HF_QCCR1M10112      Readme File not available.

The following UI-Applet hotfixes/binaries are applied
ID: HF_QCCR1M121233      Readme File not available.

NOTE: The following hotfixes/binaries have duplicate files: double-check them with HP
ID: HF_QCCR1M1244        [\com\hp\ucmdb\history\dal\command\modify\HistDalComplementLayoutPerTableCommand.class, \com\hp\ucmdb\history\operation\update\HistComplementLayoutPerClass.class]
ID: HF_QCCR1H23211      [\com\hp\ucmdb\history\dal\command\modify\HistDalComplementLayoutPerTableCommand.class, \com\hp\ucmdb\history\operation\update\HistComplementLayoutPerClass.class]
```

How to Configure UCMDB Log Levels

This task describes how to specify the log level for UCMDB log files.

1. On the UCMDB server, launch the Web browser and enter the following address:
https://localhost:8443/jmx-console

You may have to log in with a user name and password.
2. Click **UCMDB:service=Server Services** to open the JMX MBEAN View page.
3. Locate the **loggersLevels** method.
4. Click **Invoke**.
5. From the list next to each log file name for which you want to set the level, select the required log level (OFF, FATAL, ERROR, WARN, INFO, DEBUG, TRACE, or ALL).
6. Click **Update loggers**.

How to Retrieve UCMDB Server Log Files

This task describes how to retrieve UCMDB Server log files.

- **If the UCMDB Server is operational**

- a. Launch the Web browser and enter the following address: **https://localhost:8443/jmx-console**

You may have to log in with a user name and password. (Default user name is **sysadmin**)
- b. Search and click **UCMDB:service=Server Services** to open the JMX MBEAN View page.
- c. Click **executeLogGrabber**.
- d. Click **Invoke**.
- e. Provide the downloaded zip package to Micro Focus Customer Support Service.

- **If the UCMDB server is not operational**

- a. Execute the LogGrabber script: **<UCMDB_Server_Home>/tools/logGrabber/logGrabber.bat**
- b. Clear the content of the following folder: **<UCMDB_Server_Home>/runtime/log**

Make sure NOT to remove the **log** folder itself.
- c. Restart the UCMDB Server.
- d. Allow some time for the problem to reproduce.
- e. Execute the LogGrabber script again: **<UCMDB_Server_Home>/tools/logGrabber/logGrabber.bat**

- f. Collect the most recent LogGrabber archive first from **<UCMDB_Server_Home>/runtime/logGrabber_xxx.zip** and upload it to the Support incident.
- g. Once the upload completes in [step f](#), inform Support and upload the LogGrabber output of [Step a](#).

How to Configure UCMDB to Save User Audit Log to a Remote Machine

UCMDB may be configured to save user audit log on a different remote machine. The communication with the remote machine is usually done using TCP.

On the remote machine, a ServerSocket should be running that listens for connections on a specific port. The port should not be blocked by the firewall.

To start the ServerSocket on the remote machine, run the following command:

```
java -cp log4j-1.2.14.jar org.apache.log4j.net.SimpleSocketServer 4712  
log4jServer.properties
```

where :

- 4712 is the listening port.
- log4jServer.properties is the log configuration file that you should create and place on the Server machine. It will contain all the information about where to write the received logs. Make sure you follow the log4j configuration standards (<https://logging.apache.org/log4j/1.2/manual.html>) when you create the file.

For a sample file, see [log4jServer.properties file example](#) below.

- log4j-1.2.14.jar is needed to start the ServerSocket. It can be obtained from the **<UCMDB_Server_Home>\lib** directory.

On the client machine (where UCMDB is installed), the desired logs should be configured in order to connect to the ServerSocket.

To configure the log on the client machine,

1. Open the log configuration file on the client machine. In the example below, the log file is **reconciliation.properties** from the **<UCMDB_Server_Home>\conf\log** directory.

2. Add the following lines into the file:

```
#####  
### cmdb.reconciliation.appender    ##  
#####  
  
log4j.appender.cmdb.reconciliation.log.appender=org.apache.log4j.net.SocketAppender  
  
log4j.appender.cmdb.reconciliation.log.appender.layout=org.apache.log4j.PatternLayout  
  
log4j.appender.cmdb.reconciliation.log.appender.layout.ConversionPattern=${msg.layout}  
log4j.appender.cmdb.reconciliation.log.appender.Port=4712  
log4j.appender.cmdb.reconciliation.log.appender.RemoteHost=<IP address of the remote host>
```

3. Restart UCMDB.

log4jServer.properties file example

Below is an example of the file:

```
log4j.rootLogger=debug, stdout  
log4j.appender.stdout=org.apache.log4j.ConsoleAppender  
log4j.appender.stdout.Target=System.out  
log4j.appender.stdout.layout=org.apache.log4j.PatternLayout  
log4j.appender.stdout.layout.ConversionPattern=%t %-5p %c{2} - %m%n  
  
log4j.category.cmdb.reconciliation.log=DEBUG,cmdb.reconciliation.log.appender  
  
#####  
### cmdb.reconciliation.appender    ##  
#####  
log4j.appender.cmdb.reconciliation.log.appender=org.apache.log4j.FileAppender  
log4j.appender.cmdb.reconciliation.log.appender.File=cmdb.reconciliation.log  
log4j.appender.cmdb.reconciliation.log.appender.layout=org.apache.log4j.PatternLayout  
log4j.appender.cmdb.reconciliation.log.appender.layout.ConversionPattern=%t %-5p %c{2} - %m%n
```

How to Configure Microsoft IIS as Reverse Proxy for UCMDB Server

1. Prerequisites:

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

2. 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.

3. Right-click **Server Farms** and select **Create Server Farm....**

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

4. 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....**)

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

How to Download a Zip File of Log Files and Thread Dumps

You can produce a zip file that includes all logs and thread dumps. You create the file either through a JMX operation on the client machine, or by running a batch file on the UCMDB Server.

Thread dumps are created periodically: Once a minute, a thread dump snapshot is taken and is saved to a new file in the **C:\UCMDB\UCMDBServer\runtime\log\threadDumps** folder. Thread dump files from the last hour are kept. This folder also holds the ad hoc Server snapshots that are generated during the **logGrabber** execution.

To generate the zip file from the client machine:

1. Launch the Web browser and enter the server address, as follows: **https://<UCMDB Server Host Name or IP>:8443/jmx-console**.

You may have to log in with a user name and password.

2. Under **UCMDB**, click **UCMDB:service=Server services** to open the JMX MBEAN View page.
3. Locate the **executeLogGrabber** operation.
4. Click **Invoke**.

A Server snapshot file with the name **LogGrabber_serverSnapshot_<current date and time>.txt** is created in the following location:

C:\UCMDB\UCMDBServer\runtime\log\threadDumps. This is a thread dump that includes the threads of the Server framework only.

5. In the File Download dialog box, you can open the **logGrabber_<current time>.zip** file, or download it to the client machine.

To generate the zip file from the UCMDB Server:

1. Access the following folder on the UCMDB Server:
C:\UCMDB\UCMDBServer\tools\logGrabber.

2. Run the **logGrabber.bat** file.

The **LogGrabber_<current time>.zip** file is created in the following location:

C:\UCMDB\UCMDBServer\runtime. This is a thread dump that includes the threads of the Server framework only.

How to Enable Validation of the Host Header of a Request

To enable validation of host header of a request based on a regular expression,

1. Access the UCMDB server JMX console: Launch a Web browser and enter the following address: **https://<UCMDB machine name or IP address>:8443/jmx-console**. You may have to log in with a user name and password (default user name: **sysadmin**).
2. Locate **UCMDB:service=Settings Services** and click the link to jump to the Operations table.

3. Locate the **setGlobalSettingValue** operation.
4. To enable validation of host header of a request, provide values for the following parameters for the **setGlobalSettingValue** method:
 - **name:** **security.filter.header.allowed.host**
 - **value:** <enter a JAVA regex that matches a valid host>

For example,

- **mymachine**, will only accept a host header that contains the value **mymachine**.
- **mymachine.*|localhost**, will accept **mymachine.mydomain.com**, **mymachine.subd1.domain1.com** or any domain starting with **mymachine** or **localhost** as host.

The default value of the **security.filter.header.allowed.host** setting is **.***. It affects URLs containing **/ucmdb-ui/** only. For example, **https://localhost:8443/ucmdb-ui/applet/applet.jsp**.

5. Click **Invoke**. The setting takes effect immediately.
6. Restart the whole UCMDB cluster to ensure that the setting is picked up by all readers.

How to Retrieve UCMDB Server Logs for a Specific Time Frame

You can produce a zip file containing all UCMDB server logs for a given time frame. This is intended for support engineers or other users who need to obtain logs for a specific time frame.

To generate the zip file from the client machine:

1. Launch the Web browser and enter the server address, as follows: **https://<UCMDB Server Host Name or IP>:8443/jmx-console**.

You may have to log in with a user name and password.
2. Under **UCMDB**, click **UCMDB:service=Server Services** to open the JMX MBEAN View page.
3. Locate the **executeServerLogParser** operation.
4. Enter the start time in the required format.

5. (Optional) Enter an end time. If you do not provide an end time, the current time that the JMX method is invoked is used.
6. Click **Invoke**.

When the process has finished, the file can be downloaded from the browser.

Limitations

- The zip file is also located on the UCMDB server machine as the **C:\UCMDB\UCMDBServer\runtime\ParsedLogGrabber_<time>.zip** file. For maintenance purposes, this file must be manually deleted.
- The folder **C:\UCMDB\UCMDBServer\runtime\log\ParsedLogs_<date>** is also created and contains the unzipped contents. For maintenance purposes, this file must be manually deleted.
- In high availability UCMDB deployments, this JMX method is running against one server only.
- Only logs from the same date can be parsed.

How to Use the User Activity Log

When troubleshooting a problem in your system, another useful tool is the User Activity log. When activated, this log records all the actions performed on your system, enabling Micro Focus Software Support to reproduce the problem and troubleshoot it.

To activate the User Activity log, first verify that it is enabled:

1. On the UCMDB server, launch the Web browser and enter the following address:
https://localhost:8443/jmx-console

You may have to log in with a user name and password.
2. Click **UCMDB:service=Settings Services** to open the JMX MBEAN View page.
3. Locate the **showSettingsByCategory** method.
4. Enter General Settings as the category name and click **Invoke**.
5. Locate the **mam.web.user.activity.log.enabled** setting and verify that it is set to **true**.
6. If it is set to false, go back to the **Settings Services** page, and select the **setSettingValue** method.
7. Enter **mam.web.user.activity.log.enabled** as the setting and **true** as the value and click **Invoke**.

Next, change the log level to INFO:

1. In the JMX Console, click **UCMDB:service=Server Services**
2. Locate the **loggersLevels** method and click **Invoke**.
3. Locate the **com.hp.ucmdb.uiserver.aspects** logger and select **INFO** from the drop-down list.
4. Click **Update loggers**.

The log is now activated. Perform the actions that led to the problem. The User Activity log automatically records them.

When you are finished, disable the log using the **loggersLevels** method and selecting **ERROR** as the level for the **com.hp.ucmdb.uiserver.aspects** logger.

How to Limit the Number of Concurrent Sessions for System Accounts

This security control addresses certain U.S. government guidelines for limiting the number of concurrent sessions for each account to a configurable number of sessions.

Note:

- You must have administrator privileges to make this change.
- This change will have global impact on all user accounts.

1. From UCMDB UI, go to **Administration > Infrastructure Settings Manager**.
2. In the **Categories** pane, click **Security Settings**.
3. Locate the **Maximum number of sessions allowed per user** parameter and change the value in the **Value** column.

Note: The default value is 0, which means that there is no limit to the number of concurrent sessions an account can have while logging on from different computers.

The change takes effect on your next login to the UCMDB server.

How to Set Up an External Standalone Solr Environment

1. Create and configure the Solr installation directory on the machine dedicated for the Solr engine.
To do this, follow these steps:
 - a. Create the **<Solr_install_dir>** directory.
 - b. Download Apache Solr 7.2.1 from <http://archive.apache.org/dist/lucene/solr/7.2.1>.
 - **Windows:** solr-7.2.1.zip
 - **Linux:** solr-7.2.1.tgz
 - c. Extract the package to the **<Solr_install_dir>** directory.
2. Create and configure the Solr home directory on the machine dedicated for the Solr engine. To do this, follow these steps:
 - a. Create the **<Solr_home>** directory.
 - b. Copy the **<UCMDB_Server_Home>\search\solr_dp\solr.xml** file from the machine where the UCMDB server is installed to the **<Solr_home>** directory.
 - c. Copy the **<UCMDB_Server_Home>\search\solr_dp\configsets** directory from the machine where the UCMDB server is installed to the **<Solr_home>** directory.

Note:

Check if the **schema.xml.bak** file exists in the **<Solr_home>\configsets\ucmdb_configs\conf** folder, and rename it to **schema.xml**.
3. Create **security.json** file and set solr user and password that UCMDB uses to connect to solr.
 - a. Create a **security.json** file using a text editor.

For more details, see ["About the security.json file" on the next page](#).
 - b. Place the **security.json** file into the **<Solr_Home>** folder, with the same level as the **solr.xml** file.
 - c. Go to the **<Solr_install_dir>/bin** directory and open the command prompt.
 - d. Run the following:

```
set SOLR_AUTH_TYPE=basic
```

- e. Run the following:

```
set SOLR_AUTHENTICATION_OPTS="-Dbasicauth=username:password"
```

Example:

```
set SOLR_AUTHENTICATION_OPTS="-Dbasicauth=solr:SolrRocks"
```

4. Start Solr.

To do this, go to the **<Solr_install_dir>\bin** directory in a command prompt, and then run the following command:

```
solr start -p <Solr_port> -s <Solr_home>
```

Example:

```
solr start -s e:\programs\solr
```

Note:

- **<Solr_install_dir>** is the directory where the Solr package is extracted. **<Solr_home>** is the full path to the Solr home you created in [Step 2.a](#).
- To check if Solr is started, go to **http://<solr_machine_name>:8983/solr**, which is the URL for Solr dashboard.
- To stop Solr, run the **solr stop -all** command in the same directory.
- If you do not change the Solr User often, you can also start solr without running `set SOLR_AUTH_TYPE=basic` and `set SOLR_AUTHENTICATION_OPTS="-Dbasicauth=username:password"` from command prompt. To do so, go to the **<Solr_install_dir>/bin** directory and edit **solr.in.cmd** (on Windows) or **solr.in.sh** (on Linux) to uncomment the `SOLR_AUTH_TYPE` and `SOLR_AUTHENTICATION_OPTS` properties in the file.

5. Add the following settings into **<UCMDB_Server_Home>\conf\settings.override.properties**.

```
cmdb.search.solr.standalone=true
```

```
cmdb.search.solr.standalone.url=http://<solr_machine_name>:8983/solr
```

Note:

- The value for `cmdb.search.solr.standalone.url` should be the URL verified in Step 3.
- In a High Availability environment, you have to add the above settings to all the UCMDB nodes from the cluster.

6. Start the UCMDB server.

About the security.json file

The security file **security.json** is introduced for keeping user credentials. This file resembles the following:

```
{
  "authentication":{
    "blockUnknown": true,
    "class":"solr.BasicAuthPlugin",
    "credentials":{"solr":"IV0EHq10nNrj6gvRCwvFwTrZ1+z1oBbnQdiVC3otuq0=
Ndd7LKvVBAAzIF0QAVi1ekCfAJXr1GGfLtRUXhgrF8c="}
  }}
}
```

The above **security.json** file should be used in your first setup of the Solr environment.

This file defines the following:

- Basic authentication and rule-based authorization plugins are enabled.
- The parameter "blockUnknown": true means that unauthenticated requests are not allowed to pass through.
- The default user is **solr**, with the default password **SolrRocks**.

Note:

- You can change the default user and password that UCMDB connects to Solr by using the **setSolrUser** JMX method from the **UCMDB:service=Topology Search Services** category.
- If you set a new user, the default user will be deleted. Only one user is supported for communicating with Solr.

Increase external Solr memory size

By default Solr allocates only 512MB RAM. You might need to increase this setting, depending on the server's RAM and other processes that run on the same server.

The estimated amount of disk space and memory necessary for Solr to run properly are as follows:

	Minimal Recommendation
Memory (RAM)	512 MB / million of CIs
Disk Space	3 GB / million of CIs

To increase Solr memory size,

1. Open the following file using a text editor:

Windows: `<solr_install_dir>\bin\solr.in.cmd`

Linux: `<solr_install_dir>/bin/solr.in.sh`

2. Locate the following setting and increase the setting to a desired value:

- **Windows:**

```
set SOLR_JAVA_MEM=-Xms512m -Xmx2048m
```

where `Xms` is the initial amount, `Xmx` is the total amount of memory allocated.

- **Linux:**

```
SOLR_JAVA_MEM="-Xms512m -Xmx2048m"
```

3. Save the file.

4. Restart Solr.

Go to the `<Solr_install_dir>\bin` directory in a command prompt, and then run the following command:

```
solr stop --all
```

```
solr start -s <Solr_home>
```

5. Restart the UCMDB Server.

How to deploy Solr HA cluster based on Zookeeper

To deploy Solr HA cluster based on Zookeeper, follow these steps:

1. Install the Apache Zookeeper. To do this follow these steps:

- a. Download Apache zookeeper 3.4.10 (<https://archive.apache.org/dist/zookeeper/zookeeper-3.4.10/>).

- b. Unzip the downloaded package.

The path where you unzip the package will be later referred as `<zookeeper_install_dir>`.

- c. Go to the `<zookeeper_install_dir>\conf` folder and rename the `zoo_sample.cfg` file to

zoo.cfg.

- d. Open the **zoo.cfg** file using a text editor.
 - i. Locate the **dataDir** property in line 12.
 - ii. Set its value to a folder of your choice.
Example: `dataDir=D:/zookeeper/dataDir`
 - iii. At the end of the file, add the IP to which you want Zookeeper to listen.
Example:
`clientPortAddress=192.168.168.68`
Otherwise Zookeeper will listen to `0.0.0.0:2181` by default.
 - iv. Save the file.
- e. Go to the **<zookeeper_install_dir>\bin** folder and start the zookeeper by executing the following from the command line:

Windows: `zkServer.cmd`

Linux: `zkServer.sh start`

Now zookeeper is running at **HTTP://<zookeeper_ip>:<zookeeper_port>** (You can change the port in the **zoo.cfg** file).

2. Install Solr in cloud mode. To do this follow these steps:

- a. Download Solr 7.2.1 distribution (<http://archive.apache.org/dist/lucene/solr/7.2.1/>) on a different machine from the zookeeper.

Note: Solr 7.2.1 requires JAVA 8.

JAVA_HOME needs to be set as a system path or environment variable.

- b. Unzip the downloaded package.
- c. Create a directory where Solr is to be located and used as a running directory. You can call this directory **<Solr_Install_Dir>**. Example: **D:\Solr\7.2.1**
 - i. Copy the contents of the Solr package into this directory.
 - ii. Go to the **<Solr_Install_Dir>\server\solr** directory and copy the **solr.xml** file to **<Solr_Install_Dir>**.
- d. Create **security.json** file and set solr user and password that UCMDB uses to connect to solr.

- i. Create a **security.json** file using a text editor.

For more details, see ["About the security.json file" on page 136](#).

- ii. Upload the **security.json** file to the zookeeper using the command:

```
bin/solr zk cp file:<path_to_local_security.json> zk:/security.json -z localhost:2181
```

Example:

```
solr zk cp file:C:\UCMDB\UCMDBServer2\index\security.json zk:/security.json -z localhost:2181
```

where localhost:2181 is the zookeeper address.

- iii. Go to the **<Solr_install_dir>/bin** directory and open the command prompt.
- iv. Run the following:

```
set SOLR_AUTH_TYPE=basic
```

- v. Run the following:

```
set SOLR_AUTHENTICATION_OPTS="-Dbasicauth=username:password"
```

Example:

```
set SOLR_AUTHENTICATION_OPTS="-Dbasicauth=solr:SolrRocks"
```

- e. Start Solr in cloud mode:

- i. To start Solr in cloud mode, execute the following command from the **bin** folder:

```
solr start -cloud -s <Solr_Home> -p 8888 -z <zookeeper_ip>:<zookeeper_port>
```

Example:

```
solr start -cloud -s "C:\UCMDB\UCMDBServer2\index\solr2" -p 8888 -z localhost:2181
```

Or,

```
solr start -cloud -s "D:\Solr\7.2.1\index\solr" -p 9999 -z 16.66.166.166:2181
```

Now Solr is started in cloud mode and it is connected to the zookeeper.

Note: If you do not change the Solr User often, you can also start solr without running `set SOLR_AUTH_TYPE=basic` and `set SOLR_AUTHENTICATION_OPTS="-`

Dbasicauth=username:password" from command prompt. To do so, go to the **<Solr_install_dir>/bin** directory and edit **solr.in.cmd** (on Windows) or **solr.in.sh** (on Linux) to uncomment the SOLR_AUTH_TYPE and SOLR_AUTHENTICATION_OPTS properties in the file.

- f. On a different machine, install another Solr and connect to the zookeeper in the same way.
After this you have a Solr cloud cluster up and running with 1 zookeeper and 2 Solr nodes.
 - g. You can extend Solr cloud cluster by adding more Solr machines to the zookeeper.
3. Configure UCMDB for Solr cloud. To do this follow these steps:
- a. Go to the UCMDB server **JMX console > UCMDB:service=Topology Search Services**.
 - b. Locate the **setupSolrCloudConfiguration** operation.
 - c. Provide values for the parameters and make sure that the setup meets both of the following requirements:
 - $\text{numberOfShards} * \text{replicationFactor} \% \text{numberOfNodes} == 0$
 - $\text{numberOfShards} * \text{replicationFactor} / \text{numberOfNodes} == \text{maxShardsPerNode}$
 - d. Click **Invoke**.
 - e. Restart UCMDB server.

UCMDB server will create the index in Solr based on the configurations you provided in the JMX console.

Note:

- For more information about Solr terminology, see <https://cwiki.apache.org/confluence/display/solr/Solr+Glossary>.
- To view the configurations, invoke the **viewSolrCloudConfigurations** JMX method.
- To revert the configurations, and also clean the Solr cluster, invoke the **cleanupSolrCluster** JMX method.

To view the Zookeeper configuration details, go to https://zookeeper.apache.org/doc/r3.4.10/zookeeperAdmin.html#sc_configuration.

Example

Below is an example of how the index will look like for a UCMDB with 2 customers with the following Solr cloud configuration:

Solr Cloud Configuration:

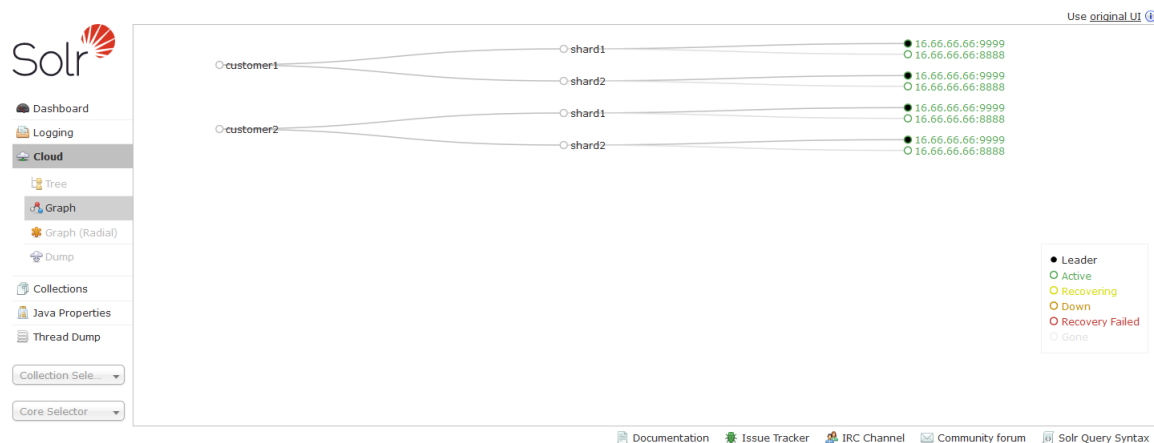
Number of nodes: 2

Number of shards: 2

Replication Factor: 2

Zookeeper URL: 16.66.166.166:2181

Is Solr Cloud enabled: true



You can see that there are 2 indexes, one for each customer, customer1 and customer2.

Each index is split into 2 shards, with shard 1 being on the Solr machine 16.66.66.66:9999 and replicated on Solr machine 16.66.66.66:8888. Shard 2 is also present on both machines. So if a Solr machine shuts down, the index will still be available from the other one, and the users can still perform searches.

About the **security.json** file

The security file **security.json** is introduced for keeping user credentials. This file resembles the following:

```
{
  "authentication":{
    "blockUnknown": true,
    "class":"solr.BasicAuthPlugin",
    "credentials":{"solr":"IV0EHq10Nrj6gvRCwvFwTrZ1+z1oBbnQdiVC3otuq0=
Ndd7LKvVBAAZIF0QAVi1ekCfAJXr1GGfLtRUXhgrF8c="}
  }}
}
```

The above **security.json** file should be used in your first setup of the Solr environment.

This file defines the following:

- Basic authentication and rule-based authorization plugins are enabled.
- The parameter "blockUnknown": true means that unauthenticated requests are not allowed to pass through.
- The default user is **solr**, with the default password **SolrRocks**.

Note:

- You can change the default user and password that UCMDB connects to Solr by using the **setSolrUser** JMX method from the **UCMDB:service=Topology Search Services** category.
- If you set a new user, the default user will be deleted. Only one user is supported for communicating with Solr.

How to configure Solr cloud with Zookeeper Ensemble

ZooKeeper runs in Java release 1.6 (JDK 6) or greater. It runs as an ensemble of ZooKeeper servers. Three ZooKeeper servers is the minimum recommended size for an ensemble, and we also recommend that they run on separate machines.

Note: At Yahoo!, ZooKeeper is usually deployed on dedicated Red Hat Enterprise Linux boxes, with dual-core processors, 2GB of RAM, and 80GB IDE hard drives.

To configure Solr cloud environment with Zookeeper Ensemble, do the following:

1. **Install the Apache Zookeeper on 3 (or more) different machines**
 - a. Download Apache zookeeper 3.4.10 (<http://zookeeper.apache.org/releases.html#download>).
 - b. Unzip the downloaded package.
 - c. Go to the **<zookeeper_install_dir>/conf** folder, rename the **zoo_sample.cfg** file to **zoo.cfg**.
 - d. Edit the **zoo.cfg** file using a text editor and set the **dataDir** property to a folder of your choice. Example, dataDir=D:/zookeeper/dataDir
 - e. In each **zoo.cfg** file, add the 3 zookeepers as follows:

```
tickTime=2000
dataDir=D:/zookeeper/dataDir
clientPort=2181
initLimit=5
syncLimit=2
server.1=davidho1:2888:3888
server.2=davidho2:2888:3888
server.3=davidho3:2888:3888
```

Also, in each **dataDir**, create a file **myid** and add the server ID. The server ID is a number between 1-255, and it must be unique. Also it must correspond with **server.\${id}** in the **zoo.cfg** files. In this example, there should be 3 **myid** files containing the IDs **1**, **2** and **3**.

- f. Go to the **bin** folder and start the zookeeper by executing the following from the command line:

Windows: zkServer.cmd

Linux: zkServer.sh start

Now the zookeepers are running at **<IP_address>:2181** (you can change the port in the **zoo.cfg** file).

2. Install Solr in cloud mode

- a. Download Solr 7.2.1 distribution from <http://www-us.apache.org/dist/lucene/solr/7.2.1/> on a machine different from the zookeeper (Solr 7.2.1 requires JAVA 8).
- b. Unzip the downloaded package.
- c. Setup a solr home folder:
 - i. Create the solr home folder with a structure similar to **<Solr_Install_Dir>\index\solr**.
 - ii. Go to the **<Solr_Install_Dir>\server\solr** folder and copy the **solr.xml** file into the **<Solr_Install_Dir>\index\solr** folder you just created in the step above.
- d. Create **security.json** file and set solr user and password that UCMDB uses to connect to solr.

- i. Create a **security.json** file using a text editor.

For more details, see ["About the security.json file" on page 142](#).

- ii. Upload the **security.json** file to each zookeeper using the following command:

```
bin/solr zk cp file:<path_to_local_security.json> zk:/security.json -z
localhost:9983
```

Example:

```
solr zk cp file:C:\UCMDB\UCMDBServer2\index\security.json  
zk:/security.json -z localhost:2181
```

where localhost:2181 is the zookeeper address.

- iii. Go to the **<Solr_install_dir>/bin** directory and open the command prompt.
- iv. Run the following:

```
set SOLR_AUTH_TYPE=basic
```

- v. Run the following:

```
set SOLR_AUTHENTICATION_OPTS="-Dbasicauth=username:password"
```

Example:

```
set SOLR_AUTHENTICATION_OPTS="-Dbasicauth=solr:SolrRocks"
```

- e. Start solr in cloud mode.

To start solr in cloud mode, execute the following command from the **bin** folder:

```
bin/solr start -cloud -s <path to solr home for new node> -p 8987 -z  
zookeeper_ip:zookeeper_port
```

Example:

```
solr start -cloud -s "D:\solr-7.2.1\index\solr -p 9999 -z  
"davidho1:2181,davidho2:2181,davidho3:2181"
```

Or,

```
solr start -cloud -s "D:\solr-7.2.1\index\solr -p 9999 -z  
"16.51.181.103:2181,16.51.181.104:2181,16.51.181.105:2181"
```

Note: For the zookeepers, enter each of the URLs from the ensemble separated by a comma:

```
16.51.181.103:2181,16.51.181.104:2181,16.51.181.105:2181
```

Now Solr is started in cloud mode and it is connected to the zookeeper.

Note: If you do not change the Solr User often, you can also start solr without running `set SOLR_AUTH_TYPE=basic` and `set SOLR_AUTHENTICATION_OPTS="-Dbasicauth=username:password"` from command prompt. To do so, go to the **<Solr_install_dir>/bin** directory and edit **solr.in.cmd** (on Windows) or **solr.in.sh** (on Linux) to uncomment the `SOLR_AUTH_TYPE` and `SOLR_AUTHENTICATION_OPTS` properties in the file.

- f. On a different machine, install another solr and connect in the same way to the zookeeper.

After this you should have a solr cloud cluster up and running with **3 zookeepers** and 2 solr nodes.

3. Configure UCMDB for solr cloud

- a. Go to the UCMDB JMX console, locate the **setupSolrCloudConfiguration** operation in the **UCMDB:service=Topology Search Services** category.
- b. Fill all values. Make sure that the values meet both of the following requirements:
 - $(\text{numberOfShards} * \text{replicationFactor}) \% \text{numberOfNodes} == 0$
 - $(\text{numberOfShards} * \text{replicationFactor}) / \text{numberOfNodes} == \text{maxShardsPerNode}$
- c. Click **Invoke**
- d. Restart UCMDB server.

UCMDB will create the index in solr based on the values you configured in JMX console.

Note: More information about solr terminology can be found here:

<https://cwiki.apache.org/confluence/display/solr/Solr+Glossary>

- e. To view the configuration, invoke the **viewSolrCloudConfiguration** operation.
- f. To revert the configuration, and also clean the solr cluster, invoke the **cleanupSolrCluster** operation.

Example of how the index looks like for an UCMDB with 2 customers and the below solr cloud configuration:

Solr Cloud Configuration:

Number of nodes: 2

Number of shards: 2

Replication Factor: 2

Zookeeper URL: 16.51.181.103:2181,16.51.181.104:2181,16.51.181.105:2181

Is Solr Cloud enabled: true

View solr cluster state from JMX console

You can use the new JMX method **viewSolrCluster** introduced in the **UCMDB:service=Topology Search Services** category to view the cluster state.

- **Example: Solr Standalone**

Mbean: UCMDB:service=Topology Search Services. Method: viewSolrCluster

```
Solr Live Nodes:
http://localhost:8983/solr
Solr Collections/Cores:
solr.core.customer1
solr.core.customer2
solr.core.analyzer_core
JVM and Disk statistics for localhost:8983/solr:
Solr allocated memory: 512 MB
Solr memory used: 102.46 MB
Solr memory usage: 0.20880398272314035
Total Disk space: 222.59 GB
Available Disk space: 7.14 GB
Index Sizes of Solr Cores:
solr.core.customer1 from node http://localhost:8983/solr 13.59 MB
solr.core.customer2 from node http://localhost:8983/solr 975.51 KB
solr.core.analyzer_core from node http://localhost:8983/solr 11.85 MB
```

- **Example: Solr Cluster**

Mbean: UCMDB:service=Topology Search Services. Method: viewSolrCluster

```
Solr Live Nodes:
169.169.222.222:8888/solr
169.169.222.222:9999/solr
Zookeeper Nodes:
localhost:2181
localhost:2182
localhost:2183
Solr Collections/Cores:
customer1
customer2
Collection shards for customer1:
shard2
shard1
Collection shards for customer2:
shard2
shard1
Replicas for shard shard2 of collection customer1:
customer1_shard2_replica_n4 active
customer1_shard2_replica_n6 active
Replicas for shard shard1 of collection customer1:
customer1_shard1_replica_n1 active
customer1_shard1_replica_n2 active
Replicas for shard shard2 of collection customer2:
customer2_shard2_replica_n4 active
customer2_shard2_replica_n6 active
Replicas for shard shard1 of collection customer2:
customer2_shard1_replica_n1 active
customer2_shard1_replica_n2 active
JVM and Disk statistics for: 169.169.222.222:8888/solr
Solr allocated memory: 512 MB
Solr memory used: 151.14 MB
Solr memory usage: 0.3080185222224876
Total Disk space: 222.59 GB
Available Disk space: 6.95 GB
JVM and Disk statistics for: 169.169.222.222:9999/solr
Solr allocated memory: 512 MB
Solr memory used: 180.96 MB
Solr memory usage: 0.3687826080574927
Total Disk space: 222.59 GB
Available Disk space: 6.95 GB
Index Sizes of Solr Cores:
solr.core.customer2.shard2.replica_n6 from node 169.169.222.222:8888/solr 551.79 KB
solr.core.customer2.shard1.replica_n2 from node 169.169.222.222:8888/solr 540.29 KB
solr.core.customer2.shard1.replica_n1 from node 169.169.222.222:9999/solr 540.31 KB
solr.core.customer2.shard2.replica_n4 from node 169.169.222.222:9999/solr 551.78 KB
solr.core.customer1.shard1.replica_n1 from node 169.169.222.222:9999/solr 7.73 MB
solr.core.customer1.shard1.replica_n2 from node 169.169.222.222:8888/solr 7.69 MB
solr.core.customer1.shard2.replica_n6 from node 169.169.222.222:8888/solr 7.72 MB
solr.core.customer1.shard2.replica_n4 from node 169.169.222.222:9999/solr 7.4 MB
```

About the security.json file

The security file **security.json** is introduced for keeping user credentials. This file resembles the following:

```
{
  "authentication":{
    "blockUnknown": true,
    "class":"solr.BasicAuthPlugin",
    "credentials":{"solr":"IV0EHq10nNrj6gvRCwvFwTrZ1+z1oBbnQdiVC3otuq0=
Ndd7LKvVBAAZIF0QAVi1ekCfAJXr1GGfLtRUXhgrF8c="}
  }}
}
```

The above **security.json** file should be used in your first setup of the Solr environment.

This file defines the following:

- Basic authentication and rule-based authorization plugins are enabled.
- The parameter "blockUnknown": true means that unauthenticated requests are not allowed to pass through.
- The default user is **solr**, with the default password **SolrRocks**.

Note:

- You can change the default user and password that UCMDB connects to Solr by using the **setSolrUser** JMX method from the **UCMDB:service=Topology Search Services** category.
- If you set a new user, the default user will be deleted. Only one user is supported for communicating with Solr.

How to Run Solr in a Different Process than UCMDB

Starting from UCMDB version 10.30, Solr is running by default in a different process than UCMDB. Now, Solr features a Web interface that makes it easy and safe for the users to access it.

To open the Solr's main dashboard, launch the Web browser and enter the following address:
http://localhost:8983/solr.

Note: You can open the Solr's main dashboard through localhost access only.

Every 60 seconds, the UCMDB server verifies if the Solr is running. If for some reason the Solr stops running, the UCMDB server tries three times to restart it.

To change the interval at which the UCMDB Server verifies if the Solr is running:

1. Go to **JMX Console > UCMDB:service=Settings Services > setGlobalSettingValue**.
2. In the **name** field enter **cmdb.solr.fallback.period.in.seconds**.
3. In the **value** field, specify a time interval in seconds. The default value is 60 seconds.
4. Click **Invoke**.
5. Restart the UCMDB Server.

Change the Default Port of the Solr

The default port value (8983) of the Solr 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. In UCMDB, go to **Administration > Infrastructure Settings Manager > General Settings**.
2. In the Name column, choose **The port on which solr will start**.
3. In the **Value** column, change the **8983** to any other port number.
4. Click **Save**.
5. Restart the UCMDB server.

Modify Solr Memory Size

The estimated amount of disk space and memory necessary for Solr to run properly are as follows:

	Minimal Recommendation
Memory (RAM)	512 MB / million of CIs
Disk Space	3 GB / million of CIs

The estimated disk space and memory requirements may vary up or down, depending on the following:

- The CI Types of the indexed CIs.
- The size of the indexed CI's attributes.
- The type of the indexed CI's attributes (string, date, numeric).
- The number of Solr queries expected to run in a certain interval.
- The rate at which the CIs are added/updated/deleted in the index (the data-in rate).

You can change the amount of memory allocated for the Solr's usage as follows:

1. Open the following file using a text editor:

Windows: `<UCMDB_install_dir>\solr\bin\solr.in.cmd`

Linux: `<UCMDB_install_dir>/solr/bin/solr.in.sh`

2. Locate the following setting and modify the setting to a desired value:

- **Windows:**

```
set SOLR_JAVA_MEM=-Xms512m -Xmx2048m
```

where *Xms* is the initial amount, *Xmx* is the maximum amount of memory allocated.

- **Linux:**

```
SOLR_JAVA_MEM=-Xms512m -Xmx2048m
```

Note: By default, the initial amount of memory allocated is 512 MB, and the maximum amount of memory that can be allocated is 2 GB.

3. Save the file.
4. Stop Solr. To do this, go to the **<UCMDB_install_dir>\bin** directory in a command prompt, and then run the following command:

- **Windows:** `solr stop`

- **Linux:** `./solr.sh stop`

Note: After you stop Solr, the UCMDB Server automatically restarts it, and the changed setting takes effect.

How to Configure Maximum Number of Condition Phrases for a Single Node for Solr Search

Solr grammar is configured to support only 2 condition phrases, meaning that you can have only 3 condition words for a single node. This was limited to **2** for performance reasons.

The **cmdb.search.max.condition.phrases** setting available since version 10.22 allows you to configure the maximum number of condition phrases for a single node. By default it has value **2** and can be set using the **setSettingValue** JMX method from **JMX console > Mbean:**

UCMDB:service=Settings Services.

Note: Solr has a search mechanism to take multiple words as a single value by enclosing the searched text with the quotation symbol ("). For example, if you want to search a node named **avaya aic logs error**, you should use the following notation:

node with name **"avaya aic logs error"**

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.

How to Set UCMDB Server Time, Change Time Zone Setting, or Correct System-induced Clock Drift

Note: UCMDB server (also all HA nodes servers) and the database server should be based on UTC time. This helps preventing issues caused by time zone and daylight savings time changes.

When changing the UCMDB server system time backward or forward on the database server, administrators should follow a scenario that eliminates risk of unresponsive servers and/or data inconsistencies (for both standalone or high-availability based UCMDB systems).

To do so,

1. Stop UCMDB server.

In case of cluster environment, stop all the nodes.

2. Perform actions needed to change the system time.
3. On the UCMDB server machine, execute the following command:
 - **Windows:** Go to the **C:\UCMDB\UCMDBServer\tools\dbscripts** folder, and run the following command from command prompt:
dbtool resetClusterConf
 - **Linux:** **/opt/UCMDB/UCMDBServer/tools/dbscripts/dbtool.sh resetClusterConf**
4. Restart UCMDB server.

How to Disable Caching of Generated IDs for CIs, Jobs, and URM Resources

The **-Dcache.usage.id.generation.enabled** setting in the **wrapper.conf** file was introduced for enabling/disabling caching of generated IDs for CIs, jobs, and URM resources.

You may disable the caching in order to use the old cache when necessary, for example, when you encounter heap space consumption issue. To do so,

1. Locate the **C:\UCMDB\UCMDBServer\bin\wrapper.conf** file.
2. Uncomment the following lines:

```
#Enables caching of the generated IDs for CIs, jobs, and urm resources  
#wrapper.java.additional.57=-Dcache.usage.id.generation.enabled=true
```

By default caching is disabled as the above lines are commented out.

3. Restart the UCMDB Server for the change to take effect.

How to Increase the Java Heap Memory Used by the UCMDB UI Java Applet

This can be done using one of the following two methods:

- [Editing the JSP File](#)
- [Editing the Control Panel Java Settings](#)

Editing the JSP File

This change affects all applets launched from the Internet browsers on all different computers from where the UCMDB UI is accessed.

To perform the change on the UCMDB server computer, do the following:

1. Stop the UCMDB Server.
2. Increase UCMDB server's memory.
 - a. Open the **<UCMDB_Server_Home>\bin\wrapper-platform.conf** file.
 - b. Change the values for **wrapper.java.initmemory** and **wrapper.java.maxmemory** to 4GB or greater as follows:

```
wrapper.java.initmemory=4096  
wrapper.java.maxmemory=4096
```

- c. Save the file.

3. Increase UCMDB Applet's memory.
 - a. Open the **<UCMDB_Server_Home>\deploy\ucmdb-ui\applet\applet.jsp** file.
 - b. Change the **java_arguments** parameter value to specify the amount of memory in megabytes, for example, to use 1280 MB, change it as follows:

```
<param name="java_arguments" value="-Xmx1280m -Xms1280m">
```

- c. Delete all files in the following folders:

UCMDB 10.22 or earlier:

- **<UCMDB_Server_Home>\runtime\jetty-cache**
- **<UCMDB_Server_Home>\runtime\jsp**

UCMDB 10.30 or later:

- **<UCMDB_Server_Home>\runtime\jetty-cache**

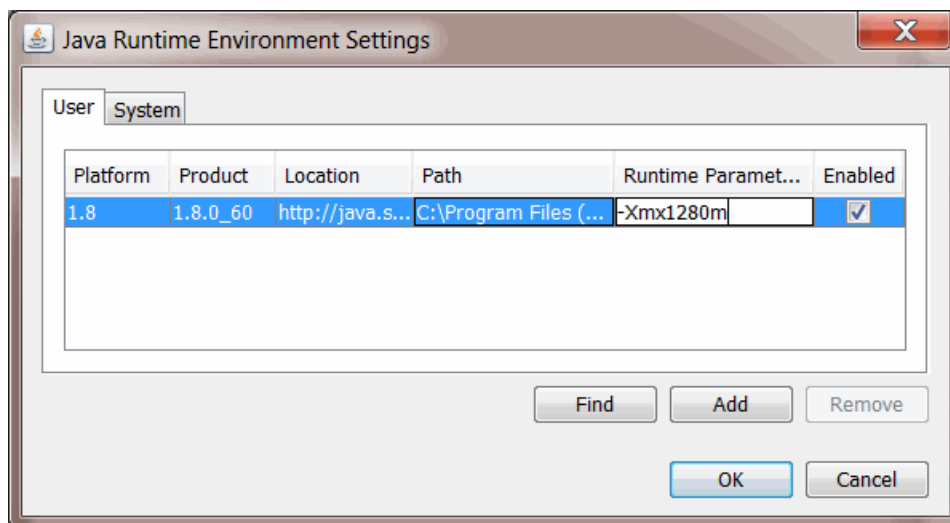
4. Start the UCMDB Server.

Editing the Control Panel Java Settings

This change only takes effect on the computer on which the Internet browser that is used to access the UCMDB UI is run.

To perform the change on the computer which is used for accessing the UCMDB UI, do the following:

1. From the **Start** menu, search **Java**.
2. Click **Configure Java**.
3. In the Java Control Panel, go to the **Java** tab, and click **View**.
4. In the Java Runtime Environment Settings dialog, double-click the value field for the **Runtime Parameters** column, and enter the amount of memory in megabytes in the **-Xmx** command line switch, for example, **-Xmx1280m**.



5. Click **OK**.
6. Click **Apply** and then click **OK**.
7. Close all open Internet browser windows and restart the UCMDB UI.

How to View the KPI Dashboard

You can use the key performance indicator (KPI) dashboard in the JMX console to view the following information of the UCMDB Server:

- Database connection summary
- Discovery processing statistics
- Operations information

Follow these steps to view the KPI dashboard:

1. Launch a web browser and enter the following address: **https://localhost:8443/jmx-console**.
You may have to log in with a user name and password.
2. Locate **KPI:service=Dashboard** and click the link to open the JMX MBEAN View page.
3. Invoke one of the following methods:
 - **viewDbConnectionSummary**: displays database connection summary
 - **viewDiscoveryProcessingStatistics**: displays discovery processing statistics

- **viewOperationsInformation**: displays operations information

Note: The **showHTML** option controls if the information is displayed in the HTML or JSON format.

True: the information is displayed in the HTML format

False: the information is displayed in the JSON format

If the database is Oracle, the **viewDbConnectionSummary** method can gather and display database sessions. To enable this capability, the customer DBA must grant rights to the UCMDB:

- grant select on v_\$session to <db_schema>;
- grant select on v_\$locked_object to <db_schema>;
- grant select on v_\$sqlarea to <db_schema>;
- grant select on v_\$transaction to <db_schema>;

The UCMDB Server regularly exports the information displayed in the KPI dashboard into the following folder: **UCMDBServer/runtime/log/statistics/metrics_json**. The automatic export is performed by a scheduled job: **KPI Dashboard Dump**, which by default runs hourly. The exported files have names that resemble the following examples:

- DbConnectionSummary2016.05.01-11.30.00.json
- DiscoveryProcessingStats2016.05.01-11.30.00.json

If you want to start or stop this automatic export, use one of the following options:

- Activate or deactivate the **KPI Dashboard Dump** job from **Administration > Scheduler**
- Set the **statistics.gathering.enabled** setting to true (activate) or false (deactivate).

Performance Statistics Dashboard

The UCMDB Server automatically captures performance metrics and saves the data statistically in .csv files under the **UCMDBServer\runtime\log\statistics\metrics** folder.

To define the interval (measured in minutes) at which the UCMDB Server gathers performance metrics:

1. In UCMDB, go to **Administration > infrastructure Settings Manager > General Settings**.
2. Locate **Statistics gathering interval** setting and specify a time interval in minutes. The default

value is 15 minutes.

3. Restart the UCMDB Server.

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 ¹²
p75	75% quantile ¹²
p95	95% quantile ¹²
p98	98% quantile ¹²
p99	99% quantile ¹²
p999	99.9% quantile ¹²
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.

Counters are not 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.

Data-in statistics

Metrics	Measurement	Note
data-in.<submodule>	Timer	A breakdown of times in the data in process, by submodule (and submodules of submodules)
data-in.total	Timer	An overall timer from start to end for the data-in operation

UCMDB API Request statistics

Metrics	Measurement	Note
api-executed.<Operation>	Timer	A timer over API requests
api-failed	Counter	A counter that shows the number of failed API requests

Server Session statistics

Metrics	Measurement
server-sessions	Counter

DB Connection statistics

Metrics	Measurement
db-connection-borrowed	Counter
db-connection-borrow-failed	Counter
db-connection-returned	Counter

DB Connection statistics, continued

Metrics	Measurement
db-connection-invalidated	Counter
Connection timers	Timer

DAL statistics

Metrics	Measurement	Note
dal-executed.<sql>	Timer	A timer over the execution of a specific, long-running SQL (>1 minute)
dal-executed	Timer	Overall timer across all DAL executions
dal-failed	Counter	
db-rows-updated	Counter	A counter showing how many rows all the SQLs modified

TQL statistics

Metrics	Measurement	Note
tql-calculation.<tql>	Timer	A timer over the execution of a specific, long-running TQL (>1 minute)
tql-calculation	Timer	Overall timer across all TQL executions
tql-results	Timer	Counter for the total amount of CIs returned by TQL queries so far

Startup statistics

Metrics	Measurement	Note
startup	Timer	A timer over the startup of UCMDB and shows the time needed for the server startup

Operation statistics

Metrics	Measurement	Note
operation-executed.<"sync"/"async">.<CallerApp>.<OperationName>	Timer	Timers over specific operations <ul style="list-style-type: none"> “sync”: the caller is waiting for the operation to finish

Operation statistics, continued

Metrics	Measurement	Note
		<ul style="list-style-type: none">“async”: the operation runs in an async thread
operation-executed."end-to-end".<"sync"/"async">.<CallerApp>.<OperationName>	Timer	Timers that are over end-to-end operations, meaning the operation in the timer name is the first operation in an operation call stack
operation-failed	Counter	A counter that shows the number of failed operations

UI Server statistics

Metrics	Measurement	Note
ui-service-executed.<Service>	Timer	Timers over specific UI Server service calls
ui-service-failed.<Service>	Counter	

JVM statistics

Metrics
"gc"
"buffers"
"memory"
"threads"

Jetty statistics

Metrics
war-context-handler.<context>
root-handler
empty-root-handler
jetty-connections

Jetty Queued Thread Pool

Metrics
utilization
utilization-max
size
jobs

Statistics on overall counters (objects, links, merges) for data-in operations

Metrics	Measurement
merged-cis	Counter
type_changes	Counter
merge-operations	Counter
ignored-from-cmdb	Counter
ignored-from-bulk	Counter
updated-objects	Counter
updated-links	Counter

How to Enable License Usage Tracking

Universal CMDB can report the license usage information to Micro Focus Usage Hub.

To enable this feature, follow the steps below:

Note: Make sure Usage Hub is already set up. Otherwise, this feature does not work.

For more information about Usage Hub, refer to ITOM Marketplace:

<https://marketplace.microfocus.com/itom/content/usage-hub>

1. In UCMDB, select **Administration > Infrastructure Settings > General Settings**.
2. Set the **License usage tracking** setting to **True**.
3. Specify the URL of the Usage Hub service in the **license.usage.tracking.hub.name** setting.
4. Restart the UCMDB Server.

How to Use the External JAR Configuration File

Starting from 10.30, you can customize the **service-config.xml** file from a JAR file and save it to the following directory to override the default configurations of the JAR file:

<UCMDB_Server_Home>\conf\service-config\<the_same_path_as_in_the_JAR>

The directory structure under the **service-config** folder must be the same as the path to the **service-config.xml** file in the JAR file. For example, the following directories are for **authorization.jar** and **reconciliation.jar** respectively:

- **<UCMDB_Server_Home>\conf\service-config\services\authorization\service-config.xml**
- **<UCMDB_Server_Home>\conf\service-config\services\reconciliation\service-config.xml**

If a correctly configured **service-config.xml** file is present in the above location, the UCMDB server no longer loads the default configurations from the corresponding JAR file. Instead, the UCMDB server only loads the configurations specified in this external **service-config.xml** file for the corresponding JAR file.

Note: After you configure the external **service-config.xml** file as mentioned above, you need to restart the UCMDB server for the changes to take effect.

As an example of how to do this, see *How to Modify the Maximum Thread Numbers of the Data In Service* in the *Data Flow Management section of the UCMDB Help*.

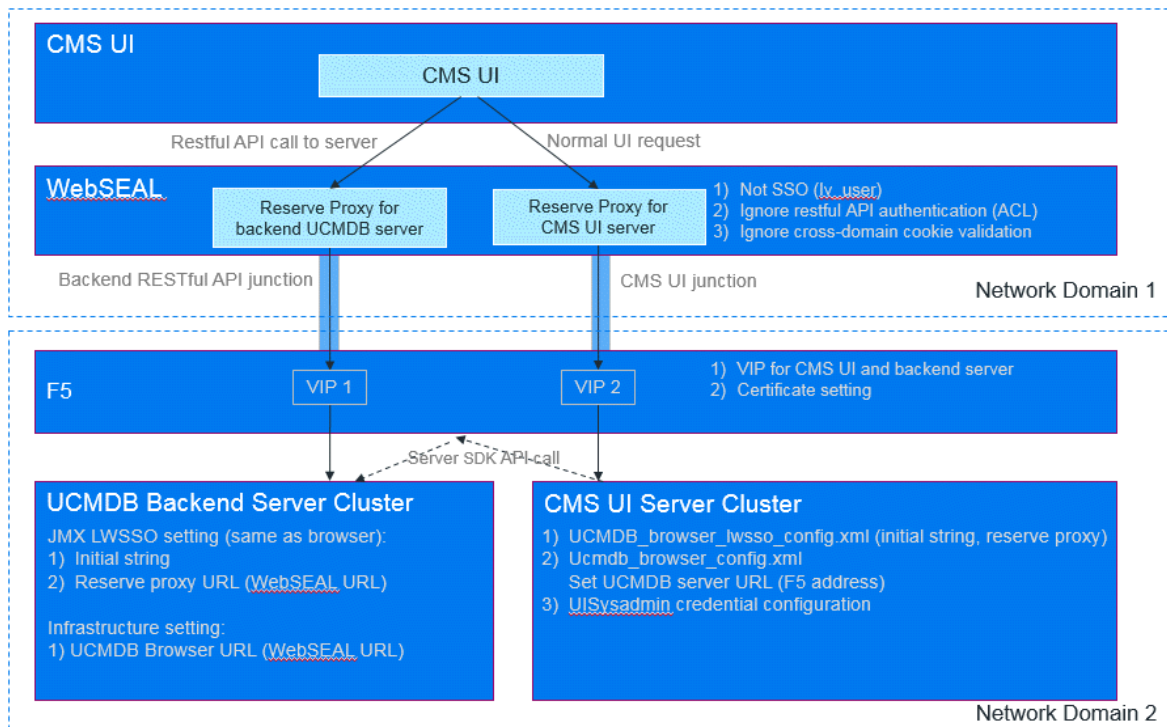
How to set up UCMDB server and CMS UI environment with F5 BIG-IP load balancer and WebSEAL reverse proxy

This end-to-end use case describes how to set up a high-availability UCMDB and CMS UI environment with F5 BIG-IP load balancer and WebSEAL reverse proxy.

Note: Product versions used in this end-to-end use case:

- F5 BIG-IP version 13.00 Build 0.0.1645 Final
- WebSEAL version 8.0.1.0
- UCMDB version 2018.08
- CMS UI Standalone version 2018.08

The diagram below illustrates the overall architecture of the environment we will set up.



This case contains the following key tasks:

1. UCMDB Server configuration
2. F5 load balancer configuration
3. WebSEAL reverse proxy configuration
4. CMS UI configuration
5. Verify the configured environment works

1. UCMDB Server configuration

a. Prerequisites

- i. You have installed the UCMDB Server and CMS UI.
- ii. (Optional) You have set up high availability mode by following the instructions in the Deployment Guide: "Set Up High Availability Mode".

b. **Export the out-of-the-box UCMDB server keystore to a cert file**

If using the out-of-the-box (OOTB) UCMDB cert, export it for later use.

To export the UCMDB server keystore (**server.keystore**) to a cert file (**server.cert**), do the following:

- i. Open the command prompt and run the following command:

```
C:\UCMDB\UCMDBServer\bin\jre\bin\keytool.exe -export -alias  
<certificate alias> -keystore <Keystore file path> -file  
C:\UCMDB\UCMDBServer\conf\security\server.cert
```

where:

- **certificate alias** is the name given to the certificate.
- **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:\UCMDB\UCMDBServer\conf\security\server.cert
```

Note: If self-signed certificate is not used, but a company generated certificate, use the following command to get the alias for this certificate:

```
C:\UCMDB\UCMDBServer\bin\jre\bin\keytool.exe -list -keystore  
c:\ucmdb\ucmdbserver\conf\security\server.keystore
```

Keystore type: JKS

Keystore provider: SUN

Your keystore contains 1 entry.

<alias>, 14 Sept. 2012, PrivateKeyEntry.

Certificate fingerprint (SHA1):

2A:52:DF:17:D9:A5:37:2D:1F:1D:BA:4B:41:46:33:A8:18:42:5B:D7

The alias will look like: {45789-15478-1236-7895}

Use this alias to export the certificate.

- ii. Enter the keystore password.
- iii. Verify that the certificate was created in the following directory:
C:\UCMDB\UCMDBServer\conf\security\server.cert
- iv. Convert the generated JKS file into PKCS12 format using UCMDB key tool **keytool.exe** (located in the **<UCMDBServer>\bin\jre\bin** directory). (WebSEAL requires PKCS12 format cert.)

Run the following command:

```
C:\UCMDB\UCMDBServer\bin\jre\bin\keytool.exe -importkeystore -  
srckeystore server.keystore -destkeystore server.p12 -srcalias  
<source serverkey> -destalias <target serverkey> -srcstoretype jks -  
deststoretype pkcs12 -srcstorepass <keystore password> -  
deststorepass <keystore password> -noprompt
```

The `server.p12` file is the resulting PKCS12 format cert.

c. **(Single Sign-On only) Set IDM User Name**

- i. Go to UCMDB server JMX console.
- ii. Locate the **setUserName** JMX operation under the **UCMDB-UI:name=LW-SSO Configuration** category.
- iii. Provide the following parameter values for the **setUserName** JMX method:
 - **Is inbound handler enabled:** True
 - **LW-SSO IDM User Name:** <The real value for the IDM user name>. For example, **iv-user** (if you are using LDAP with user **iv-user**).
- iv. Click **Invoke**.

d. **Set CMS UI URL**

- i. In UCMDB UI, go to **Administration > Infrastructure Settings Manager**.
- ii. Locate the **UCMDB Browser URL** infrastructure setting, and set the value to your WebSEAL URL.



2. F5 load balancer configuration

- a. Make sure you have a working F5 BIG-IP load balancer environment.
- b. Log in to the F5 BIG-IP load balancer environment.
- c. Make sure you have created the following in the F5 BIG-IP load balancer environment (**Local**

Traffic > Virtual Servers > Nodes|Pools):

- A node for each of the virtual machines on which UCMDB server and/or CMS UI are running.
 - A pool that contains all the above nodes.
- d. Import the UCMDB CA cert/key into F5.
- i. In the navigation pane, go to **Main > System > Certificate Management**.
 - ii. Click **Import** .
 - iii. In the SSL Certificate/Key Source page, select Import Type:
 - When selecting **Certificate**, do the following:
 - **Certificate Name:** Keep **Create New** selected and provide the certificate name.
 - **Certificate Source:** Keep **Upload File** selected, click **Browse...** to select the UCMDB **server.cert** file you exported earlier.
 - When selecting **Key**, do the following:
 - **Key Name:** Keep **Create New** selected and provide the key name.
 - **Certificate Source:** Keep **Upload File** selected, click **Browse...** to select the UCMDB key file.
 - iv. Click **Import** .
- e. Add UCMDB CA cert/key to Certificate Key Chain.
- i. In F5, go to **Local Traffic > Virtual Servers > Profiles > SSL**.
 - ii. Select and click an existing UCMDB cert profile.

Note: Create a SSL profile for HTTPS by clicking **Create** if you do not have one.
 - iii. Go to the Certificate Key Chain configuration setting, click **Add** .
 - iv. In the Add SSL Certificate to Key Chain dialog, select or provide values for the following settings as appropriate and click **Add** :
 - Certificate:** Select the UCMDB certificate file.
 - Key.** Select the UCMDB key.
 - Chain.** Select the UCMDB chain.
 - Passphrase.** Provide a pass phrase.

- f. Create a cookie-based persistence profile.
 - i. In F5, go to **Local Traffic > Virtual Servers > Persistence**, and click **Create** .
 - ii. Select **Cookie** for Persistence Type and provide a name for the persistence profile.
 - iii. Click **Finished**.
- g. Create a virtual server.
 - i. In F5, go to **Local Traffic > Virtual Servers**, and click **Create** .
 - ii. Specify values the following settings:
 - **Configuration > HTTP Profile:** **http**
 - **Configuration > SSL Profile (Client):** Select the UCMDB cert you imported in [step 2.e](#) from the **Available** column and add it into the **Selected** column.
 - **Configuration > Source Address Translation:** **Auto Map** (If you select SNAT, make sure you configure SNAT related settings properly)
 - **Resources > Default Persistence Profile:** Select the persistence profile you created in [step 2.f](#).
 - iii. Provide values for other settings as appropriate.
 - iv. Click **Finished**.

3. WebSEAL reverse proxy configuration

- a. Configure WebSEAL reverse proxy by following IBM official documentation: [IBM Security Access Manager \(ISAM\) Reverse Proxy Scenario](#).

Important: During the configuration, in the Identity tab of the Edit a Standard Junction window, make sure you set the following settings as described below:

- **Junction Cookie:** Leave the checkbox unselected
- **Include session cookie:** Select the checkbox
- **HTTP Basic Authentication Header:** For CMS UI and RESTful API authentication to work properly, select **Ignore** from the dropdown list.
- (Optional) **HTTP Header Identity Information:** Select **IV-USER** if you are using LDAP with user **iv-user**.

- b. Import UCMDB cert (OOTB or self-signed).

- i. In IBM Security Access Manager, go to **Manage > Secure Settings > SSL Certificate**.
- ii. Go to **Manage > Edit SSL certificate database** menu option, and select **pdsrv**.
- iii. Go to the **Personal Certificates** tab, check if the OOTB UCMDB cert (for example, **ucmdbcert**) is already listed in this tab.
- iv. If no, select **Manage > Import** from the menu.

Provide the self signed certificate from the CMS UI/UCMDB Server or the OOTB UCMDB cert.

Make sure the cert type is **PKCS12**. If not PKCS12, you may need to convert it to PKCS12 from JKS.

Note: The OOTB UCMDB cert can be converted to PKCS12 using UCMDB key tool **keytool.exe** (located in the **<UCMDBServer>\bin\jre\bin** directory). For the conversion command, see [step 1.b.iv](#) in [UCMDB Server configuration](#).

4. CMS UI configuration

- a. Configure the **ucmdb_browser_config.xml** file.
 - i. Open the **ucmdb_browser_config.xml** file (located in the **<CMS_UI_install_dir>\conf** folder) using a text editor.
 - ii. Set the **<hostname>** parameter value to the VIP that you set in F5.
 - iii. Set the **<host_port>** parameter to the Port that you set in F5.
 - iv. (Single Sign-on only) If you are using LDAP with user **iv-user**, locate the **<webui>** tags, then the **<validation>** tags, copy and paste the following into the file:

```
<in-ui-identity-management>
  <identity-management>
    <userNameHeaderName>iv-user</userNameHeaderName>
  </identity-management>
</in-ui-identity-management>
```

- v. Save the file.
- b. Create and configure a credentials file.
 - i. Create a **credentials.txt** file and put it in the same directory as the **ucmdb_browser_config.xml** file.
 - ii. In the file **credentials.txt**, enter the following content:

- user=UISysadmin
 - password=<your-password>
- iii. Save the file.

5. Verify the configured environment works

To do so, log in to any of the following:

Environment	Login URL	Remarks
WebSEAL	https://<WebSEAL URL>:<port><WebSEAL Junction>	Including CMS UI, UCMDB server, and API
F5	https://<VIP>:<port>	Including CMS UI and UCMDB server
CMS UI	https://<CMS UI IP address>:<port>	
UCMDB Server	https://<UCMDB Server IP address>:<port>	

Troubleshooting F5 load balancer

Problem: In a very rare case, you might find UCMDB server is displayed as down or not available in F5 monitor.

Workaround: This might be caused by the difference between the F5 interval setting and the duration that garbage collector requires to run on UCMDB server. For example, the default value for the **Interval** setting is **5** seconds in F5 (**Local Traffic > Monitors > Browser > Properties**); on UCMDB server, in a very extreme case, the garbage collector needs more than 5 seconds to complete a run (normally it takes only 2 seconds or so to complete a run), which makes the UCMDB writer server in the high availability environment busy with garbage collection and F5 monitor fails to detect the UCMDB writer server status.

In case you encounter such extreme case, to resolve the issue, increase the **Interval** setting in F5 environment (**Local Traffic > Monitors > Browser > Properties**) to a desired value. Normally the default **Interval** value of **5** seconds should be sufficient.

To determine the total duration needed for running garbage collector on the UCMDB server, you can check for the longest duration that the garbage collector takes in the **<UCMDBServer>\runtime\log\wrapper.log** file.

How to Enable UCMDB Support for Microsoft Azure

Overview

Microsoft Azure provides resources such as databases, virtual machines, networks, projects and many other into one Cloud based portal for a successful management of your applications.

To connect UCMDB to Microsoft Azure, the following types of resources are required:

- **Virtual machines.** This resource provides Windows and Linux machines in a matter of seconds.
- **SQL databases.** This resource manages relational databases as a service.

You can connect UCMDB to Microsoft Azure using the following methods:

- SQL database service provided by Azure
- SQL server installed in Azure environment

Prerequisites

- Create virtual machines in Microsoft Azure, according to the recommendations provided in the *Sizing section of the UCMDB Help*. For detailed information about how to create a virtual machine in Microsoft Azure, see Azure online documentation at: <https://docs.microsoft.com/en-us/azure/>.
- Create an SQL database service in Microsoft Azure, according to the recommendations provided in the *Sizing section of the UCMDB Help*. For detailed information about how to create an SQL database service in Microsoft Azure, see Azure online documentation at: <https://docs.microsoft.com/en-us/azure/>.

How to deploy UCMDB in Microsoft Azure using SQL Database service provided by Azure

To deploy UCMDB in Microsoft Azure using SQL Database service provided by Azure, follow these steps:

1. Connect to the virtual machine created in Azure using any remote manager, and then install the UCMDB Server without configuring the schema. For detailed information about how to install the Universal CMDB server, see the interactive *Universal CMDB Deployment Guide*.
2. Check if the `<UCMDB_Install_Dir>/UCMDBServer/conf/jdbc.properties` file exists. If not, create it.

Note: The `jdbc.properties` file must be encoded in ANSI. If the file is UFT-8 encoded, the properties will be ignored.

3. Check if the following settings are added in the `jdbc.properties` file. If not, add them.

```
SQLServer = ddmssql  
ddmssql.EncryptionMethod=SSL
```

4. In the `UCMDBServer/bin/wrapper.conf` file, set the following:

wrapper.java.additional.60=-Dazure.enabled=true

Note: The default value is **False**.

5. Create the schema using the SQL Database service provided by Azure.
6. Start the Configuration Wizard.
7. In the Configuration Wizard, select **Connect to an existing schema**.

Note: Run the configure file in Administrator mode to make sure you have access to the file.

8. Provide the following values, and then click **Finish**.
 - **hostname:** your_azure_server_name
 - **schema name:** your_azure_db_name
 - **port:** 1433
 - **Username:** your_azure_server_username
 - **Password:** your_azure_server_password
9. Click **Done** to finish the installation.
10. Start UCMDB service.

How to deploy UCMDB in Microsoft Azure using an SQL server installed in Azure environment

To deploy UCMDB in Microsoft Azure using an SQL server installed in Azure environment, follow these steps:

1. Create two virtual machines in Microsoft Azure, start them, and then connect to them. For detailed information about how to create a virtual machine in Microsoft Azure, see Azure online documentation at: <https://docs.microsoft.com/en-us/azure/>.
2. Install the SQL server on one of the virtual machines created.
3. Install the UCMDB server on the other virtual machine.
4. Connect the UCMDB server to the SQL server.

Note: In a high availability environment you have to add the internal IP address for the virtual machines that have the UCMDB installed on them, and then turn off the Windows Firewall on those virtual machines.

How to Disable History for Specific Object CITs

There are use cases where history is not needed for all CITs, for example, inventory CIs or leaf CIs. In such case, you can disable history for specific **object CITs**. This means that basically unneeded data will not be stored. This capability also has a positive impact on the following:



- Overall throughput of the reconciliation engine - Since less calls are made to UCMDB database in order to insert CIs.
- Performance of history related reports or history tasks (baseline, purging) - Since less CIs will be stored in history tables of UCMDB database, SQL statements will run faster.

How to disable history for specific object CITs


When the **CIT_NOT_TRACKED_FOR_HISTORY** qualifier is assigned to an object CIT, **no CI** events (*add*, *update*, *delete*) will be stored to history for all instances of the selected CIT as well as **all incoming and outgoing links related**.

You can set the **CIT_NOT_TRACKED_FOR_HISTORY** qualifier for a class from UCMDB UI. Note that for the first time when you set it, it is not displayed by default, you need to manually add it to the desired CIT, see [step 3](#) below.

To disable history for a specific object CIT:

1. In UCMDB UI, go to **Modeling > CI Type Manager**.
2. In the CI Types panel, select a desired object CIT, and then go to the **Qualifiers** tab in the right window.
3. Add the **CIT_NOT_TRACKED_FOR_HISTORY** qualifier for the selected CIT.
 - If the qualifier does not exist in the left Qualifiers panel, copy and paste it into the text field in front of the **Insert**  button at the bottom of the window, and then click **Insert** .

The qualifier is added to the right Configuration Item Type Qualifiers panel directly.

- If the qualifier already exists in the left Qualifiers panel, move it to the right Configuration Item Type Qualifiers panel.
4. Click **Save**  to save the change for the selected CIT.

The history is disabled for the selected object CIT.

Also, the **CIT_NOT_TRACKED_FOR_HISTORY** qualifier is added to the left Qualifiers panel of the Qualifiers tab for other object CITs.

Note:

- The qualifier is not applied to child classes.
- This feature works only for object CITs (no link CITs).

The history of the links related to instances of the selected CITs will not be saved to history as well.

Baseline/purging/complement layout history operations will NOT run for such CITs.

- This feature has an impact on the snapshot functionality. If there are CITs saved by snapshots that have disabled history, then those CITs will not appear in the snapshots.

When history is disabled for a specific CIT, the following operations will be done:

- Drop all history tables for the selected CIT.
- Remove all history partitions from UCMDB for the selected CIT.
- Remove all related links from history tables for all instances of the selected CIT

These operation may take longer depending how many instances of the selected CIT are there in the environment as well as the UCMDB load and UCMDB database performance. As a baseline for an idle UCMDB server (no user or discovery activity and a database properly configured and maintained as documented in *Database section of UCMDB Help*), disabling history for a CIT with 1 million instances and ~3.5 million related links should not take more than 10 minutes.


Once the operation ends, the history for the selected CIT will not be stored anymore, and the old history data is dropped. It is recommended to check logs to ensure that the all operations tasks ended successfully. For details, see ["Troubleshooting - Disable History for Specific Object CITs" on the next page](#).

Note:

- All history data will be removed for the selected CIT and it cannot be recovered. It is recommended to make a database dump beforehand.
- When checking history details for such CITs in IT Universe Manager, nothing is displayed. Similar for related CITs and links, no history data should be available regarding the CIT for which history was disabled.

How to re-enable history for specific CITs

In case the history is needed for CITs for which the history was disabled, you can re-enable the history by doing the following:

- Remove the **CIT_NOT_TRACKED_FOR_HISTORY** qualifier for the desired CITs.
 - a. In UCMDB UI, go to **Modeling > CI Type Manager**.
 - b. In the CI Types panel, select the desired object CIT, and then go to the **Qualifiers** tab in the right window.
 - c. Move the **CIT_NOT_TRACKED_FOR_HISTORY** qualifier for the selected CIT from right Configuration Item Type Qualifiers panel to the left Qualifiers tab.
 - d. Click **Save** .

This creates the history partitions and history tables (empty) for the selected CIT.

- Add existing CIs to the created history tables (create a baseline for existing instances)
 - a. Access the UCMDB server JMX console: Launch a Web browser and enter the following address: **https://<UCMDB machine name or IP address>:8443/jmx-console**. You may have to log in with a user name and password (default user name: **sysadmin**).

- b. Search for the **initializeHistoryDBFromModel** JMX method.
- c. In the value field for **customerID**, provide your customer ID. (Default: 1)
- d. In the value field for **ciType**, enter the desired CIT (for example, **installed_software**).

Note: Only one CIT can be entered.

- e. Click **Invoke**.

Note:

- You can only add object CITs. Note that the related links will not be added.
- If the same method is invoked for links, then all links history will get removed.

Troubleshooting - Disable History for Specific Object CITs

In case of investigation, if history was disabled for specific CITs, the logs can provide useful information if the operation finished successfully or why it failed. The logs to check are history logs (mainly **history.classmodel.changes.log**), **error.log** and **cmdb.dal.log**.

For example, if you successfully disabled the history for the **installed_software** CIT, you should see the following log messages:

```
----- Starting alignment for class installed_software -----
--
Align will be done for all descendant classes of class [installed_software]
Class [installed_software] should not store history events anymore, going to
remove history tables
About to remove partition registry for class [installed_software].
Done removing partition registry for class [installed_software].
About to remove history table [HDM_L_170910INSTALL_182931014].
Done removing history table [HDM_L_170910INSTALL_182931014].
About to remove history table [HDM_RL_INSTALLED_SOFTWARE_1].
Done removing history table [HDM_RL_INSTALLED_SOFTWARE_1].
About to remove history table [HDM_170910INSTALL_182931014].
Done removing history table [HDM_170910INSTALL_182931014].
About to remove history table [HDM_R_INSTALLED_SOFTWARE_1].
Done removing history table [HDM_R_INSTALLED_SOFTWARE_1].
About to remove class [installed_software] from HDM_ROOT table
Done removing class [installed_software] from HDM_ROOT table
About to remove related history links for class [installed_software].
Retrieved 2,671,197 objects from memory took 452 ms
Retrieved 3,382,173 related links from memory took 36,850 ms
```

```
About to delete from root link table
deleted 565,119 rows
Entries from root link table deleted successfully
About to delete from links history tables
deleted 419,028 rows
deleted 146,091 rows
Entries from links history tables deleted successfully
Done removing related history links for class [installed_software].
----- Finished alignment for class installed_software -----
--
```

To double check that the CITs have been deleted from history tables, you can use the following SQL statements. The count should match with the ones in the logs or should show 0 when running against **HDM_ROOT_1** and **HDM_Root_Link_1** tables.

- Check that CIs were deleted from HDM_ROOT_1 table

```
select count(*) from HDM_ROOT_1 where OBJECT_CLASS='installed_software'
```

- Check the links that were deleted

Taking **installed_software** as an example (the related links history tables may vary (usage, composition)).

Check the number of related links to instances of the CIT that was disabled history

```
select count(*) from link_1 l where l.end2_id in (select cmdb_id from CDM_
INSTALLED_SOFTWARE_1)

select count(*) from link_1 l where l.end1_id in (select cmdb_id from CDM_
INSTALLED_SOFTWARE_1)
```

- Check the number of related links that will be removed from HDM_Root_Link_1 table

```
SELECT count(*) from HDM_root_link_1 where CMDB_ID IN (select l.CMDB_ID from
link_1 l , cdm_root_1 r where l.END1_ID=r.CMDB_ID and r.A_ROOT_
CLASS='installed_software')
SELECT count(*) from HDM_root_link_1 where CMDB_ID IN (select l.CMDB_ID from
link_1 l , cdm_root_1 r where l.END2_ID=r.CMDB_ID and r.A_ROOT_
CLASS='installed_software')
```

- Check the number of related link that will be removed from links history tables (the links history tables may vary (usage, composition))

```
SELECT count(*) from HDM_170910CONTAINMENT_1 where CMDB_ID IN ( select
l.CMDB_ID from link_1 l , cdm_root_1 r where l.END2_ID=r.CMDB_ID and r.A_
ROOT_CLASS='installed_software')
SELECT count(*) from HDM_170910CONTAINMENT_1 where CMDB_ID IN ( select
```

```
l.CMDB_ID from link_1 l , cdm_root_1 r where l.END1_ID=r.CMDB_ID and r.A_
ROOT_CLASS='installed_software')
```

The following logs should be seen when removing the qualifier from UI(enabling history for the selected CIT):

```
INFO [qtp1197761641-589] - ----- Starting alignment for class
installed_software -----
INFO [qtp1197761641-589] - Align will be done for all descendant classes of class
[installed_software]
INFO [qtp1197761641-589] - Start align for Class [installed_software]
INFO [qtp1197761641-589] - Class installed_software is new (has no registry of
current table name). Going to create history tables for it.
INFO [qtp1197761641-589] - Going to create history tables for class installed_
software
INFO [qtp1197761641-589] - Table name for class installed_software: HDM_
170510INSTALL_867021642
INFO [qtp1197761641-589] - Created table HDM_170510INSTALL_867021642 for class
[installed_software]
INFO [qtp1197761641-589] - Created table for removed CIs HDMR_INSTALLED_SOFTWARE_
1 for class [installed_software]
INFO [qtp1197761641-589] - Created table for removed CIs HDMR_INSTALLED_SOFTWARE_
1 for class [installed_software]
INFO [qtp1197761641-589] - Created list attributes table HDML_170510INSTALL_
867021642 for for class [installed_software]
INFO [qtp1197761641-589] - Created list attributes table for removed CIs HDMRL_
INSTALLED_SOFTWARE_1 for for class [installed_software]
INFO [qtp1197761641-589] - Created list attributes table for removed CIs HDMRL_
INSTALLED_SOFTWARE_1 for for class [installed_software]
INFO [qtp1197761641-589] - Finished to create history tables for class installed_
software
```

For large environments, adding the CIT_NOT_TRACKED_FOR_HISTORY qualifier may take longer depending on the environment activity and its performance as well as UCMDB Database performance. If the operation fails with an operation timeout or sql query timeout increase the timeout specified and add the qualifier again after a server restart.

If the operation fails with an error, the CIT_NOT_TRACKED_FOR_HISTORY qualifier should be added to the CIT, and it should work as expected. However, not all history instances were deleted from history tables. You can check these instances directly in the database using similar SQL queries like the ones presented above. (Only the tables names and class name should match the required CIT). Same queries can be converted to delete statements to clean the history tables from CI instances that should be removed.

How to Monitor High Availability Cluster with Endpoint /ping

The endpoint **/ping** allows monitoring of the High Availability cluster. So far the endpoint could be configured to ask for the status of:

- entire cluster (writer + readers)
- only writer

The **restrictToReader** parameter was added to the aforementioned endpoint that returns the status of only the readers in the cluster.

To configure this, the endpoint **/ping** should be called with the following parameter:

restrictToReader=true

For example, **/ping:8443?restrictToReader=true**

Note: In case both **restrictToWriter** and **restrictToReader** parameters are present and have the value set to **true**, for example,

/ping:8443?restrictToReader=true&restrictToWriter=true

Only the parameter **restrictToWriter** will be taken into account.

As a best practice for deployments that rely heavily on CMS UI, we recommend the use of a UCMDB HA Cluster with at least three nodes (one writer and two readers).

For this type of deployment, we recommend that two virtual IPs are created on the load balancer:

- One that points only to the writer, the endpoint for health check is: **<UCMDB_URL>/ping?restrictToWriter=true**
- In case that the cluster contains 2 or more reader servers, one endpoint that points to all the reader servers. The endpoint for health check is: **<UCMDB_URL>/ping?restrictToReader=true**
- In case that the cluster contains 1 reader server, one endpoint that points to all the servers (reader and writer). The endpoint for health check is: **<UCMDB_URL>/ping**

The health check endpoint will return:

- status code 200 and the payload "Up" if the application is started successfully.
- status code 503 and the payload "Down" if the application is not yet fully started.

Note that other elements can affect the health check process, in this case the load balancer can get an error similar to "Connection refused".

How to Create and Enable a Custom Login and Logout Splash Screen

In some cases, you may require users to acknowledge something (for example, legal or security restrictions) before they can log in to UCMDB. To do this, you can display a splash screen that requires user confirmation before the login screen is displayed. When enabled, the splash screen is displayed before users log in to the following UCMDB components:

- CMS UI
- Admin UI
- JMX Console

The splash screen is disabled by default.

Create a Custom Splash Screen

The splash screen is composed of an image of your choice, together with an **OK** button for the user to acknowledge the content of the splash screen. Note that the text on the button is not customizable; therefore, you should ensure that any text incorporated into the image is appropriately answered by "OK".

To create the image displayed on the splash screen, use a file that meets the following requirements:

- Format is .svg
- Size is under 2 MB
- Does not include any scripts
- File is stored on the UCMDB server (in a suite environment, the .svg file must be stored in the following suite mounted folder: `/var/vols/itom/itsma/itsma-itsma-global/custom-splash/ucmdb/`)

Enable a Custom Splash Screen

To enable a custom splash screen, follow these steps:

1. Go to **JMX Console > UCMDB-UI:name=Custom Splash Screen > uploadSplashScreenFromFile**.
2. In the **Value** field enter the path to the .svg file that you want to use as the splash screen image. For example, enter `"/ucmdb/custom-splash/test.svg"`.
3. Click **Invoke**.
4. Go to **JMX Console > UCMDB-UI:name=Custom Splash Screen > enableCustomSplashScreen**.
5. In the **Value** field, select the **true** option.
6. Click **Invoke**. The splash screen is enabled immediately; you do not need to restart the UCMDB server.

To confirm whether a custom splash screen is enabled or disabled, invoke the **isCustomSplashScreenEnabled** JMX method.

Note: You can also enable a custom splash screen by using the **cmdb.custom_splash_screen.enabled** infrastructure setting. To do this, click **Administration > Infrastructure Settings Manager > Enable Custom Splash Screen**, and then set the value of the **Current Value** field to "True".

Splash Screen Behavior

- When the splash screen is displayed, users must click **OK** in order to log in. There is no other method to clear the splash screen.
- Once a user has clicked **OK** in the splash screen, the splash screen is not displayed again in the Admin UI or JMX Console until the browser is restarted. However, the splash screen is displayed again in CMS UI after the user logs out, the browser is closed, or the session expires.
- Multi-customer environments do not support custom splash screens, as the (customer-specific) splash screen is displayed before the user is able to select a customer.

(Suite Only) How to Set the IP for Access to the UCMDB JMX Console in SMA Suite Mode

When using UCMDB in the Service Management Automation (SMA) suite mode, you can allow only the configured IP to access the UCMDB server JMX Console.

Note: You must have administrator privileges to make this change.

To do so,

1. From UCMDB UI, go to **Administration > Infrastructure Settings Manager**.
2. Locate the **Set IP which is allowed to access JMX console in SMA suite mode** setting.

For example, you can select **Name** for **Filter by column**, and then type **IP** in the text field to locate the setting.
3. In the **Value** column, specify the IP that you want to allow access to the UCMDB server JMX Console.

Note: Only one IP can be set.

4. Restart the UCMDB server.

History Storage and Purging in UCMDB

History Storage

Universal CMDB stores history for all CIs and relationships. By default, history is stored for all attributes of a CI or relationship. You can configure specific CIT attributes to be excluded from history storage by selecting the **Not Tracked for History** qualifier for those attributes. For details on editing CIT attributes, see "Add/Edit Attribute Dialog Box" in the *Modeling section of the UCMDB Help*.

Baseline Process

Stored history events for CIs and relationships are grouped by CI type. For each CI type, the history events for each CI instance are stored by monthly periods with a separate database table for each monthly period. At the beginning of each table, the current data for all CIs and relationships is recorded. Such history entries are known as a **baselines**. The **Baseline Process** is the mechanism that creates a new table and records the baseline entries in the history.

The Baseline Process runs at the date and time fixed as the start time of a period. This value is defined using the **history.baseline.defined.start.date setting** in the **override.properties file** located in the **\UCMDB\UCMDBServer\conf** folder. The setting stores the day of the month in the first 2 digits and the hour in the last 2 digits (with a space between the day and the hour). The setting applies to all CI types, and the Baseline Process runs at the specified hour on the specified day in each month. The default value for the setting is **10 00**, which means that by default, the Baseline Process runs at midnight on the 10th of each month.

If the server was down at the start time of the period, the Baseline Process runs at the predefined baseline hour on the next day that the server is running, and creates all the required tables. If the Baseline Process failed to run at the start of a new period, and a new table was not yet created, then all history events after the start of the new period are temporarily stored in the previous period's table. The events are moved to the appropriate monthly table the next time the Baseline Process runs and creates a table for the new period.

Note:

- Values between 01 and 28 are valid for the day of the month setting; values between 00 and 23 are valid for the hour setting.
- The starting hour of the Baseline Process should not be the same as the starting hours of the History Purging or Aging processes.
- Because the Baseline Process affects the population integration performance, schedule the Baseline Process to run at an appropriate distance from the discovery process time.
- Enabling/disabling server setting **automatically adjust clock for daylight saving time** may result in corrupting the history partitions. It is recommended to choose the setting value for this at the installation time and then do not change it back.

History Purging

Universal CMDB purges the stored history data periodically. The default setting schedules purging once every 24 hours at night. You can configure the purging schedule using the following history infrastructure settings:

- **History Scheduler Hour Of The First Run.** The scheduled time of the first purge.
- **History Scheduler Interval.** The number of hours between purges.

When purging runs, it permanently deletes all history data prior to a certain time, except for the CIs and relationships that were removed from the CMDB. The removed CI and relationship data is stored in a different table for an additional specified period of time. You can configure the number of months of historical data to store using the following history infrastructure settings:

- **History Months To Save Back.** The number of months of historical data to save. Any data older than this is purged. The default value is 3 months.

Note: During the upgrade to version 10.20 or later, all snapshots older than the period defined for saving history are deleted. All custom reports based on such snapshots will be empty.

- **History purging extra months to save back removed data.** The number of extra months to store the removed CI and relationship data after it is purged. If this value is set to 0, the data is not saved for an additional period.

Note: Purging cannot be disabled. It begins running according to the set schedule immediately after server startup.

How to View and Delete History Partitions

The **PurgeHistoryTroubleshooting** JMX method in the **UCMDB:service=History DB Services** category allows users to view history partitions and generate SQL statements for deleting the history partitions.

Check partitions

To check all partitions from DB and UCMDB, do the following:

1. On the UCMDB server, launch the Web browser and access JMX console by providing the following address: **https://localhost:8443/jmx-console**.

You may have to log in with a user name and password.

2. Locate the **PurgeHistoryTroubleshooting** JMX method in the **UCMDB:service=History DB Services** category.
3. Select **False**.
4. Click **Invoke**.

The result page displays the partitions corresponding to the values from the infrastructure settings **History Months To Save Back** and **History purging extra months to save back removed data**.

Mbean: UCMDB:service=History DB Services. Method: purgeHistoryTroubleshooting

UCMDB_HIST_PARTITIONS (hist_YYMM)	Rows_count
hist_1804	1
hist_1805	1
hist_1806	763
DB_HIST_PARTITIONS (hist_YYMM)	Rows_count
hist_1804	1
hist_1805	1
hist_1806	1470
other_tables	2541

Delete partitions

You can view all partitions from UCMDB (records in the URM_RESOURCES table) and DB (physical tables in DB), and also generate the delete statements.

To delete partitions, do the following:

1. View partitions and generate delete statements
 - a. On the UCMDB server, launch the Web browser and access JMX console by providing the following address: **https://localhost:8443/jmx-console**.

You may have to log in with a user name and password.
 - b. Locate the **PurgeHistoryTroubleshooting** JMX method in the **UCMDB:service=History DB Services** category.

- c. Select **True**.
- d. Click **Invoke**.

The returned result page displays all partitions from UCMDB (records in the URM_RESOURCES table) and DB (physical tables in DB), and also the delete statements generated.

The delete statements are generated depending on the values from the infrastructure settings **History Months To Save Back** and **History purging extra months to save back removed data**.

Mbean: UCMDB:service=History DB Services. Method: purgeHistoryTroubleshooting

UCMDB_HIST_PARTITIONS (hist_YYMM)	Rows_count
hist_17	1
hist_1801	1
hist_1802	1
hist_1803	1
hist_1804	1
hist_1805	1
hist_1806	763
DB_HIST_PARTITIONS (hist_YYMM)	Rows_count
hist_17	1
hist_1801	1
hist_1802	1
hist_1803	1
hist_1804	1
hist_1805	1
hist_1806	1470
other_tables	2541

Copy this statement and then run it in the DB context in order to delete old UCMDB history partitions from URM_RESOURCES.

```
DELETE FROM URM_RESOURCES WHERE TYPE = 'History_HIST_PARTITIONS' AND ( 1 = 2
or TEXT_DATA like '%HDM_16%' or TEXT_DATA like '%HDM_16%'
or TEXT_DATA like '%HDM_17%' or TEXT_DATA like '%HDM_17%'
or TEXT_DATA like '%HDM_1801%' or TEXT_DATA like '%HDM_1801%'
or TEXT_DATA like '%HDM_1802%' or TEXT_DATA like '%HDM_1802%'
or TEXT_DATA like '%HDM_1803%' or TEXT_DATA like '%HDM_1803%');
GO
```

Copy this statement, and then run it in the DB context. The output will be a set of DROP TABLES statements which needs to be run in the DB context for the actions to take place.

```
select 'DROP TABLE ' + name + ';' + CHAR(10) + 'GO' from sys.tables WHERE (1 = 2
or name like '%HDM_16%' or name like '%HDM_16%'
or name like '%HDM_17%' or name like '%HDM_17%'
or name like '%HDM_1801%' or name like '%HDM_1801%'
or name like '%HDM_1802%' or name like '%HDM_1802%'
or name like '%HDM_1803%' or name like '%HDM_1803%');
```

In the screenshot above, you can see that there exists partitions from last year (2017 - “hist_17”) until June 2018 (“hist_1806”).

2. Delete partitions

- a. To delete old **UCMDB history partitions** (from the URM_RESOURCES table), copy the first statement from the result page and then run it in the DB context.

```

4  DELETE FROM URM_RESOURCES WHERE TYPE = 'History_HIST_PARTITIONS' AND ( 1 = 2
5  or TEXT_DATA like '%HDM_16%' or TEXT_DATA like '%HDML_16%'
6  or TEXT_DATA like '%HDM_17%' or TEXT_DATA like '%HDML_17%'
7  or TEXT_DATA like '%HDM_1801%' or TEXT_DATA like '%HDML_1801%'
8  or TEXT_DATA like '%HDM_1802%' or TEXT_DATA like '%HDML_1802%'
9  or TEXT_DATA like '%HDM_1803%' or TEXT_DATA like '%HDML_1803%');
10 GO
11
100 %
Messages
(4 row(s) affected)

```

- b. To delete old **DB history partitions**, copy the second statement from the result page and then run it in the DB context.

```

15 select 'DROP TABLE ' + name + ';' + CHAR(10) + 'GO' from sys.tables WHERE ( 1 = 2
16 or name like '%HDM_16%' or name like '%HDML_16%'
17 or name like '%HDM_17%' or name like '%HDML_17%'
18 or name like '%HDM_1801%' or name like '%HDML_1801%'
19 or name like '%HDM_1802%' or name like '%HDML_1802%'
20 or name like '%HDM_1803%' or name like '%HDML_1803%');
00 %
Results Messages

```

	(No column name)
1	DROP TABLE HDM_171210INTERFACE_1; GO
2	DROP TABLE HDM_180110INTERFACE_1; GO
3	DROP TABLE HDM_180210INTERFACE_1; GO
4	DROP TABLE HDM_180310INTERFACE_1; GO

- c. The output will be a set of DROP TABLE statements which needs to be run in the DB context for the actions to take place.

```

23 DROP TABLE HDM_171210INTERFACE_1;
24 GO
25 DROP TABLE HDM_180110INTERFACE_1;
26 GO
27 DROP TABLE HDM_180210INTERFACE_1;
28 GO
29 DROP TABLE HDM_180310INTERFACE_1;
30 GO
100 %
Messages
Command(s) completed successfully.

```

3. After running the scripts on DB, check if all old history partitions were cleaned, by invoking the same **PurgeHistoryTroubleshooting** JMX method with the flag setting to **False**.

Logging

The calls of the **PurgeHistoryTroubleshooting** JMX method are logged in the **history.purge.log** file (<UCMDBServer>\runtime\log) along with the timestamp, DB stored procedure used, value of parameters (settings).

When invoking **PurgeHistoryTroubleshooting** with the flag setting to **true**, both DB stored procedures (SPU_SHOW_HIST_PARTITIONS and SPU_DELETE_HIST_PARTITIONS) will be executed; whereas invoking it with the flag setting to **false**, only the SPU_SHOW_HIST_PARTITIONS procedure will be executed.

```
2018-07-09 11:52:14,374 INFO [qtp1403217169-6441] - (purgeHistoryTroubleshooting JMX method) -  
Calling stored procedure SPU_SHOW_HIST_PARTITIONS with the following parameters: monthsToSaveBack= 3  
and extraMonthsToSaveOldRemovedData= 1  
2018-07-09 11:52:15,511 INFO [qtp1403217169-6441] - (purgeHistoryTroubleshooting JMX method) -  
Calling stored procedure SPU_DELETE_HIST_PARTITIONS with the following parameters: monthsToSaveBack= 3  
and extraMonthsToSaveOldRemovedData= 1
```

UCMDB Services

View the Status of Universal CMDB Server Services

On the UCMDB Server machine, open your client browser and enter **https://localhost:8443/status**.
The **Status** and **Detailed Status** of all services are displayed, indicating whether the Universal CMDB services are running (Up) or are down (Not Started).

Note: In case there are services that are not running, contact Micro Focus Support.

Status		
Customer Name	Customer ID	6154786
Default Client	1	Up

Detailed Status	
Component	Default Client
	6154786ee6ae_1512435998746
browser_resources	Up
folders	Up
fcmdb-config	Up
configuration	Up
model_statistics	Up
reconciliation_conf	Up
model_topology	Up
tql	Up
docker	Up
authorization	Up
scheduler	Up
enrichment	Up
view	Up
tql_tracker	Up
world	Up
histDB	Up
cla_queue	Up
msg_sync	Up
content-install	Up
system-health	Up
model	Up
cmdb_mod_not	Up
recon-analyzer	Up
licensing	Up
classModel	Up
cmdb_sys_tqls	Up
fcmdb-management	Up
tql_res_utils	Up
impact	Up
mapping-engine	Up
packaging	Up
topology-search	Up
grouping	Up
reconciliation	Up
cmdb_view	Up
model_update	Up
framework	Up
correlation	Up

Universal CMDB Services

The Universal CMDB services are described in the following table:

Service Name	Description of Service
authorization	Responsible for the security model enforcement (users, roles, tenants, and so on).
autodiscovery	Responsible for Data Flow Management-related services.
Browser_resources	Responsible for managing the UCMDB Browser module related resources like categories.
cla_queue	Responsible for Client level authorization.
cla_statistics	Responsible for Client level authorization.
classModel	Responsible for maintaining the class model in the CMDB.
cmdb_mod_not	Responsible for notifications of changes that occur in the CMDB.
cmdb_sys_tqls	Responsible for the conditions applied to TQL nodes, and the condition results that are stored in the system TQL.
cmdb_view	Responsible for calculating view definitions over TQL results (the transformation from graph to tree is given the view definition).
cmdb_widget_tracker	Responsible for managing UCMDB Browser module widgets.
configuration	Responsible for snapshots, CI change queries, and TQL/View History queries.
content-install	Responsible for managing the content packs.
correlation	Responsible for Universal CMDB impact, root cause, and correlation subsystems.
data-acquisition	Responsible for managing integrations.
enrichment	Responsible for executing both ad hoc and active enrichments.
fcmdb-config	A cache mechanism for federated data that allows basic FCMDB services before the FCMDB is fully loaded.
fcmdb-management	Responsible for managing the adapters, federation, and the data push flow.
folders	Responsible for managing the folder hierarchy for every type of resource.

Service Name	Description of Service
framework	Responsible for dispatching operations within the UCMDB server.
generic_adapter_manager	Responsible for generic adapter related operations.
grouping	Responsible for holding the different bundles that allow the classification of resources.
histDB	Responsible for saving changes to CIs and relationships in the CMDB.
impact	Responsible for Universal CMDB impact, root cause, and correlation subsystems.
licensing	Responsible for license management.
mapping-engine	Used by the integrations. Allows reconciliation during a federated TQL calculation.
model	Responsible for mapping CIs from external data sources to local CMDB CIs.
model_statistics	Allows running database optimization operations. These operations are run in various scenarios, such as history, upgrade, and JMX.
model_topology	Responsible for loading the model topology graph (an internal data structure that contains all CIs and relationships without properties and often allows avoiding database queries).
model_update	Responsible for managing updates to the class model in the CMDB.
msg_sync	Messaging service for asynchronized history change messages.
offline_tql	Responsible for managing and executing queries needed for CI tracking in the UCMDB Browser module.
packaging	Responsible for packages. Packages are zip files containing resources that are structured in organized, predefined subdirectories.
reconciliation	The CMDB's data population reconciliation service. Responsible for the reconciliation engine of Universal CMDB.
reconciliation_conf	Handles the reconciliation configuration such as identification rules and reconciliation priority configuration
report	Responsible for Universal CMDB report services, such as adding, editing, and removing System reports, calculation of Asset reports, Node Dependency reports.
scheduler	Responsible for scheduling offline tasks.
softwarelibrary	Software library (Teaching server) service for SAI editor/Express Teaching operations

Service Name	Description of Service
state_management	Responsible for managing states.
system-health	Responsible for gathering a storing server related statistics.
topology_search	Responsible for search engine related services.
tql	Responsible for TQL calculations.
tql_res_utils	Responsible for TQL result maintenance (active) and layout retrieval.
tql_tracker	Responsible for managing UCMDB browser module CI tracking.
view	Responsible for part of the business logic of the Modeling Studio, including "watch".
world	A central repository for configuration information that is gathered from the various Universal CMDB and third-party applications and tools. This information is used to build Universal CMDB views.

UCMDB Server Ports

The following ports are used by the UCMDB server:

Protocol	Port	Process	Description
TCP	8080	ucmdb_server.exe	Default Jetty HTTP port. Note: Disabled by default in 10.30 and later. To enable HTTP communication, see "How to Enable HTTP Communication for Universal CMDB" in this guide.
TCP	8443	ucmdb_server.exe	Default Jetty HTTPS port.
TCP	8444	ucmdb_server.exe	Default Jetty HTTPS port with client authentication.
TCP	7800 – 7810	ucmdb_server.exe	Default JGroups port (HA).
UDP	7600 – 7610	ucmdb_server.exe	Multicast JGroups port (HA).

Protocol	Port	Process	Description
TCP & UDP	7500	ucmdb_server.exe	Default JGroups diagnostic port (HA).
TCP	29601	ucmdb_server.exe	JMX remote port (JBoss – RMI Agent).
TCP	1024 – 65535	ucmdb_server.exe	Callback port on UI server (used by RMI).
TCP	32000 – 32999	wrapper.exe	Port used by the wrapper.exe process to communicate with the UCMDB Server JVM process.
TCP	31000 – 31999	wrapper.exe	Port used by the UCMDB Server JVM process to communicate with the wrapper.exe process.
TCP	5431	PostgreSQL	Default port for local installed PostgreSQL database.

UCMDB Integration Service Ports

The following ports are used by the UCMDB Integration Service:

Port	Description
1977	Data Flow Probe's web application port. Used for JMX console and other web services.
8453	Data Flow Probe's secured web application port. Same as 1977, and is used for the JMX console and other web services if the Jetty HTTPS mode is enabled.
1777	Port used by the Tanuki wrapper.

UCMDB Log Files

CMDB log files enable you to perform basic troubleshooting of CMDB runtime problems. Additionally, by tracking the CMDB behavior in the log files, you can examine the effects of changes made in the system. The CMDB is composed of subsystems and each subsystem records to several log files. CMDB Server logs have consistent format. The order is data and time: **(format "yyyy-MM-dd hh:mm:ss:SSS") logLevel [Thread Name]**. The wrapper log is an exception to this standard. These settings can be changed from log properties files located in the **UCMDBServer\conf\log** folder.

Log files are located in:

- **Windows:** C:\UCMDB\UCMDBServer\runtime\log
- **Linux:** /opt/UCMDB/UCMDBServer/runtime/log

Note: UCMDB log levels should be set to the OOTB values. They may be increased when investigating issues. However, after obtaining the required information the log levels should be reverted. Increased log levels for a longer period of time may have an impact over performance.

If you want to delete the logs, you should delete the content in the **log** folder only, and never delete the folder itself. Make sure that the **log** folder always exists. If the **log** folder is deleted accidentally, create the **log** folder manually before starting up the UCMDB Server.

This section includes the following topics:

- ["General Log Files" below](#)
- ["Class Model Log Files" on page 191](#)
- ["TQL Log Files" on page 192](#)
- ["Data-In Log Files" on page 193](#)
- ["History Log Files" on page 194](#)
- ["Enrichment Log Files" on page 196](#)
- ["Dal Log Files" on page 196](#)
- ["Authorization Log Files" on page 197](#)
- ["UCMDB UI Log Files" on page 198](#)
- ["SAML Authentication Log File" on page 199](#)
- ["Data Flow Management Log Files" on page 199](#)

General Log Files

Quota Log Parameters

The log name is **cmdb.quota.log**.

Log File	Description
Purpose	Quota names, quota values, and current quota levels.

Log File	Description
Information Level	Quota names and values set in the server and customer levels during a customer load.
Error Level	CMDB operations that fail because they exceed quota limits.
Debug Level	A count collector runs every n minutes and gathers current counts for all quotas. Collected counts are logged.
Basic Troubleshooting	If operations fail because of quota limits, check the count growth and quota values.

CMDB Operation Statistics Log

The log name is **cmdb.operation.statistics.log**.

The log does not appear in the log folder by default. Only when you perform some specific action, the log becomes available. For example, when you invoke the **resetOperationStatistics** JMX method from the **Framework Services** category, it resets CMDB Server Operation Statistics and writes dump to this log.

Log File	Description
Purpose	Statistics for all operations performed in the past 15 minutes including worst operation instances.
Information Level	Statistics per operation including operation class name, caller application, and customer ID. Default of 10 worst operation instances.
Error Level	Disables the statistics feature.
Debug Level	Not available.
Basic Troubleshooting	Check when there is a performance slowdown.

Configuration Log

The log name is **configuration.log**.

Log File	Description
Purpose	Contains basic environment details, including: <ul style="list-style-type: none">• Server version and CUP version• Database vendor and version

Log File	Description
	<ul style="list-style-type: none">• Content pack version• High Availability configuration• Data Flow Probe version• Changes to settings (each setting is audited in the log)
Information Level	Information is written to the log when the system starts up or when a setting is changed.
Error Level	Not available.
Debug Level	Not available.
Basic Troubleshooting	Used by Customer Support to help reproduce customer problems.

Keystore and Truststore Password Save Log

The log name is **save_store_pass.log**.

Log File	Description
Purpose	Information about installation log: keystore password and truststore password save time and encryption type.
Information Level	Operation details.
Error Level	Not available.
Debug Level	Not available.
Basic Troubleshooting	This is especially useful when installing and starting the UCMDB server. You can use this log information together with the information in Troubleshooting Keystore and Truststore .

Keystore and Truststore Password Verify Log

The log name is **verify_store_pass.log**.

Log File	Description
Purpose	Information about the installation log: whether keystore password and truststore password are saved correctly or not. If server-storepass.conf exists, then the UCMDB server installer will change keystore and truststore passwords with keytool.
Information	Operation details.

Log File	Description
Level	
Error Level	Not available.
Debug Level	Not available.
Basic Troubleshooting	This is especially useful when installing and starting the UCMDB server. You can use this log information together with the information in Troubleshooting Keystore and Truststore .

Long Running Threads Troubleshooting

The log name is **slow.log**.

Log File	Description
Purpose	This log file is used to troubleshoot long running threads and operations.
Information Level	A list of slow running threads with operations will be displayed. A list of all managers and their load will also be displayed. Finally a list of open connections to the database will be displayed.
Error Level	Errors about collecting the information about the threads will be displayed. All threads interrupted due to operation timeout will be displayed.
Debug Level	No information.
Basic Troubleshooting	If an operation takes a lot of time you will see it in this log. If an operation is interrupted you will see it in this log.

Class Model Log Files

CI Type Model Log

The log name is **cmdb.classmodel.log**.

This log should appear when you perform operations on the UCMDB class model, like creating a new CI Type, or adding an attribute on an existing CI Type.

Log File	Description
Purpose	CI Type Model errors and debug messages.
Information	When a CI Type Model is loaded, incorrect definitions are logged as informational

Log File	Description
Level	messages. An example of an incorrect definition is <code>duplicate attributes</code> .
Error Level	Not available.
Debug Level	<p>Every CI Type update includes the following:</p> <ul style="list-style-type: none"> • Original CIT in XML format • New CIT in XML format • Differences between the CITs <p>If the CI Type Model update is rejected, the reason is logged.</p>
Basic Troubleshooting	<p>Compares the differences that the server finds between the original CIT and the new CIT. This is useful to understand the following scenarios:</p> <ul style="list-style-type: none"> • A CIT in a package failed • An action in the CIT browser applet failed • An action in the CIT browser applet succeeded when it should have failed

TQL Log Files

CMDB Notification Log

The log name is **cmdb.notification.log**.

Log File	Description
Purpose	<p>Notification messages from the time of the component's creation in the CMDB until the client's listener receives a message.</p> <p>Most components receive configuration changes from the CMDB in push mode, by the notification mechanism, rather than in pull mode.</p>
Information Level	<ul style="list-style-type: none"> • Startup and shutdown of publishers • Register and unregister remote and internal listeners
Error Level	<ul style="list-style-type: none"> • Errors when messages are published • Errors when messages are received
Debug Level	<ul style="list-style-type: none"> • Unique message ID • Number of changes that a message includes as well as more details according to the type of the message (for example, the TQL result version)

Log File	Description
	<ul style="list-style-type: none"> JMS header properties
Basic Troubleshooting	<p>If an application does not receive a notification, check the following:</p> <ul style="list-style-type: none"> a listener is registered with the appropriate notification filter a message is published with data that matches this filter a message is received by the listener (use the unique message ID to verify)

Data-In Log Files

CMDB Model Audit Short Log

The log name is **cmdb.model.audit.short.log**.

Log File	Description
Purpose	<p>Information about a CI Type operation: type of operation, data received as input, and what happened to the data in each CIT.</p> <p>Also contains information about the caller application, execution time, and persistency time.</p>
Information Level	Operation details.
Error Level	Not available.
Debug Level	Not available.
Basic Troubleshooting	<p>If there are no changes when there should be, check the following:</p> <ul style="list-style-type: none"> Whether the operation exists. Whether the input is correct. What happened to the data. There may have been a false update. <p>This is especially useful when running DFM to trace the input.</p>

History Log Files

History Log

The log name is **history.log**.

Log File	Description
Purpose	Records general history events
Information Level	<ul style="list-style-type: none">• Auto completion events• Auto complete table lock/unlock messages• Tenants bitmask column size handling• Delete customer fuse notice
Debug Level	<ul style="list-style-type: none">• Auto completion details• History Root table handling messages

History Audit Update Log

The log name is **history.update.audit.log**.

Log File	Description
Purpose	Tracks events saved in the History tables
Information Level	<ul style="list-style-type: none">• Details all events stored in the history tables• Event statistics
Debug Level	Database statistics

History Partition Log

The log name is **history.partition.log**.

Log File	Description
Purpose	<ul style="list-style-type: none">• Records history partition data.• Records the Baseline process events.
Information Level	<ul style="list-style-type: none">• Add/Remove partition history tables• Baseline events

Log File	Description
	<ul style="list-style-type: none">• Baseline statistics
Error Level	<ul style="list-style-type: none">• Table partition failures• Baseline process failures

Query History Log

The log name is **history.queries.log**.

Log File	Description
Purpose	Records all the queries performed on the history tables.
Information Level	<ul style="list-style-type: none">• Query condition• Query results summary
Error Level	Fuse exceeded
Debug Level	<ul style="list-style-type: none">• Query condition details• Query result details

History Class Model Changes Log

The log name is **history.classmodel.changes.log**.

Log File	Description
Purpose	Tracks all the class model changes that affect the history tables.
Information Level	Class aligning messages
Error Level	Errors that occurred during class aligning

History Purging Log

The log name is **history.purge.log**.

Log File	Description
Purpose	Records the History purging process events
Information Level	Purging process information
Error Level	Errors that occurred during the purging process
Debug Level	Details about purged data

Enrichment Log Files

CMDB Enrichment Log

The log name is **cmdb.enrichment.log**.

Log File	Description
Purpose	<ul style="list-style-type: none">• Enrichment definitions: adding, updating, removing, and calculating.• Calculation results such as how many CIs were added, how many relationships were removed, and so forth.• Supplies the reason for a calculation failure. Failure in a model update, however, is not included since it is an asynchronous execution.
Information Level	<ul style="list-style-type: none">• Add, update, and remove enrichment definitions.• Add, update, and remove CIs or relationships to or from a model.
Error Level	Calculation failure.
Debug Level	Traces the enrichment calculation process.
Basic Troubleshooting	<ul style="list-style-type: none">• If no calculation was carried out, check the definition of add enrichment.• If there are no results, check the finish calculate entry.

Dal Log Files

CMDB Dal Log

The log name is **cmdb.dal.log**.

Log File	Description
Purpose	Information about activity that occurred in the data access layer, the layer that works with the CMDB.
Information Level	Not available.
Error Level	<ul style="list-style-type: none">• Connection pool errors• Database errors• Command execution errors

Log File	Description
Debug Level	<ul style="list-style-type: none">• All DAL commands executed• All SQL commands executed
Basic Troubleshooting	<p>If you suspect that CMDB actions are taking too long, check the time spent on queries and updates in the DAL logs and operation logs.</p> <p>Exception details and ID are entered into the log. The exception ID appears in the exception itself.</p>

Authorization Log Files

CMDB Authorization Management Log

The log name is **security.authorization.management.log**.

Log File	Description
Purpose	Audit all modifications related to the authorization model.
Information Level	<ul style="list-style-type: none">• Creation and deletion of users, user groups, tenants, roles, and resource groups.• Addition and removal of users from user groups, changes to user passwords, and changes in users' default tenants.• Addition and removal of permissions from roles and changes in read-only status of roles.• Addition and removal of resources from resource groups.• Changes in user role assignments.• Changes in resource tenant associations.
Error Level	Failure to create or modify authorization resources, such as trying to create a user with an existing name.
Debug Level	Web services login requests.
Basic Troubleshooting	May be used to track why a user no longer has a specific permission.

CMDB Authorization Permissions Log

The log name is **security.authorization.permissions.log**.

This log contains detailed information for authorization and out-of-the-box information. To enable the print of information, you may need to set the log level to **DEBUG**.

Log File	Description
Purpose	Debug authorization permissions queries.
Debug Level	Print all existing permissions for the user currently logged in, whenever they are queried in the server.
Basic Troubleshooting	<p>To check a specific permission issue, turn on the debug level, perform the action in the UI, turn the debug level off, and check the log for the existing permissions of the user.</p> <p>It is not recommended to keep this log at debug level, because it generates a large amount of printed output.</p>

UCMDB UI Log Files

Client-side Applet Logs

The following client side applet logs are also available:

- **applet-operations.log**. Tracks the operations that are executed from the CMDB UI to the UCMDB server.
- **applet-general.log**. General log for the UI.
- **applet-cacheStatistics.log**. Tracks statistics of the UI cache.
- **applet-missing_resources.log**. Missing resources log.
- **applet-applet-tasks.log**. Logs task executions.
- **applet-timeMeasure.log**. Log for measuring performance.
- **applet-memoryTracker.log**. Tracks the memory usage of the UI.
- **applet-errors.log**. Logs the errors that occurred in the UI

Note: UCMDB UI log files are present in the **%Temp%/UcmdbLog/log** folder on the machine from which you access the UCMDB UI.

SAML Authentication Log File

cmdb.samlAuthentication.log

This log file contains all log information related to SAML Authentication. By default, the log level is set to **DEBUG**. You can change the log level in the **conf/log/cmdb.properties** file by updating the following line:

```
samlAuthentication= DEBUG
```

Note: For starters, we suggest leaving this log on DEBUG in order to resolve possible problems more easily.

Log File	Description
Purpose	Log the details related to SAML authentication.
Information Level	The default log level is DEBUG for now.
Error Level	Errors that appeared during SAML Authentication.
Debug Level	Details related to SAML Authentication, like the request send to IdP, the response received, and so on.
Basic Troubleshooting	Errors could appear if the configurations are not done correctly. If anything wrong happens, it will be logged in the file.

Data Flow Management Log Files

Data Flow Management log files store information about data flow activity (discovery and integrations), as well as related errors, that occur on the Server side.

mam.AutoDiscovery.log

Contains information about tasks running on the server. The server provides services to the user interface or the Probe Gateway, such as: activating jobs, processing results from the Probe, or creating tasks for the Probe.

Level	Description
Error	All DFM process errors on the server side.
Information	Information about requests being processed.
Debug	Logs mainly for debugging purposes.

Basic Troubleshooting. Check this log when you have invalid user interface responses or errors you need to explore. This log provides information to enable you to analyze the problems.

discoveryServlet.log

This log receives messages from:

- **The Collectors Utilities Servlet.** The user interface connects to the server through this servlet.
- **The Collectors Servlet.** The Probe requests new tasks from the server through this servlet.
- **The Collectors Results Servlet.** The Probe sends new results through this servlet.
- **The Collectors Download Servlet.** The Probe downloads new server data through this servlet.

Level	Description
Error	All errors in the servlet.
Information	Information about user requests and Probe task requests.
Debug	<ul style="list-style-type: none">• User requests• Probe requests to read DFM tasks.• Probe access to the servlet.

Basic Troubleshooting

- User Interface – Server communication problems.
- Probe – Server communication problems.

Some processing problems may be written to this log instead of to **mamAutoDiscovery.log**.

mam.autodiscovery.results.stat.log

Contains the statistics of the results received from the Probe.

mam.autodiscovery accuratedependency.log

(Deprecated) Contains information about accurate dependency for the Automatic Service Modeling feature. This log is related to the old ASM version (before Content Pack 18), and is no longer in use.

mam.dispatch.log

Contains all the dispatch related information.

To enable this log,

1. Locate and open the **<UCMDB_Server_Home>/conf/log/mam.properties** file.
2. Manually add the following settings into the **mam.properties** file:

```
log4j.category.mam.dispatch=${loglevel}, mam.dispatch.appender
#####
##    mam.packaging                ##
#####

log4j.appender.mam.dispatch.appender=com.mercury.topaz.cmdb.shared.base.log.
BetterRollingFileAppender

log4j.appender.mam.dispatch.appender.File=${logs.dir}/mam.dispatch.log

log4j.appender.mam.dispatch.appender.MaxFileSize=${def.file.max.size}

log4j.appender.mam.dispatch.appender.MaxBackupIndex=${def.files.backup.coun
t}

log4j.appender.mam.dispatch.appender.layout=org.apache.log4j.PatternLayout

log4j.appender.mam.dispatch.appender.layout.ConversionPattern=${msg.layout}
```

3. Save the file.

Autodiscovery Dal Log

The log name is **mam.autodiscovery.dal.log**.

Log File	Description
Purpose	Holds information on queries and other actions taken on the server's database tables as part of the discovery process.
Information Level	A summary of actions taken and their results on the database (such as retrieving information, deleting records, and so on).

Log File	Description
Error Level	All critical errors that occurred during the attempt to access the database.
Debug Level	Detailed information on query parameters and/or the results that are retrieved from them
Basic Troubleshooting	If there are any database errors or failures (such as connection failed, technical error in the query, and so on), the error log is included in this log file also.

workflow_sizing.log

Enabling this log file helps you to collect running statistics (for example, time spent on normalization and auto delete) of each modules on a probe.

To enable this log, follow these steps:

1. On the probe, locate and open the **/conf/log/probeGWLog4j.properties** and **/conf/log/probeMgrLog4j.properties** files.
2. Manually add the following settings into each of the above files:

```
#####  
### cmdb.workflow.sizing          ##  
#####  
log4j.category.cmdb.workflow.sizing=INFO, cmdb_workflow_sizing  
log4j.appender.cmdb_workflow_  
sizing=com.mercury.topaz.cmdb.shared.base.log.BetterRollingFileAppender  
log4j.appender.cmdb_workflow_sizing.File=${logs.dir}/workflow_sizing.log  
log4j.appender.cmdb_workflow_sizing.Append=true  
log4j.appender.cmdb_workflow_sizing.MaxFileSize=512MB  
log4j.appender.cmdb_workflow_sizing.Threshold=INFO  
log4j.appender.cmdb_workflow_sizing.MaxBackupIndex=10  
log4j.appender.cmdb_workflow_sizing.layout=org.apache.log4j.PatternLayout  
log4j.appender.cmdb_workflow_sizing.layout.ConversionPattern=<d> [%-5p]  
[%t] (%F:%L) - %m%n  
log4j.appender.cmdb_workflow_sizing.encoding=UTF-8
```

3. Save the files.
4. Restart the probe.

Sample log

```
<2015-11-11 13:56:51,459> [INFO ] [ProbeGW Task Results Sender]
(TaskResultsSenderThread.java:458) -
[TaskResultsSenderThread.handleSuccessTriggers.start][desc=update ID
mapping,size=1]

<2015-11-11 13:56:51,460> [INFO ] [ProbeGW Task Results Sender]
(TaskResultsSenderThread.java:481) -
[TaskResultsSenderThread.handleSuccessTriggers.stop][desc=update ID
mapping,size=1]
```

Probe Auto Upgrade Log

The log name is **probe_auto_upgrade.log**.

It shows in the **C:\UCMDB\DataFlowProbe\runtime\log\probeUpgradeLogs\<source_version>to<target_version>** folder. For example:

C:\UCMDB\DataFlowProbe\runtime\log\probeUpgradeLogs\10.32to10.33.

This log file is also sent to the UCMDB server and shows as **<domain_name>_probename_auto_upgrade.log** in the **C:\UCMDB\UCMDBServer\runtime\log\probeUpgradeLogs\<source_version>to<target_version>\failed|success** folder.

Log File	Description
Purpose	Shows the related information when the probe auto upgrade agent upgrades a probe.
Information Level	Shows the console output of normal information.
Error Level	Any error that occurs when the probe auto upgrade agent upgrades a probe.
Debug Level	N/A
Basic Troubleshooting	Check this log file when the probe upgrade fails.

Log Severity Levels

Each log is set so that the information it records corresponds to a certain severity threshold. Because the various logs are used to keep track of different information, each is pre-set to an appropriate default level. For details on changing the log level, see ["Changing Log Levels" on the next page](#).

Typical log levels are listed below from narrowest to widest scope:

- **FATAL.** The log records only events that prevent the system from functioning.
- **ERROR.** In addition to Fatal events, the log records events that adversely affect the immediate functioning of the CMDB. When a malfunction occurs, you can check if Error messages were logged and inspect their content to trace the source of the failure.
- **WARN.** The log's scope includes, in addition to Fatal and Error-level events, problems for which the CMDB is currently able to compensate and incidents that should be noted to prevent possible future malfunctions.
- **INFO.** The log records all activity. Most of the information is normally routine and of little use and the log file quickly fills up.
- **DEBUG.** This level is used by Micro Focus Software Support when troubleshooting problems.


Note: The names of the different log levels may vary slightly on different servers and for different procedures. For example, **INFO** may be referred to as **Always logged** or **Flow**.

Changing Log Levels


If requested by Micro Focus Software Support, you may have to change the severity threshold level in a log, for example, to a debug level. For details on changing the log level, see ["Log Configuration Dialog Box" below](#).

Log Configuration Dialog Box

This dialog box enables you to view Universal CMDB logs and change the log level.

To access	On the Status bar, click Log Level Configuration  or select Tools > Log Configuration... from the Modeling main menu.
See also	"Log Severity Levels" on the previous page

User interface elements are described below:

UI Element	Description
	Apply. Click to apply the selected log level to the log.
Appender	The name of the appender.
Appender pane	Displays details for the appender you selected in the Loggers pane.
File	Click the link to open the log file in an editor.
Max file size	Maximum appender file size.
Max backup index	Maximum number of backup indexes. Default: 5
Loggers pane	An expandable list of Universal CMDB logs. Select the required log from the list: the details of the log appear in the lower pane.
Logger pane	Displays details for the logger you selected in the Loggers pane.
Loggers table	Displays a list of loggers (with Logger Name and Log level) for the selected log.
Log level	Select a log level from the drop-down list.
Logger's appender	A string defining the log category. For internal use only.
Appender file	The name of the logger's appender file.

Enhanced File Upload Mechanism

UCMDB introduced check for proper extensions of the files that a user selects for uploading in the following areas:

- Modeling
 - **CI Type Manager > Import From XML** (imports a CI Type)
 - **Impact Analysis Manager > Import From XML**
 - **Modeling Studio > Import From XML** (imports queries and views)
- Administration
 - **Package Manager > Deploy packages**
 - **Package Manager > Upload Content Pack**
- Data Flow Management

- **Data Flow Probe Setup > Deploy Probe Update**
- **Software Library > Import SAI File, Import SAI File from CP**

The following infrastructure settings are added to limit the file size for uploading:

Name	Description	Default Value
File upload maximum file size for archive type	The maximum size in KB for an archive file that will be uploaded by a user	500,000 (KB)
File upload maximum file size for XML type	The maximum size in KB for an XML file that will be uploaded by a user	10,000 (KB)

Troubleshooting and Limitations – UCMDB Server Administration

This section describes troubleshooting and limitations for UCMDB.

- If the **wrapper.java.additional.10=-XX:+HeapDumpOnOutOfMemoryError** parameter is set (it is enabled by default) in the **wrapper.conf** file, then every time the server fails with an Out of Memory error, it dumps the full memory to the disk. Since the memory contents could be very large, you should delete these files to avoid disk space problems.
- **Problem:** When working in a Firefox browser using Linux, you get an **OutOfMemoryError: PermGen space** error.

Solution: Follow these steps:

- Go to the **bin** directory of the Java installation directory and open the Control Panel.
 - In the **Java** tab, select **View**.
 - In the Java runtime environment settings, under Runtime parameters, increase the -**XX:MaxPermSize**.
- **Limitation: Unsupported characters in password when UCMDB is used in integrations**
When UCMDB is used in integrations, the following characters should not be used in the password:
 - All non-ASCII characters (valid ISO 8859/1 characters that are not also ASCII characters)
 - The following special characters: the tab character, the space character, and `[\] ^ ` { | } ~ " # % & + , / : < = > ? @`
 - **Problem:** The "User {0} has exceeded the maximum number of login sessions" message is

displayed.

Solution: Ensure that you are properly logged out from other sessions on other computers. For example, closing a tab or closing the browser does not immediately close a user session on the server.

Chapter 6: Infrastructure Settings Manager

This chapter includes:

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Infrastructure Settings Validation	208
Infrastructure Settings Manager User Interface	211

Infrastructure Settings Manager Overview

You can define the value of settings that determine how Universal CMDB and its applications run.

Caution: By modifying certain settings, you may adversely affect the performance of Universal CMDB. It is strongly recommended not to modify any settings without first consulting Micro Focus Software Support or your Micro Focus Services representative.

Infrastructure Settings Validation

By default, field validation is enabled for infrastructure settings values. Supported validation types include emails, URLs, ports, protocols, deprecated values, time values, and root CI/relationship.

When you configure the value for an infrastructure setting in the Infrastructure Settings Manager pane,

- if the value is valid, the background for the value cell remains as is.
- if the value is invalid, the background for the value cell turns red.

To enable or disable infrastructure settings validation, follow these steps:

1. Access the Infrastructure Settings Manager by selecting **Managers > Administration > Infrastructure Settings Manager**.
2. In the Categories navigation pane, select **General Settings**.
3. In the Infrastructure Settings Manager pane, locate **Validate infrastructure settings**.

4. Click in the Value field, and then select **True** (enable) or **False** (disable) from the drop-down list.
5. Click the **Save** button.
6. Log off and then log in for the change to become effective.

Validation Types

Validation types are described in details below:

Emails

Ensures that the cell value has a valid email format.

The validation is performed using the following regex (also the default regex used in UCMDB for email validation):

```
^[_A-Za-z0-9-]+\.[_A-Za-z0-9-]+*@(?:[A-Za-z0-9]{1}(?:[A-Za-z0-9-]*[A-Za-z0-9])?\.[\.]+(?:[A-Za-z]{2,}))
```

An email address that satisfies all of the following format requirements is considered a valid value:

- Starts with **letters**, **digits**, or **_** (underscore)
- Contains **letters**, **digits**, **_** (underscore), or **.** (dot) before the **@** character
- Contains the **@** character
- Contains at least one **letter** or **digit** after the **@** character and before the **.** (dot)
- Can have one or more domains after the **.** (dot), and the domain must have two or more letters

Port

Ensure that the cell value has a valid port format. (Valid values: An integer between 0-65536)

Protocol

You can choose one or multiple valid protocol values from the drop-down list. Valid options include **http** and **https**.

CIT/Relationship

You can select a CIT/Relationship from a drop-down CIT tree.

URL

Ensure that the cell value has a valid URL format.

The URL validation is performed using the `java.net.URL` implementation.

URLs need to be strictly formatted according to RFC2396.

Examples of valid URL:

- `http://www.my.work.com/`
- `http://www.my.uni.edu/info/matriculation/enroling.html`
- `http://info.my.org/AboutUs/Phonebook`
- `http://www.library.my.town.va.us/Catalogue/76523471236%2Fwen44--4.98`
- `http://www.my.org/462F4F2D4241522A314159265358979323846`
- `http://www.w3.org:8000/imaginary/test`
- `http://www.myu.edu/org/admin/people#andy`
- `http://info.my.org/AboutUs/Index/Phonebook?dobbins`
- `http://www.w3.org/RDB/EMP?*%20where%20name%%3Ddobbins`

Examples of invalid URL:

- `fxqn:/us/va/reston/cnri/ietf/24/asdf%*.fred`
- `news:12345667123%asdghfh@info.cern.ch`

Note: Validation of relative URLs is not supported, and the setting **mam.server.logout.forward.url** is excluded from the validation.

Deprecated Values

All deprecated cell values have a dark gray cell background.

Time Values

The integer number is followed by a time unit so that it is clear what the field represents (seconds, milliseconds, minutes, hours).

- For milliseconds: Example "3000 milliseconds"
- For seconds: Example "300 seconds"

- For minutes: Example "3 minutes"
- For hours: Example "2 hours"
- At a certain hour: The hour is an integer between 0-24 and is validated with cell value background change (turning red on an invalid value).

Infrastructure Settings Manager User Interface





This section includes (in alphabetical order):

Change Default Value Dialog Box	212
Infrastructure Settings Manager Page	212

To access	
Important information	The default values for global settings cannot be altered.

UI Element (A-Z)	Description
Default Value	The modified default value.
Factory Value	The default value initially provided by Universal CMDB.


To access	Select Infrastructure Settings Manager from the Navigation Menu or select Managers > Administration > Infrastructure Settings Manager .
See also	"Infrastructure Settings Manager Overview" on page 208

UI Element (A-Z)	Description
	Save. Saves the changes you have made.
	Properties. Enables you to view the infrastructure properties for the selected setting. Opens the Properties window.
	Restore Default. Restores the previous default value of the selected infrastructure setting.
	Change Default Value. Enables you to edit an infrastructure setting. Opens the Change Default Value dialog box.
Categories pane	Contains a list of the infrastructure setting categories. You can either select a category to view the infrastructure settings connected with that category, or

UI Element (A-Z)	Description
	alternatively select <All> to display all the infrastructure settings.
Description	A description of the infrastructure setting.
Filter by column	
Name	The name of the infrastructure setting.
Refresh Rate	Indicates when the change takes effect in Universal CMDB after an infrastructure setting value is modified.
Value	The value of the infrastructure setting.
Was modified	Indicates if the parameter was modified. If the parameter was not modified, the row in the column for the relevant parameter remains empty. If the parameter was modified, an asterisk appears in the row of the relevant parameter.

Change Default Value Dialog Box

This dialog box enables you to edit the default values of the infrastructure settings.

To access	Select Infrastructure Settings Manager from the Navigation Menu or select Managers > Administration > Infrastructure Settings Manager , select the required setting, and then click the Change Default Value  button.
Important information	The default values for global settings cannot be altered.

User interface elements are described below:

UI Element (A-Z)	Description
Default Value	The modified default value.
Factory Value	The default value initially provided by Universal CMDB.





Infrastructure Settings Manager Page

This page enables you to view and edit infrastructure settings.

To	Select Infrastructure Settings Manager from the Navigation Menu or select Managers >
-----------	---

access	Administration > Infrastructure Settings Manager.
See also	"Infrastructure Settings Manager Overview" on page 208

User interface elements are described below (unlabeled elements are shown in angle brackets>):

UI Element (A-Z)	Description
	Save. Saves the changes you have made.
	Properties. Enables you to view the infrastructure properties for the selected setting. Opens the Properties window.
	Restore Default. Restores the previous default value of the selected infrastructure setting.
	Change Default Value. Enables you to edit an infrastructure setting. Opens the Change Default Value dialog box.
Categories pane	Contains a list of the infrastructure setting categories. You can either select a category to view the infrastructure settings connected with that category, or alternatively select <All> to display all the infrastructure settings.
Description	A description of the infrastructure setting.
Filter by column	Enables you to define the criteria for which infrastructure settings you want to appear on the Infrastructure Settings Manager page. <ul style="list-style-type: none"> From the drop-down list, select the desired column as your filter criteria. In the value box, enter the text or part of the text for which to search.
Name	The name of the infrastructure setting.
Refresh Rate	Indicates when the change takes effect in Universal CMDB after an infrastructure setting value is modified.
Value	The value of the infrastructure setting.
Was modified	Indicates if the parameter was modified. If the parameter was not modified, the row in the column for the relevant parameter remains empty. If the parameter was modified, an asterisk appears in the row of the relevant parameter.

Chapter 7: Package Manager

Package Manager User Interface

Each package in the Package Manager User Interface includes the following:

- An **Icon** identifying the package as factory, hidden or user
- 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** of the package (optional)
- The **Build Number** of the package (optional)
- A **Description** that corresponds to the description located in the **descriptor.xml** file

This chapter includes:

Package Administration Overview

A package contains resources that are grouped together by defined criteria. For a list of the default resource types, see ["Resource Types" on page 233](#).

Package Manager fulfills several functions:

- Enables the discovery of specific IT infrastructure assets. For example, Universal CMDB 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 Universal CMDB.

By default, factory packages are located in: **C:\UCMDB\UCMDBServer\content\basic_packages**.

Note: Some of the factory packages that are deployed with the installation are not visible in the list of packages that appear in Package Manager. To display the hidden packages, right-click anywhere on the Package Manager page and select **Show Hidden Packages**.

- **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 ["Create Custom Package/Edit Package Wizard" on page 237](#).

Caution: If you create custom packages for the resources or tools you develop, do not place them in the **C:\UCMDB\UCMDBServer\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 225](#).
- Deploy some or all of a package's resources to the CMDB from your local directory. For details, see ["How to Deploy a Package" on page 224](#).

Package Locations

There are three pre-defined folders with out-of-the-box, automatically deployed packages under **C:\UCMDB\UCMDBServer\content**:

- **basic_packages.** Contains internal packages.
- **adapters.** Contains adapter packages.
- **content_packs.** Contains the latest Content Pack package **CP_xx.zip** (where **xx** represents Content Pack version).

Package Manager User Interface

Each package in the Package Manager User Interface includes the following:

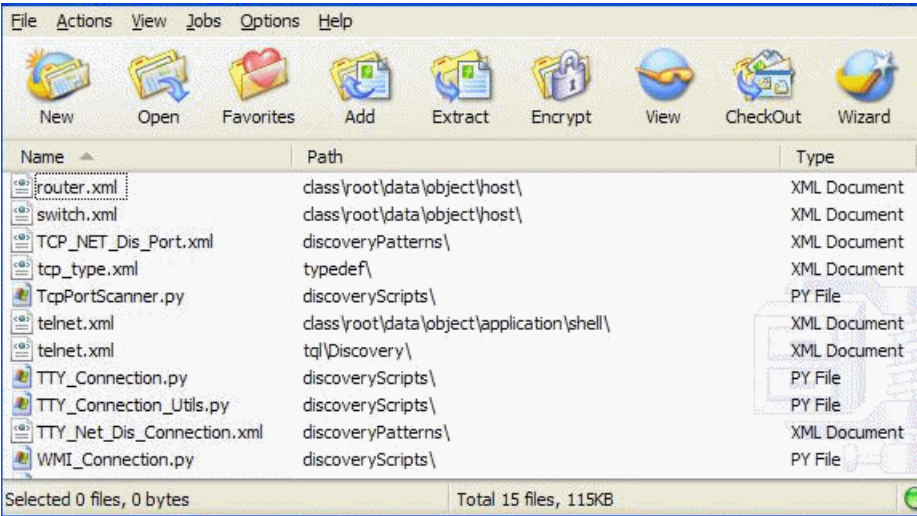
- An **Icon** identifying the package as factory, hidden or user
- A **Package Name** representing the name of the .zip file (optional)
- The **Category** as allocated in the **descriptor.xml** file (optional)
- A **Readme** file that corresponds to the package (optional)
- The **Version** of the package (optional)
- The **Build Number** of the package (optional)
- A **Description** that corresponds to the description located in the **descriptor.xml** file

Package Zip File Contents and Format

A package's resources are stored in the CMDB. To export a package from system to system, you use the Package Manager interface (for details, see ["Package Manager Page" on page 1](#)). 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*](#).

Compare and Merge Packages or Content Packs

This section includes:

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Overview

When you deploy packages or install a Content Pack, you may want to retain your customized resources separate from the deployed packages or installed Content Pack. Therefore, the functionalities of comparing and merging packages or Content Packs are introduced.

For convenience, the following terms are used in the document:

- **INSTALLED:** The out-of-the-box resources from the currently in-use Content Pack.
- **CUSTOMIZED:** Your customized resources.
- **NEW:** The resources to be deployed from the new Content Pack or packages.

Compare and Merge

This section describes the functionalities of comparing and merging packages or Content Packs.

Compare

This functionality compares the files included in NEW with the same files included in CUSTOMIZED and INSTALLED, and then a report file **upgrade_report.csv** is generated to show the comparison results, and a ZIP package **backup.zip** is generated to back up the resources that are not semantically equivalent.

The report file **upgrade_report.csv** is under the **<UCMDB_Server_Home>/runtime/log/package_reports/customer_<customerId>/cpUpgrade/<timestamp>** folder.

The following table describes columns included in the **upgrade_report.csv** file and the default operation to be taken by this functionality:

Column Name	Options	Description	Operation
Type	-	The resource type	-
Name	-	The file name	-
Package	-	The new deployed package name	-
Existence Status	NEW	The file only exists in NEW.	Use NEW
	CUSTOMIZED_NEW	The file exists in CUSTOMIZED and NEW but does not exist in INSTALLED.	Use NEW
	INSTALLED_NEW	The file exists in INSTALLED and NEW but does not exist in CUSTOMIZED.	Use NEW
	ALL	The file exists in INSTALLED, NEW, and CUSTOMIZED.	Go to Equality Status and compare

Column Name	Options	Description	Operation
Equality Status	ALL_EQUAL	INSTALLED, NEW, and CUSTOMIZED are all equal.	Use NEW
	INSTALLED_CUSTOMIZED_EQUAL	INSTALLED and CUSTOMIZED are semantically equal but different from NEW.	Use NEW
	INSTALLED_NEW_EQUAL	INSTALLED and NEW are semantically equal but different from CUSTOMIZED.	Use CUSTOMIZED
	CUSTOMIZED_NEW_EQUAL	CUSTOMIZED and NEW are semantically equal but different from INSTALLED.	Use NEW
	ALL_DIFFERENT	INSTALLED, NEW, and CUSTOMIZED are all different.	Go to Merge Strategy and merge
Merge Strategy	USE_CUSTOMIZED	Use CUSTOMIZED	Use CUSTOMIZED
	USE_NEW	Use NEW	Use NEW
	MERGED	CUSTOMIZED and NEW are merged	CUSTOMIZED and NEW are merged
	CONFLICT	INSTALLED, NEW, and CUSTOMIZED cannot be merged	Go to Conflict Strategy
Conflict Strategy	USE_CUSTOMIZED	Use CUSTOMIZED	Use CUSTOMIZED
	USE_NEW	Use NEW	Use NEW
Final Strategy	USE_CUSTOMIZED	Use CUSTOMIZED	Use CUSTOMIZED
	USE_NEW	Use NEW	Use NEW
	MERGED	CUSTOMIZED and NEW are merged	CUSTOMIZED and NEW are merged

For details about the backup package, see ["Log and Backup Files" on page 221](#).

Note: The following resources are not compared and cannot appear in the report and backup files because these resources are merged by UCMDB:

- **class**
- **cmdbview**
- **correlation**
- **discoveryConfigFiles**
 - **applicationsSignature.xml**
 - **portNumberToPortName.xml**
- **enrichment**
- **identification**
- **schedulerJob**
- **tql**
- **typedef**
- **validlinks**

Merge

This functionality enables you to use CUSTOMIZED or NEW. The default is using NEW. However, you can use CUSTOMIZED in the following files only if you set **Merge Packages/Content Pack** to **True** in the Infrastructure Settings Manager:

- **HardwareMappingConfig.xml**
- **NATIpAddress.xml**
- **UriEndpointConfiguration.xml**
- All files under the **PrePostScripting** folder

The following resource types can be merged:

- **discoveryJobs**
- **discoveryModules**
- **discoveryPatterns**
- **discoveryScripts**
- **discoveryConfigFiles**

- **EnricherServiceSettings.ini**
- **globalSettings.xml**

Note: **discoveryScripts** can be merged only if you set **Merge Packages/Content Pack** and **Merge Discovery Scripts** to **True** in the Infrastructure Settings Manager.

Related information

["How to Merge Packages or Content Pack" below.](#)

How to Merge Packages or Content Pack

To merge packages or Content Pack, follow these steps:

1. In UCMDB, go to **Administration > Infrastructure Settings Manager**.
2. From the **Filter by column** drop-down list, click **Name**, and then type **merge**.
3. Locate the **Merge Packages/Content Pack** setting, and then select **True** in the **Value** column.

Note: Apart from discovery scripts, this merges all other resources in the packages or Content Pack.

4. Locate the **Merge Discovery Scripts** setting, and then select **True** in the **Value** column.

Important: This merges all resources in the packages or Content Pack, including discovery scripts. Skip this step if you do not want to merge discovery scripts.

5. Click **Save** . The changes take effect immediately.

Related information

["Compare and Merge" on page 218](#)

Log and Backup Files

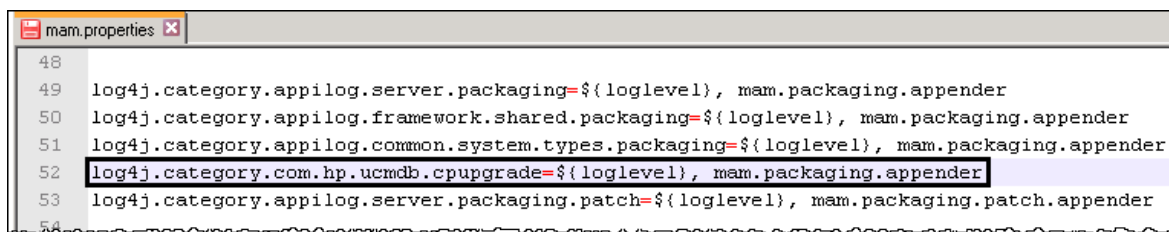
This section describes the files related to comparing and merging packages or Content Packs.

Log file

The **mam.packaging.log** file under the **<UCMDB_Server_Home>/runtime/log** folder is enhanced to contain the detailed log information about comparing and merging packages or Content Packs.

For the log file to contain the information that you need, make sure that you add the following line to the **<UCMDB_Server_Home>/conf/log/mam.properties** file manually, as illustrated in the screenshot:

```
log4j.category.com.hp.ucmdb.cpubgrade=${loglevel}, mam.packaging.appender
```



Backup package

The backup package **backup.zip** is under the **<UCMDB_Server_Home>/runtime/log/package_reports/customer_<customerId>/cpUpgrade/<timestamp>** folder.

If the **Equality Status** of a resource is **ALL_DIFFERENT**, **INSTALLED_NEW_EQUAL**, or **CUSTOMIZED_NEW_EQUAL**, the resource will be saved in **backup.zip**, except some binary files, such as *.dll, and *.exe.

The **backup.zip** package includes the following folders where you can find all the resource types as sub folder names:

Folder Name	Description
INSTALLED	Resources that are backed up from INSTALLED
CUSTOMIZED	Resources that are backed up from CUSTOMIZED
NEW	Resources that are backed up from NEW
MERGED	Resources that are backed up from the merged results

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. For details, see ["Create Custom Package/Edit Package Wizard" on page 237](#).

Example of Resources Selected to Be Included in a Package:

The summary page in the Create Custom Package wizard displays the resources selected to be included in the package, as shown in the illustration below.

The package contains resources from the following resource groups:

- Relationships
- Valid Links
- Configuration Item Types (CITs)



Selection Summary
View the resources to be included in the package.
Relationships: applicationLink
Valid Links: Service Desk Link: Siebel Application -> IT Incident
Configuration Item Types: Business Service View

How to Deploy a Package



You can deploy some or all of a package's resources to the CMDB from your local directory. The package must be on your local directory in order to deploy its resources.

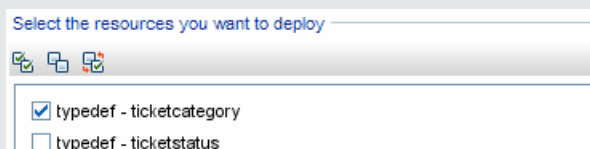
To deploy resources from packages on your local directory:

Note: If you want to retain your customized resources separate from the deployed packages, see ["Compare and Merge Packages or Content Packs" on page 217](#) for details.

1. Click the  button to open the Deploy Packages to Server dialog box.
2. Click the  button to open the Deploy Packages to Server (from local disk) dialog box.
3. Select a package zip file and click **Open**. The package appears in the upper pane of the dialog box and its resources appear in the lower pane.
4. Select the resources from the package that you want to deploy. All the resources are selected by default.
5. Optionally, select another package zip file and select the relevant resources to deploy.
6. When you have selected all the resources you want to deploy from each selected package, click **Deploy**.
7. A status report appears indicating whether the deployment was successful for each resource selected.

Example of Deploying Only Specific Resources in a Package:

You want to deploy only some of the resources contained in the package called **ticket2.zip**. Click the  button. In the Deploy Packages to Server dialog box, click the  button, browse to the package's location and select the resources from the package you want to deploy. See the following illustration:




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\package_reports\customer_1\classModel` folder. The zip

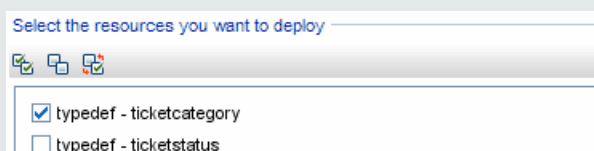
file contains the class model file before the change, the class model file after the change, and the package deployment report.

How to Export a Package

You can export some or all of a package's resources to your local directory. For details, see ["Package Manager Page" on page 1](#).

Example of Exporting Only Specific Resources in a Package:

You want to export only some of the resources contained in a package called **ticket2.zip** to your local directory. Click the  button. In the Export Package dialog box, select the **Export Resources** option and select the resources you want to export. See the following illustration:



Exporting User Permissions in a Package


If you want to export users from your UCMDB instance, along with their permissions, to another UCMDB instance, you can create a custom package containing the users and roles and export the package to the required location. The package must contain the selected users, the roles that are assigned to them, and also the role assignments (the association between a user and a role). You can select each of these entities in the **Resource Selection** tab of the Edit Package dialog box, under **Administration**. When you select **Role Assignments** in the left pane, all available combinations of users and assigned roles are displayed in the right pane. If a user has more than one role assigned, you must include each role and each role assignment in the package, to retain the user's permissions. If the users and the roles already exist on the target UCMDB instance, you can export a package containing only the relevant role assignments.

For details on selecting resources for a package, see ["Resource Selection Page" on page 238](#).

How to Install 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:

Note: If you want to retain your customized resources separate from the installed Content Pack, see ["Compare and Merge Packages or Content Packs"](#) for details.

1. If the required Content Pack is available on the local file system of the UCMDB server, access Package Manager: **Administration > Package Manager**. Click **Install Content Pack**  to open the **Install Content Pack** dialog box. For details, see ["Package Manager Page" on page 1](#).

2. Select the Content Pack to install and click **Install**.

3. Answer **OK** to the message.

UCMDB begins to install the Content Pack.

When installation is complete, a message is displayed with the results of the installation.

4. 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**.

5. Download the zip file and extract it to the Universal CMDB Server root folder.

6. In Package Manager, click **Upload Content Pack**  to upload the Content Pack from the local file system and install on the server.

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" below](#)
- ["View Package Deployment History" on the next page](#)
- ["Undeploy a Package" on the next page](#)
- ["Display Currently Deployed Packages" on the next page](#)
- ["Export Packages" on page 229](#)
- ["Package Name Rules" on page 230](#)

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>:8443/jmx-console**, where **<server_name>** is the name of the machine on which Universal CMDB 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. For details, see ["Package Name Rules" on page 230](#).
7. Select **True** to override job configurations changed in Universal Discovery. For details, see "Discovery Modules/Jobs Tab" in the *Data Flow Management section of the UCMDB Help*.
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>:8443/jmx-console**, where **<server_name>** is the name of the machine on which Universal CMDB 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>:8443/jmx-console**, where **<server_name>** is the name of the machine on which Universal CMDB 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. For details, see ["Package Name Rules" on page 230](#).
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>:8443/jmx-console**, where **<server_name>** is the name of the machine on which Universal CMDB 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. For details, see ["Package Name Rules" on the next page](#).
6. Click **Invoke** to display the packages that are currently deployed.

Export Packages

Follow these steps to export resources from the CMDB to the server on which Universal CMDB is installed using the JMX console.

1. Launch the Web browser and navigate to: **https://<server_name>:8443/jmx-console**, where **<server_name>** is the name of the machine on which Universal CMDB 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 **packageName**, enter the name of the package you want to export. For details, see ["Package Name Rules" on the next page](#).
6. In the **Value** box for the parameter **outputDir**, enter the name of the folder on the Universal CMDB 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 package names by commas.

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 package names by commas.

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 233](#).

- **acl**. The definition of a role such as Administrator or Guest. For details, see ["Roles Manager" on page 315](#).
- **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" on page 245](#). 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 CMDB, an instance of the CI is created. If a CI already exists in the CMDB, the values of the CI from the package resource overwrites the values of the CI in the CMDB.
- **datamodelcreateonly.** Used to import CI instances into the system. If the CI does not exist in the CMDB, an instance of the CI is created. If a CI already exists in the CMDB, the values of the CI from the package resource does not overwrite the values of the CI in the CMDB.
- **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 definition.
- **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 adapter 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 CMDB 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*.
- **docs.** Contains document for the package (if applicable).
- **dynamicSettings.** The dynamicSettings package contains a list of settings which are specific for the CMS UI. The package is deployed by the CMS UI at startup time.
- **enrichment.** Enrichment rule definitions. For details, see "Enrichment Manager" in the *Modeling section of the UCMDB Help*.
- **identification.** Contains the identification definition of a specific CI type.
- **integrationUsers.** Used to define a user of type integration.
- **modelnotification.** Contains filter definitions for CMDB model notifications. The data model notification system gives notification of changes that occurred in the CMDB. For example, items in the CMDB 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" on page 249](#).
- **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*.
- **urm.** Resources of a Dynamic Widget, which gets deployed by the CMS UI at startup time.
- **users.** The definition of a user and the user's role. For details, see ["Users and Groups" on page 301](#).

- **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 230](#).

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*.

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*.

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" on page 249](#).
- **State Categories.** The states defined in the State Manager. For details, see ["State Manager" on page 245](#).

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 *CMS UI 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*.

Administration

- **Users.** The users defined in the Users and Groups module. For details, see ["Users and Groups" on page 301](#).

- **User Groups.** The user groups defined in the Users and Groups module. For details, see ["Users and Groups" on page 301](#).
- **Resource Groups.** The resource groups defined in the Resource Groups module. For details, see ["Resource Groups" on page 331](#).
- **Roles.** The roles defined in the Roles Manager module to assign permissions to users. For details, see ["Roles Manager" on page 315](#).
- **Tenants.** The tenants added in the Tenants Management module. For details, see ["Tenants Management" on page 354](#). (Only available when multi-tenancy is enabled.)
- **Role Assignments.** The role assignments to users defined in the Users and Groups module. For details, see ["Users and Groups" on page 301](#).

Miscellaneous

- **Miscellaneous.** Contains miscellaneous resources.

Package Manager User Interface

This section includes (in alphabetical order):

Choose Resources to Export Dialog Box	236
Create Custom Package/Edit Package Wizard	237
Export Package Dialog Box	240
Filter Dialog Box	240
Find Dialog Box	241
Undeploy Package Resource Wizard	242

Choose Resources to Export Dialog Box

This dialog box enables you to export an entire package or specific resources to your local directory.



To access	Click the Export resources button in the Export Package dialog box.
------------------	--

User interface elements are described below (unlabeled elements are shown in angle brackets):

UI Element (A-Z)	Description
<List of resources >	Displays the list of resources contained in the package. Select the resources you want to export to your local directory.

Create Custom Package/Edit Package Wizard

This wizard enables you to create a package using existing resources or edit an existing package.

To access	Do one of the following: <ul style="list-style-type: none">Click the Create custom package  button on the Package Manager page to create a new package.Select a package and click the Edit package  button to edit an existing package.
Important information	When editing an existing package, this feature is not a wizard, but a dialog box. The dialog box contains two tabs: the Package Properties tab and the Resource Selection tab.
Relevant tasks	"How to Create a Custom Package" on page 223
Wizard map	The "Create Custom Package/Edit Package Wizard" contains: "Package Properties Page" > "Resource Selection Page" > "Selection Summary Page"
See also	<ul style="list-style-type: none">"Package Administration Overview" on page 214"Package Resources" on page 230"Resource Types" on page 233

Package Properties Page

This wizard page enables you to define the properties of the package.

Wizard map	The "Create Custom Package/Edit Package Wizard" contains: "Package Properties Page" > "Resource Selection Page" > "Selection Summary Page"
-------------------	---

User interface elements are described below:

UI Element (A-Z)	Description
Package Build Number	The build number of the package.
Package Category	A free text box for any notes you want to associate with the package.
Package Description	A description of the package.
Package Name	The name of the package.

Resource Selection Page

This wizard page enables you to add the required resources to the package. Select the required resources from the various resource types.

Important information	You can make multiple selections from each resource type.
Wizard map	The "Create Custom Package/Edit Package Wizard" contains: "Package Properties Page" > "Resource Selection Page" > "Selection Summary Page"

User interface elements are described below (unlabeled elements are shown in angle brackets):

UI Element (A-Z)	Description
Automatically export dependencies of the checked resources	(Create Custom Package Wizard only) Select this check box allows you to automatically export dependencies of the checked resources when creating a package.
✓	Appears in the left pane. Indicates that a resource has been added to the package.
-	Appears in the left pane. Indicates that no resource has been added to the package.
<Resource types in the left pane>	Contains the resource types from which you can choose the required resources to add to the package. For details of a list of the available resource types and their descriptions, see "Resource Types" on page 233 . Note: A green dot appears on the resource type icon in the right pane, when one or more of its resources are selected to be included in the package.
<Resources	Select the resources you want to add to the package. You can select multiple

UI Element (A-Z)	Description
in the right pane>	<p>resources.</p> <p>Note:</p> <ul style="list-style-type: none"> • A green check appears to the right of a Configuration Item Types, Relationships, or Calculated Relationships when one or more of its children in the resource tree are included in the package. • A folder's check box has a <input type="checkbox"/> when only some of its resources are included in the package. (This does not apply to Configuration Item Types, Relationships, or Calculated Relationships.) • A folder's check box is selected when all its resources are included in the package. (This does not apply to Configuration Item Types, Relationships, or Calculated Relationships.) <p>Important information:</p> <p>To add a calculated relationship to the package, select either the required calculated relationship together with one or more of its triplets, or the required triplets without selecting the calculated relationship itself.</p> <ul style="list-style-type: none"> • If you select only specified triplets and not the calculated relationship, the triplets are added only if you already have an existing calculated relationship in the system. • If you select a calculated relationship together with one or more of its triplets, the property definitions of the calculated relationship are included in the package. If you already have a calculated relationship in the system, the property definitions of the existing calculated relationship are updated with the properties of the calculated relationship you are adding to the package. <p>For details on calculated relationships and triplets, see "Using Calculated Relationships" and "Triplets Page" in the <i>Modeling section of the UCMDB Help</i>.</p>

Selection Summary Page

This wizard page enables you to view the resources to be included in the package.


Wizard map	<p>The "Create Custom Package/Edit Package Wizard" contains:</p> <p>"Package Properties Page" > "Resource Selection Page" > "Selection Summary Page"</p>
------------	---

User interface elements are described below (unlabeled elements are shown in angle brackets>):

UI Element (A-Z)	Description
<Selected resources>	Displays the resources that were selected to be part of the package.

Export Package Dialog Box

This dialog box enables you to export the selected package's resources to your local directory.


To access	Click the Export package to local directory  button on the Package Manager page.
Important information	You can choose to export some or all the resources in the package.
Relevant tasks	"How to Export a Package" on page 225
See also	"Package Administration Overview" on page 214

User interface elements are described below:

UI Element (A-Z)	Description
Export resources	Export only some of the package's resources to your local directory. Opens the Choose Resources to Export dialog box.
Export to directory	Select the directory to which you want to export the resources.
Export whole package	Export all the resources in the package to your local directory.
File name	The name of the package. Note: The package name cannot be edited.

Filter Dialog Box

This dialog box enables you to display only specific packages on the Package Manager page.

To access	Click the Filter  button on the Package Manager page.
Important	A description of the filter condition you defined appears above the table columns on


information	<p>the Package Manager page. For example, the following illustration shows that a filter condition was created to display a package called Network.</p> <p>Filter: Package Name[Equal Network];</p>
See also	"Package Administration Overview" on page 214

User interface elements are described below (unlabeled elements are shown in angle brackets):

UI Element (A-Z)	Description
<Click a column header>	For details, see "Sort Column Content Dialog Box" in the <i>Modeling section of the UCMDB Help</i> .
<Right-click a column header>	For details, see "Sort Column Content Dialog Box" in the <i>Modeling section of the UCMDB Help</i> .
Condition	Click inside the box and select the required operator. For details, see "Attribute Operator Definitions" in the <i>Modeling section of the UCMDB Help</i> .
Display Name	<p>Filter the task list according to one of the following:</p> <ul style="list-style-type: none"> • Package name • Category • Readme • Version • Build Number • Description <p>For details, see "Package Manager Page" on page 1.</p>
Value	<p>Click inside the box to open the Edit box. Enter the required value.</p> <p>Note:</p> <ul style="list-style-type: none"> • You must choose a value in the Condition column (other than Is null or Not null) to be able to specify a value for the filter. • When using the Like or Like ignore case operators, include the wildcard (%) in the search value.

Find Dialog Box

This dialog box enables you to find a package that contains a specified resource.


To access	Click the Find  button on the Package Manager page.
See also	"Resource Types" on page 233

User interface elements are described below:

UI Element (A-Z)	Description
Case sensitive	Distinguish between uppercase and lowercase characters. When you select Case sensitive , search results find only those instances in which the capitalization matches the text you typed in the Resource name box.
Resource name	Enter a word or phrase contained in the resource for which you are looking.
Search Results	The search results. Displays the names of up to 30 resources containing the text entered in the Resource name box.
Topic	The subsystem containing the resource you want the package to contain. For details, see "Resource Types" on page 233 .

Undeploy Package Resource Wizard

This wizard deletes the resources from the system and removes them from the selected package.

To access	Click the Undeploy resources  button on the Package Manager page.
Important information	When you undeploy a package, the resources are removed from the system, and from the other packages that contain that resource. You can restore the resources only when a package containing those resources is deployed.
Wizard map	The "Undeploy Package Resource Wizard" contains: "Remove Resources Page" > "Selection Summary Page"
See also	<ul style="list-style-type: none">• "Package Administration Overview" on page 214• "How to Use the JMX Console to Perform Package Manager Tasks" on page 226

Remove Resources Page

This wizard page enables you to select the resources you want to delete.

Important	If you delete all the resources from the package, the package is automatically deleted
------------------	--

information	and removed from the list of packages on the Package Manager page.
Wizard map	The " Undeploy Package Resource Wizard " contains: "Remove Resources Page" > "Selection Summary Page"

User interface elements are described below (unlabeled elements are shown in angle brackets):

UI Element (A-Z)	Description
<List of resources contained in the selected package>	Displays the resources contained in the selected package. Select the resources you want to delete from the system.

Selection Summary Page

This wizard page enables you to view the resources you selected to be deleted.

Important information	When undeployment is finished and it is not successful, an Undeploy Package dialog box is displayed indicating which resources within the package are not successfully undeployed.
Wizard map	The " Undeploy Package Resource Wizard " contains: "Remove Resources Page" > "Selection Summary Page"

User interface elements are described below (unlabeled elements are shown in angle brackets):

UI Element (A-Z)	Description
<List of deleted resources>	Displays the resources that were selected to be deleted from the package.

Troubleshooting and Limitations – Package Manager

This section describes some of the troubleshooting issues that might arise when deploying and undeploying packages.

This section includes the following topics:

- ["Gold Master Reports Cannot be Deployed by Package Manager" on the next page](#)
- ["Datamodel Resources Cannot Be Undeployed" on the next page](#)

- ["Additional Information on Package Deployment Failure" below](#)
- ["Package Creation and Deployment in a Non-English Locale" below](#)

- **Gold Master Reports Cannot be Deployed by Package Manager**

If you export a package's resources from Package Manager that includes a Gold Master report definition, and then export those resources again to another system, the Gold Master report definition is not deployed.

- **Datamodel Resources Cannot Be Undeployed**

For a list of the package resources, see ["Package Resources" on page 230](#).

- **Additional Information on Package Deployment Failure**

If package deployment fails, you can check the Package Manager log files for additional information on why the deployment failure occurred.

Log files are located in the **C:\UCMDB\UCMDBServer\runtime\log** folder.

- **Package Creation and Deployment in a Non-English Locale**

This section describes the limitations when working in a non-English locale.

- You cannot deploy a package if the server locale is different than the client locale and the package name contains non-English characters.
- You cannot create a package that contains resources (for example, views and TQL queries) having non-English characters in their names, if the server locale is different from the client locale.

Chapter 8: State Manager

This chapter includes:

State Manager Overview	245
How to Define a State	245
State Manager User Interface	246

State Manager Overview

A state is based on a severity list called an Enumeration definition.

States are necessary for retrieving Impact Analysis results in IT Universe Manager. For details, see "IT Universe Manager" in the *Modeling section of the UCMDB Help*.


To retrieve Impact Analysis results, you must create an Impact Analysis rule in Impact Analysis Manager, which is based on the Operation state. For details, see "Impact Analysis Manager" in the *Modeling section of the UCMDB Help*.

State Manager contains two default states – Change and Operation. Each one is based on its own severity list.

You can use only the Operation state to retrieve Impact Analysis results in IT Universe Manager.

Note: It is not recommended to define states without first consulting Micro Focus Software Support.

How to Define a State

1. Click the **Add state**  button and enter a unique name and description for the state.
2. Click inside the **Type Definition** column to select the required Enumeration definition. The Type Definition list displays the Enumeration definitions that are defined in System Type Manager. For details, see "System Type Manager Dialog Box" in the *Modeling section of the UCMDB Help*.

3. (Optional) You can create a new Enumeration definition by clicking the **New Enumeration** button.
For details, see ["State Manager Page" on the next page](#).

Note: Only the Enumeration definitions whose list of key values begins with zero (0) appear in the State Manager.





Alternatively, you can create an Enumeration definition in System Type Manager. The Enumeration definition you create in System Type Manager appears in State Manager.

State Manager User Interface

This section includes:

State Manager Page247

To access	Select State Manager from the Administration module on the Navigation Menu or select Managers > Administration > State Manager .
Important information	
Relevant tasks	"How to Define a State" on the previous page
See also	




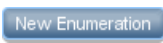
UI Element (A-Z)	Description
	Add state. Enables you to add a state.
	Delete state. Deletes the selected state.
	Saves the changes you have made.
	
Description	(Optional) Click in the box and enter a description of the state.
Name	Click in the box and enter a unique name for the state.
Type Definition	

State Manager Page

This page enables you to create a state based on a severity list (Enumeration definition).

To access	Select State Manager from the Administration module on the Navigation Menu or select Managers > Administration > State Manager .
Important information	<ul style="list-style-type: none"> The change and operation states are default states that cannot be edited. It is recommended to consult with Micro Focus Software Support before defining a state.
Relevant tasks	"How to Define a State" on page 245
See also	<ul style="list-style-type: none"> "State Manager Overview" on page 245 How to Create an Enumeration Definition – Workflow in the <i>Modeling section of the UCMDB Help</i>

User interface elements are described below:

UI Element (A-Z)	Description
	Add state. Enables you to add a state.
	Delete state. Deletes the selected state.
	Saves the changes you have made.
	<p>Creates an Enumeration definition. Opens the Create Enumeration Definition dialog box.</p> <p>For details, see Create/Update List/Enumeration Definition Dialog Box in the <i>Modeling section of the UCMDB Help</i>.</p> <p>The Enumeration definition you have created appears in the System Type Manager dialog box, where you can edit it if required (for details, see System Type Manager Dialog Box in the <i>Modeling section of the UCMDB Help</i>).</p>
Description	(Optional) Click in the box and enter a description of the state.
Name	Click in the box and enter a unique name for the state.
Type Definition	<p>Click in the box to display a list of the Enumeration definitions.</p> <p>Note: The Type Definition list only displays the Enumeration</p>

UI Element (A-Z)	Description
	definitions whose list of key values begins with zero (0) (and not List definitions) that are defined in the System Type Manager.

Chapter 9: Scheduler

This chapter includes:

How to Define Tasks That Are Activated on a Periodic Basis	249
How to Rebuild Indexes on Microsoft SQL Databases	251
Scheduler User Interface	253

How to Define Tasks That Are Activated on a Periodic Basis

This task describes how to run jobs on a periodic basis.

This section includes the following tasks:

- ["Task 1: Create a Job Definition" below](#)
- ["Task 2: Choose an Action" on the next page](#)
- ["Task 3: Schedule a Task" on the next page](#)

Task 1: Create a Job Definition

Define a job definition. Add actions to the job you created and define how often they run. The Job Definition dialog box displays the tasks that are defined. For details, see ["Job Definition Dialog Box" on page 255](#).

Example of a Job Definition

The illustration below shows that an Enrichment rule is set to run every week on Sunday at 7:30 AM.

Active	Name	Job Definition	Schedule	Last Run Time	Next Run Time
<input checked="" type="checkbox"/>	CUSTOM_ENRICHMENT_JOB	Run an Enrichment rule	Weekly ([Sunday][07:30])		Sun Apr 25 2010 07:30 ...

Task 2: Choose an Action

Select the actions that you want the Scheduler to run. For details, see ["Action Definition Dialog Box" on page 253](#).

Task 3: Schedule a Task

Set the schedule for activating a task in the Scheduler pane. For details, see ["Job Definition Dialog Box" on page 255](#).

Note: When updating a schedule for a task, all jobs run, by default, immediately upon saving the change. If you do not want jobs to run immediately upon updating the schedule, but rather when they are due to run, do the following:

In the **Administration module > Infrastructure Settings Manager > Integration Settings**, set the value for **Enable Scheduled Jobs Auto Run** to **false** (ID: enable.scheduled.jobs.auto.run).

Example of a Scheduled Task

The illustration below shows that the Scheduler is set to run an Enrichment rule called **SAP_Old_Transports** every day at 1:00 AM and 6:00 AM.

Name	
Run an Enrichment rule	SAP_Old_Transports

Scheduler	
<input type="radio"/> Once <input type="radio"/> Interval <input checked="" type="radio"/> Daily <input type="radio"/> Weekly <input type="radio"/> Monthly <input type="radio"/> Cron	
Time zone:	<div>US/Central ▼</div> <div>Reset server time zone</div>
Invocation hour	<div>01:00, 06:00</div> <div>>></div>


How to Rebuild Indexes on Microsoft SQL Databases

UCMDB is an online transaction processing (OLTP) application. It performs many insert, update, and delete operations each day, its indexes might become fragmented. The index fragmentation could be even higher if discovery jobs that run also modify the data.

To help rebuild fragmented indexes on Microsoft SQL database, the **RebuildIndexes** job is introduced. It uses a stored procedure to defragment the indexes. The **RebuildIndexes** job is deactivated by default. You can start the job manually when necessary.

How to manually start rebuilding fragmented indexes

You can start rebuilding fragmented indexes manually by using either of the following methods:

- Start the **RebuildIndexes** job from UCMDB UI. To do this, follow these steps:
 - a. On UCMDB UI, go to **Administration > Scheduler > Job Scheduler**.
 - b. Select the **RebuildIndexes** job, and click **Edit** .
 - c. Modify the job scheduler information in the Schedule section of the Job Definition dialog.

It is recommended to run the job on a daily basis.


For more information about the scheduler options, see "Job Definition Dialog Box" in the *Administer section of the UCMDB Help*.
 - d. Click **OK**.
- Invoke the **rebuildIndexes** JMX method from the JMX console. To do this, follow these steps:
 - a. Launch the Web browser and navigate to: **https://<Server name>:8443/jmx-console**, where **<Server name>** is the name of the machine on which Universal CMDB is installed.
 - b. Under **UCMDB**, click **UCMDB:service=Dal Services** to open the JMX MBean View.
 - c. Invoke the **rebuildIndexes** JMX method with a **customerID** parameter value of **1**.

Note:

- During the rebuilding of the indexes, the UCMDB database log file size may increase. Make sure that the UCMDB database log file has enough disk space.
- Before you invoke the **rebuildIndexes** JMX method, make sure that the discovery, enrichment, or other jobs that modify the data are not running.
- The **RebuildIndexes** job is visible only for Customer 1 (default customer) in UI, even if the Server has multiple customers.
- The **rebuildIndexes** JMX method recreates the indexes for all customers even if the customerID is set to 1, in case the server has multiple customers or has the authorized state.

How to modify the RebuildIndexes job definition and scheduler information

If necessary, you can modify the definition of the **RebuildIndexes** job. To do so,

1. On UCMDB UI, go to **Administration > Scheduler > Job Scheduler**.
2. Select the **RebuildIndexes** job, and click **Edit** .

3. Modify the job definition and scheduler information as necessary to meet your needs.
4. Click **OK**.


Scheduler User Interface

This section includes (in alphabetical order):

Action Definition Dialog Box	253
Filter Dialog Box	254
Job Definition Dialog Box	255
Job Scheduler Page	258
Select Days Dialog Box	260
Select Hours Dialog Box	260

Action Definition Dialog Box

This dialog box enables you to select a required action in a list of actions that can be run by the Scheduler.

To access	Click the Add  button in the Actions pane in the Job Definition dialog box.
Important information	<p>After selecting the required action, click Next to display a list of actions. The list of action details depends on which action you choose.</p> <p>For example, if you select Run an Enrichment Rule, a list of the existing Enrichment Rules appears. Select the required Enrichment rules. You can select up to 15 items.</p>
Relevant tasks	"How to Define Tasks That Are Activated on a Periodic Basis" on page 249

User interface elements are described below (unlabeled elements are shown in angle brackets):

UI Element (A-Z)	Description
<Click a column header>	For details, see Sort Column Content Dialog Box in the <i>Modeling section of the UCMDB Help</i> .
<Right-click a column header>	For details, see Sort Column Content Dialog Box in the <i>Modeling section of the UCMDB Help</i> .

UI Element (A-Z)	Description
Actions	For a list of actions that can be run by the Scheduler, see "Scheduler Actions" below .


Scheduler Actions

This section contains a list of actions that can be run by the Scheduler.

- **Rerun Discovery on View.** Runs discovery on the CIs in a selected view. This enables you to configure a general discovery for the entire infrastructure on a less frequent basis, such as once a week, while updating the CIs in important views more frequently, for example, on a daily basis.
- **Run an Enrichment Rule.** Activates the selected Enrichment rule according to its set schedule. Click **Next** to display a list of the available Enrichment rules and select the required ones. For details, see Enrichment Manager in the *Modeling section of the UCMDB Help*.

Filter Dialog Box

This dialog box enables you to filter the tasks displayed on the Job Scheduler page.

To access	Click the Filter  button on the Job Scheduler page.
Relevant tasks	"How to Define Tasks That Are Activated on a Periodic Basis" on page 249


User interface elements are described below (unlabeled elements are shown in angle brackets):

UI Element (A-Z)	Description
<click a column header>	For details, see Sort Column Content Dialog Box in the <i>Modeling section of the UCMDB Help</i> .
<right-click a column header>	For details, see Sort Column Content Dialog Box in the <i>Modeling section of the UCMDB Help</i> .
Condition	Click inside the box and select the required operator. For details, see Attribute Operator Definitions in the <i>Modeling section of the UCMDB Help</i> .
Display Name	Filters the task list according to one of the following: <ul style="list-style-type: none">• Active• Job Definition

UI Element (A-Z)	Description
	<ul style="list-style-type: none"> • Last Run Time • Name • Next Run Time • Schedule <p>For details, see the Job Scheduler page.</p>
Value	Click inside the box and either enter or select the required value.

Job Definition Dialog Box

This dialog box enables you to add actions to the job you created and define how often they run.

To access	Click the Add  button on the Job Scheduler page.
Relevant tasks	"How to Define Tasks That Are Activated on a Periodic Basis" on page 249

User interface elements are described below:


UI Element (A-Z)	Description
Job Definition	(Optional) A description for this job.
Name	The name of the job.





Actions Pane

This area enables you to add the required actions to the task you created.

Relevant tasks	"How to Define Tasks That Are Activated on a Periodic Basis" on page 249
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User interface elements are described below:

UI Element (A-Z)	Description
	Add. Adds an action to the task. Opens the Action Definition dialog box.



UI Element (A-Z)	Description
	Edit. Enables you to edit an existing action.
	Delete. Deletes an action.
	Up. Moves a selected row up.
	Down. Moves a selected row down.
Action Definition	Displays the action details you selected in the Action Definition dialog box for the action added.
Name	Displays the name of the action that was added to the job.



Scheduler Pane

This area enables you to set the schedule for activating a task.

Important information	<p>When updating a schedule for a task, all jobs run, by default, immediately upon saving the change. If you do not want jobs to run immediately upon updating the schedule, but rather when they are due to run, do the following:</p> <p>In the Administration module > Infrastructure Settings Manager > Integration Settings, set the value for Enable Scheduled Jobs Auto Run to false (ID: enable.scheduled.jobs.auto.run).</p>
Relevant tasks	"How to Define Tasks That Are Activated on a Periodic Basis" on page 249
See also	Cron Expressions in the <i>Modeling section of the UCMDB Help</i>

User interface elements are described below (unlabeled elements are shown in angle brackets):

UI Element (A-Z)	Description
	Automatically set the time zone to the correct one for the server.
	(Appears when you select Cron). Click to validate the Cron expression you entered.
<Schedule options>	<p>Select the required option for scheduling the task. The available options are:</p> <ul style="list-style-type: none"> • Once. Activates the task only once. • Interval. Activates the action at a set time interval. • Daily. Runs a task on a daily basis.

UI Element (A-Z)	Description
	<ul style="list-style-type: none"> • Weekly. Runs a task on a weekly basis. • Monthly. Runs a task on a monthly basis. • Cron. Use a Cron expression to schedule a job. For a description of the fields used in Cron expressions and examples of how to use them, see Cron Expressions in the <i>Modeling section of the UCMDB Help</i>.
Cron Expression	(Appears when you select Cron). Enter a Cron expression in the proper format. For a description of the fields used in Cron expressions and examples of how to use them, see Cron Expressions in the <i>Modeling section of the UCMDB Help</i> .
Days of month	(Appears when you select Monthly). Click the  button to the right of the Days of month box to open the Select Days dialog box and choose the day of the month on which you want to run the action. For details, see the Select Days dialog box.
Days of the week (Sunday - Saturday)	(Appears when you select Weekly). Select the day or days on which you want the action to run.
End by	<p>(Does not appear when you select Once). Choose the date and time when you want the action to stop running by selecting the End by check box and then clicking the down-arrow to the right of the box.</p> <p>Note: This step is optional. If you do not want to specify an ending date, leave the End by check box unselected.</p>
Invocation Hour	<p>(Appears when you select Daily, Weekly, or Monthly.) Choose the time to activate the action. Click the  button to the right of the Invocation Hour box to open the Select Hours dialog box. For details, see the Select Hours dialog box.</p> <p>Note: You can also enter the time manually in the Invocation hour box. Separate times by a comma and enter AM or PM after the hour. The manually entered action times are not restricted to the hour and half hour only: you can assign any hour and minute combination. Use the following format: HH:MM AM, for example, 8:15 AM, 11:59 PM.</p>
Invocation Time	(Appears when you select Once). Choose the date and time you want the action to begin running by clicking the down-arrow to the right of the box.
Months of the year (January - December)	(Appears when you select Monthly). Select the month or months in which you want the action to run.
Repeat every	(Appears only when you select Interval). Type a value for the interval between successive runs and then choose the required unit of time measurement (Minutes, Hours, or Days).


UI Element (A-Z)	Description
	<p>Note: After each change, the next time that the job runs is the current time plus the interval, that is, the job does not start immediately.</p>
Start at	<p>(Does not appear when you select Once). Choose the date and time when the action must begin running by selecting the Start at check box, opening the calendar, selecting the date and time, and clicking OK.</p> <p>Note:</p> <ul style="list-style-type: none"> When selecting the start time, the time zone in the start time is set according to the client machine's location, although it may not match the value selected in Time Zone. This step is optional. If you do not want to specify a beginning time, leave the Start at check box unselected.
Time Zone	<p>Select the time zone according to which the Probe must schedule jobs.</p> <p>The default is <<Data Flow Probe Time Zone>>: the Probe uses its own system-defined time zone. This enables scheduling to take place at different times in different geographical locations.</p> <p>For all Probes to start working at the same time, select a specific time zone. (This assumes that the Probes' system date/time and time zone are correctly configured.)</p>







Job Scheduler Page

This page enables you to define tasks that are activated on a periodic basis. For example, you can define a task that generates a Topology report on a daily basis at 3:00 PM. Or, you can define a schedule for taking snapshots of a specific view on a daily basis.

To access	Select Scheduler from the Administration module on the Navigation Menu or select Managers > Administration > Scheduler .
Relevant tasks	"How to Define Tasks That Are Activated on a Periodic Basis" on page 249


User interface elements are described below (unlabeled elements are shown in angle brackets):

UI Element (A-Z)	Description
	Add. Enables you to create and schedule a job. Opens the Job Definition dialog box.




UI Element (A-Z)	Description
	Edit. Enables you to edit a task. Opens the Job Definition dialog box.
	Delete. Deletes the selected job. Note: The user cannot delete a job scheduler linked to a pattern-based model.
	Filter. Opens the Filter dialog box which enables you to filter the scheduled jobs displayed on the Job Scheduler page.
	Clear. Clears the filter definitions created in the Filter dialog box.
	Customize Columns. Enables you to change the display order of the columns, hide a column, or display a hidden column. Opens the Select Columns dialog box. For details, see Select Columns Dialog Box in the <i>Modeling section of the UCMDB Help</i> .
	Refresh. Refreshes the display of the jobs in the Job Scheduler page.
<Click a column header>	For details, see Sort Column Content Dialog Box in the <i>Modeling section of the UCMDB Help</i> .
<Right-click a column header>	For details, see Sort Column Content Dialog Box in the <i>Modeling section of the UCMDB Help</i> .
Active	Select the check box to activate the scheduled job.
Job Definition	A description of the scheduled job as defined in the Job Definition field in the Job Definition dialog box.
Last Run Time	The last time the job was run.
Name	The name of the scheduled job.
Next Run Time	The next time the job is scheduled to run.
Schedule	How often the job is scheduled to run. For details, see "Scheduler Pane" on page 256 .

Select Days Dialog Box

This dialog box enables you to choose the day on which to activate the action.


To access	Click Monthly in the Job Definition dialog box, and then click the  button to the right of the Days of month box.
Relevant tasks	"How to Define Tasks That Are Activated on a Periodic Basis" on page 249

User interface elements are described below (unlabeled elements are shown in angle brackets>):



UI Element (A-Z)	Description
Actions	<ul style="list-style-type: none"> Select All. Select all the days. Clear Selection. Clear all the selected days. Invert Selection. Switch the selection.
<List of days from 1-31>	<p>Choose the required days by selecting the required check boxes. You can select multiple days.</p> <p>The selected days appear in the Days of month box. For details, see "Scheduler Pane" on page 256.</p>


Select Hours Dialog Box

This dialog box enables you to choose the time at which to activate the action.

To access	In the Job Definition dialog box, click Daily, Weekly, or Monthly , and then click the  button to the right of the Invocation hour box.
Relevant tasks	"How to Define Tasks That Are Activated on a Periodic Basis" on page 249

User interface elements are described below (unlabeled elements are shown in angle brackets>):

UI Element (A-Z)	Description
Actions	<ul style="list-style-type: none"> Select All. Select all the times. Clear Selection. Clear all the selected times.

UI Element (A-Z)	Description
	<ul style="list-style-type: none"> Invert Selection. Switch the selection.
<List of times by the hour and half hour>	<p>Choose all the required times by selecting the required check box. You can select multiple times.</p> <p>The selected hours appear in the Invocation hour box. For details, see "Scheduler Pane" on page 256.</p>

Chapter 10: Recipients Manager

This chapter includes:

Recipients Manager Overview	262
How to Define an Email Recipient	262
Configurable Email Rate Settings	262
Recipients Manager User Interface	263

Recipients Manager Overview

The Recipients Manager enables you to define the recipients who can automatically receive scheduled reports through email, at regular intervals, from the Reports module. For details, see Reports in the *Modeling section of the UCMDB Help*.

How to Define an Email Recipient

You create a new email recipient by clicking the **Add** button on the Recipients Manager page and entering the recipients name and email address. For details, see ["Add Mail Recipient Dialog Box" on page 264](#).

Configurable Email Rate Settings

The table below describes the new infrastructure settings available for configuring sender and recipient email rate (**Administration > Infrastructure Settings Manager > Mail Settings**):

Name	Description	Default Value
Recipient email rate	Recipient cannot receive more than 1 email within X seconds (X is the configurable amount of seconds, 0 means no limit). Default value is 10, this means that a recipient is able to receive up to 6 emails in a minute, no matter who is the sender.	10
Sender email rate	Sender cannot send more than 1 email within X seconds (X is the configurable amount of seconds, 0 means no limit). Default value is 5, this means that a sender is able to send up to 12 emails in a minute, no matter who is the recipient.	5
Sender to same recipient email rate	Sender cannot send more than 1 email within X seconds to the same recipient (X is the configurable amount of seconds, 0 means no limit). Default value is 20. This means that a sender is able to send up to 3 emails in a minute to the same recipient.	20

These settings may influence on each other, meaning that modifying one could have an impact on the other two. That is to say, setting the configurable value for one of these 3 settings to **0** means there is no limitation or restriction for that particular case; setting all 3 settings to **0** means no spam control is desired.


Admin users can easily restore these settings to their default values by selecting a setting and clicking the **Restore Default** button.


Recipients Manager User Interface

This section includes (in alphabetical order):




Add Mail Recipient Dialog Box	264
Recipients Manager Page	265

To access	
Relevant tasks	"How to Define an Email Recipient" on the previous page
See also	"Recipients Manager Overview" on the previous page

UI Element (A-Z)	Description
	Add. Adds an email address for the recipient. You can add more than one email address.


UI Element (A-Z)	Description
	Delete. Deletes the selected email address.
Name	Enter the name of the email recipient.

To access	Select Recipients Manager from the Administration module on the Navigation Menu or select Managers > Administration > Recipients Manager .
Important information	
Relevant tasks	"How to Define an Email Recipient" on page 262
See also	"Recipients Manager Overview" on page 262



UI Element (A-Z)	Description
	Add. Enables you to define a new email recipient.
	Edit. Enables you to edit the selected recipient.
	Delete. Deletes the selected recipient.
E-mail(s)	The email addresses of the email recipient.
Name	The name of the email recipient.

Add Mail Recipient Dialog Box

This dialog box enables you to create a new email recipient or edit the properties of an existing one.


To access	<ul style="list-style-type: none"> To create a new email recipient, click the Add button on the Recipients Manager page. To edit the properties of an existing recipient, select the required recipient and click the  button.
Relevant tasks	"How to Define an Email Recipient" on page 262
See also	"Recipients Manager Overview" on page 262

User interface elements are described below:




UI Element (A-Z)	Description
	Add. Adds an email address for the recipient. You can add more than one email address.
	Delete. Deletes the selected email address.
Name	Enter the name of the email recipient.

Recipients Manager Page

This page enables you to create new email recipients or edit the properties of existing email recipients.

To access	Select Recipients Manager from the Administration module on the Navigation Menu or select Managers > Administration > Recipients Manager .
Important information	The recipients that appear on the Recipients Manager page are updated with the email recipients defined in Reports (click the Open Address Book  button in the Send to box in the Schedule Report dialog box to open the Message Recipients dialog box). Only the recipients whose email addresses are defined here can automatically receive scheduled reports through email from the Reports module.
Relevant tasks	"How to Define an Email Recipient" on page 262
See also	"Recipients Manager Overview" on page 262

User interface elements are described below:

UI Element (A-Z)	Description
	Add. Enables you to define a new email recipient.
	Edit. Enables you to edit the selected recipient.
	Delete. Deletes the selected recipient.
E-mail(s)	The email addresses of the email recipient.
Name	The name of the email recipient.

Chapter 11: CI Lifecycle and the Aging Mechanism

This chapter includes:

The Aging Mechanism Overview	266
CI Lifecycle Overview	267
How to Enable and Run the Aging Mechanism	268
How to Generate CI Lifecycle Data and Filter the Results	270
CI Lifecycle User Interface	271
Aging Parameters	276

Related Information

- ["CI Lifecycle Overview" on the next page](#)
- ["How to Enable and Run the Aging Mechanism" on page 268](#)
- ["Aging Parameters" on page 276](#)
- ["CI Lifecycle User Interface" on page 271](#)
- ["Adapter Configuration Tab"](#)

The Aging Mechanism Overview

After your system has been running for some time, previously discovered CIs may no longer exist. Such CIs should be removed from the CMDB to keep it up to date.

Data Flow Management (DFM) runs periodically and, by default, updates the last access time for all CIs and relationships that it discovers. This process is known as "touching", and prevents CIs and relationships that represent active components in the system from becoming deletion candidates. If DFM does not discover a CI that exists in the CMDB, the last access time is not updated, so after some predefined time (by default, 20 days) the CI becomes a deletion candidate. The aging period is set per CI type as a static attribute in the CI Type Manager (**Deletion Candidate Period**).

Deletion candidates are reviewed and managed in the CI Lifecycle module.

If the CI remains untouched for a longer period of time (by default, 40 days), the aging mechanism deletes the CI from the system. In other words, aging deletes CIs and relationships that are no longer relevant, that is, have not been accessed for a specified period of time (by default, 40 days).

The deletion of large quantities of CIs and relationships creates a significant load for the CMDB and database servers and can impact the overall CMDB performance. To reduce this performance impact, the aging mechanism divides the objects to be deleted into chunks. A delay between chunks lowers the database load and enables other tasks to continue working. For faster work, you can shorten the delay, but the default delay value is the recommended delay. For details, see ["Aging Parameters" on page 276](#).

Note:

- Touch parameters are defined in the **DataFlowProbe.properties** file. For details, see the Probe Manager Configurations section in DataFlowProbe.properties File in the *Data Flow Management section of the UCMDB Help*.
- The aging mechanism is enabled by default.
- Aging operations are run only on CIs and relationships that have **Enable Aging** set to **true**. By default, CIs and relationships added by out-of-the-box DFM adapters are created with **Enable Aging** set to **true**. (For details, see **Enable Aging** in the Configuration Item Properties Dialog Box in the *Modeling section of the UCMDB Help*.) This behavior can be changed in the **Enable aging** check box in DFM in the Adapter Configuration tab (in the Results Management pane). For details, see Adapter Configuration Tab in the *Data Flow Management section of the UCMDB Help* and ["Enable Aging" on page 272](#).

Related Information

- ["CI Lifecycle Overview" below](#)
- ["How to Enable and Run the Aging Mechanism" on the next page](#)
- ["Aging Parameters" on page 276](#)
- ["CI Lifecycle User Interface" on page 271](#)
- ["Adapter Configuration Tab"](#)

CI Lifecycle Overview

The CI Lifecycle application enables you to view a list of CIs and relationships that are candidates for deletion by the aging mechanism, and to initiate the aging procedure. You can also select specific CIs or relationships and postpone their deletion or mark them as deletion-proof.

For each CIT, you can set the time period before a specific CI becomes a candidate for deletion or before it is actually deleted. For details, see Actual Deletion Period, Deletion Candidate Period, and Enable Aging in the Configuration Item Properties Dialog Box in the *Modeling section of the UCMDB Help*.

Related Information

- ["How to Enable and Run the Aging Mechanism"](#)
- ["How to Generate CI Lifecycle Data and Filter the Results" on page 270](#)
- ["CI Lifecycle User Interface" on page 271](#)

How to Enable and Run the Aging Mechanism

This task describes how to enable aging and run the aging mechanism.

This task includes the following steps:

- ["Task 1: Enable Aging" below](#)
- ["Task 2: First Aging Run" on the next page](#)

Task 1: Enable Aging

Access the Aging Status tab on the CI Lifecycle page (**Managers > Administration > CI Lifecycle**). Select the **Enable Aging** check box. For details, see ["Aging Status Tab" on page 272](#).

Note: When aging is turned on or off (that is, enabled or disabled), you must restart the server for the changed setting to take effect.

To turn on aging for an existing CI, access the CI in IT Universe Manager, right-click it and select **Properties**. Set the **Enable Aging** property to **True** and click **OK**.

To set aging to be enabled by default for all new CIs of a specific type, access the CI type in the Attributes tab of CI Type Manager, select the **Enable Aging** attribute and click **Edit**. In the Edit Attribute dialog box, select **True** for the **Default Value** and click **OK**.

Task 2: First Aging Run

After your system has been running for some time, there are probably many CIs that need deleting. You should perform this step in the procedure to keep the CMDB up to date.

If the number of CIs to be deleted is greater than 10,000, a confirmation message is displayed. Choose between the following options:

- CI Lifecycle divides the number of CIs and/or relationships that must be deleted into chunks (to avoid overloading the database), deletes them, and adds the information to the History. Chunk size is determined by the value in the **Aging Chunk Size** field in the Infrastructure Settings Manager.

This is the preferred method of deletion because the History is updated with the information and there is no server downtime.

- You run the database aging tool, located at **C:\UCMDB\UCMDBServer\tools\dbscripts\dbtool.bat**. If you choose this option, you must stop the UCMDB server service.

You would choose this second option if you needed a fast system of deletion: the database aging tool is an order of magnitude faster than the aging mechanism.

Caution: Before running this option, be aware of the following:

- You must completely shut down the server before running the tool, that is, there will be server downtime.
- Before running the database aging tool, disable the database's transaction logging scheme (such as transaction logs or recovery logs), to speed up the tool's running time.
- After running the database aging tool, run **clearProbeData.bat** on every Data Flow Probe. This file resides in the following location: **C:\UCMDB\DataFlowProbe\tools**.

Note: The **clearProbeData** script resets the Data Flow Probe's DB Schemas and file system state. After running this script the Data Flow Probe re-sends all discovered data to UCMDB. This could potentially create a significant load on the UCMDB Server.

- No information is saved in the History.

To run the database aging tool, follow these steps:

1. Back up the CMDB database schemas. This step is mandatory.
2. Run the tool in a testing environment before running it in a production environment. This step is recommended.
3. Stop the UCMDB server.
4. Run the **dbtool.bat** file from the file system.
5. Restart the UCMDB server.
6. Return to the Aging Status tab and enable aging.
7. Invoke **clearProbeData.bat** on every Data Flow Probe connected to the UCMDB Server.

How to Generate CI Lifecycle Data and Filter the Results

This task describes how to generate a list of CIs that are candidates for deletion, and to filter the results.

This task includes the following steps:

- ["Task 1: Generate CI Lifecycle Data" below](#)
- ["Task 2: Filter the CI Lifecycle Results" on the next page](#)


Task 1: Generate CI Lifecycle Data


To generate CI Lifecycle results for CIs or relationships, select either the **CIs** tab or the **Relationship** tab. Select the time period in which to search, using the drop-down calendars in the **From** and **To** fields, and click **Generate**. For details, see ["CI Lifecycle Page" on page 275](#).

CI Lifecycle displays a list of CIs that are candidates for deletion.

Tip: If no results are generated, try extending the time period further into the future.

Task 2: Filter the CI Lifecycle Results

To filter the CI Lifecycle data, click the **Filter**  button to open the Filter dialog box. For each column by which you want to filter, select a condition from the drop-down list and fill in the value column, either by entering a value, selecting from a drop-down list, or using the calendar. Click **OK** to apply your filter.

To clear the filter and restore the original results, click the **Clear**  button. For details, see ["Filter Dialog Box" on page 276](#).


CI Lifecycle User Interface

This section includes (in alphabetical order):

Aging Run Statistics Dialog Box	271
Aging Status Tab	272
CI Lifecycle and Relationship Tabs	273
CI Lifecycle Page	275
Filter Dialog Box	276

Aging Run Statistics Dialog Box

This dialog box enables you to view statistics for the five previous runs of the aging mechanism.

To access	Click the Statistics  button on the CI Lifecycle page.
Relevant tasks	"How to Enable and Run the Aging Mechanism" on page 268

User interface elements are described below:

UI Element (A-Z)	Description
Aging Runs	Run at. The start and finish time of the run. Deleted. The number of CIs that have been deleted. Failed. The number of CIs that have not been deleted.
Errors	ID. The IDs of the failed CIs, that is, of the CIs that could not be deleted.

UI Element (A-Z)	Description
	Error message. A message describing the cause of failure.

Aging Status Tab

This dialog box enables you to enable the aging mechanism and to run the mechanism for the first time.

To access	Select CI Lifecycle from the Navigation Menu or select Administration > CI Lifecycle .
Important information	<p>This tab displays information about the number of CIs that are candidates for deletion, and functions as follows, if you select the Enable Aging check box:</p> <ul style="list-style-type: none"> • If the number of CIs for deletion is larger than 10,000, you can choose to use the aging mechanism to delete the CIs in chunks, or to use the database aging tool. For details on which procedure to use, see "Task 2: First Aging Run" on page 269. • If the number of CIs for deletion is smaller than 10,000, the estimated time for deletion is displayed and the CIs are immediately deleted. A progress bar shows the stage of the deletion.
Relevant tasks	"How to Enable and Run the Aging Mechanism" on page 268
See also	"The Aging Mechanism Overview" on page 266

User interface elements are described below:










UI Element (A-Z)	Description
Enable Aging	<ul style="list-style-type: none"> • To enable aging, select the check box. <p>The frequency and size of the chunks that are marked as candidates for deletion are determined in Infrastructure Settings. For details, see "Aging Parameters" on page 276.</p> <ul style="list-style-type: none"> • To disable aging, clear the check box.
Run results	<p>Total CIs to delete. The number of CIs or relationships that are delete candidates and that are being deleted by the aging mechanism.</p> <p>Deleted. The number of CIs or relationships that have been deleted.</p> <p>Failed. CIs or relationships that could not be deleted. If any failures exist, click the Failed link to view their details.</p>





CI Lifecycle and Relationship Tabs

This area enables you to display a list of CIs and relationships that are candidates for deletion, and to manage the list (for example, to delete or prevent or postpone deletion of specific CIs, to view statistics, and to filter the list).

To access	Select Administration > CI Lifecycle .
Relevant tasks	"How to Generate CI Lifecycle Data and Filter the Results" on page 270
See also	<ul style="list-style-type: none"> • "CI Lifecycle Overview" on page 267 • "The Aging Mechanism Overview" on page 266 • "Working with CIs" in the <i>Modeling section of the UCMDB Help</i>

User interface elements are described below (unlabeled elements are shown in angle brackets>):

UI Element (A-Z)	Description
	Postpone Deletion. Enables you to delay the deletion of a CI by one aging period. It disappears from the list of candidates for deletion. (If the CI is not touched again for a full aging period, it again becomes a candidate for deletion.)
	Mark as Deletion Proof. Enables you to prevent a CI or relationship from being deleted. It disappears from the list of candidates for deletion.
	Delete. Deletes the selected CI or relationship.
	Statistics. Enables you to view statistics (such as the start and finish time of each run and the number of deleted CIs), for the previous five runs of the aging mechanism. For details, see "Aging Status Tab" on the previous page .
	Select/Clear All. Selects or clears all data on the current page.
	Refresh. Refreshes the displayed data.
	Filter. Opens the Filter dialog box, which enables you to customize the filter. For details, see "Filter Dialog Box" on page 276 .
	Clear. Clears the filter and display the full results.
	Customize Columns. Opens the Select Columns dialog box, which enables you to change the display order of the columns, hide a column, or display a hidden column. For details, see "Select Columns Dialog Box" on

UI Element (A-Z)	Description
	page 1 in the <i>Modeling section of the UCMDB Help</i> .
	Click the arrow to define the number of rows that should appear on each display page.
	Click to navigate through the results page by page or to jump to the first or last page.
	Generates data for a selected period. Tip: If no results are generated, try extending the time period further into the future (the To field).
	Export Data to File. Enables you to select the format for previewing and exporting the table data. The available options are: <ul style="list-style-type: none"> • CSV. The table data is formatted as a comma-separated values (CSV) text file that can be displayed in a spreadsheet. Note: For the CSV formatted table data to display correctly, the comma (,) must be defined as the list separator. In Windows, to verify or modify the list separator value, open Regional Options from the Control Panel, and on the Numbers tab ensure that the comma is defined as the List Separator value. • PDF. The table data is exported in PDF format. Note: When exporting to PDF, select a reasonable number of columns to display to ensure that the report is legible. • XLS. The table data is formatted as an .xls (Excel) file that can be displayed in a spreadsheet. • XML. The table data is formatted as an XML file that can be opened in a text or XML editor.
<Right-click a CI>	For details on the menu options, see in the <i>Modeling section of the UCMDB Help</i> .
<Right-click a column header>	For details, see "Sort Column Content Dialog Box" on page 1 in the <i>Modeling section of the UCMDB Help</i> .
CIs/Relationships tabs	Select to see a list of CIs or relationships that are candidates for deletion: Select. Select the check box to select a CI or relationship before performing an operation on it (such as Delete or Postpone Deletion). End1. The query node at one end of the relationship (relevant only for relationships). Display Label. The name of the CI or relationship as it appears in the Topology Map.

UI Element (A-Z)	Description
	<p>End2. The query node at the second end of the relationship (relevant only for relationships).</p> <p>CI Type. The type of the CI or relationship.</p> <p>Last Access Time. The last time that the CI or relationship was accessed, whether it was updated or discovered by the DFM process.</p> <p>Updated by. The administrator or process that updated the CI or relationship.</p> <p>Actual Delete Time. The date and time when the CI or relationship is deleted.</p>
From	Click the arrow and use the calendar to select the beginning date and time for the CI Lifecycle results.
Relationships tab	Select to see lifecycle results for relationships.
Rows per Page	Select the number of rows per page from the drop-down list.
To	Click the arrow and use the calendar to select the end date and time for the CI Lifecycle results.

CI Lifecycle Page

This page enables you to enable and run the aging mechanism. It also enables you to display a list of CIs and relationships that are candidates for deletion and to manage the list (for example, to delete, prevent, or postpone deletion of specific CIs, to view statistics, and to filter the list).

To access	Select Administration > CI Lifecycle .
Important information	<p>The CI Lifecycle page includes the following tabs:</p> <ul style="list-style-type: none"> • Aging Status. Use this tab to enable the aging mechanism and to run aging. For details, see "Aging Status Tab" on page 272. • CIs. Use this tab to display a list of CIs that are candidates for deletion. For details, see "CI Lifecycle and Relationship Tabs" on page 273. • Relationships. Displays the same information as the CIs tab, with the addition of the End1 and End2 columns. <p>The tab that is displayed by default depends on whether aging is enabled or disabled:</p> <ul style="list-style-type: none"> • If aging is enabled, the CIs tab is displayed. • If aging is disabled, the Aging Status tab is displayed.


Relevant tasks	<ul style="list-style-type: none"> • "How to Enable and Run the Aging Mechanism" on page 268 • "How to Generate CI Lifecycle Data and Filter the Results" on page 270
See also	<ul style="list-style-type: none"> • "CI Lifecycle Overview" on page 267 • "The Aging Mechanism Overview" on page 266 • Working with CIs in the <i>Modeling</i> section of the <i>UCMDB Help</i>

Filter Dialog Box

This dialog box enables you to filter the list of CIs that are candidates for deletion.

To access	Click Filter on the CI Lifecycle page.
Relevant Tasks	"How to Generate CI Lifecycle Data and Filter the Results" on page 270
See also	"CI Lifecycle Overview" on page 267

User interface elements are described below:

UI Element (A-Z)	Description
Condition	Click in the Condition column and select an option.
Display Name	The columns displayed for the CIs or relationships on the CI Lifecycle page.
Value	<p>Click in the Value column to set a value for the selected condition. Depending on the condition selected, you can select a value from a drop-down list, select a date and time from the calendar, or click the ellipsis  button to open an editing dialog box where you can enter a value.</p> <p>When the conditions Like or Like ignore case are selected in the Condition column, you can use a wildcard (%) before and after the string for which you are searching.</p> <p>Note: You must select a condition before entering a value.</p>

Aging Parameters

Aging parameters are defined in Infrastructure Settings (**Administration > Infrastructure Settings Manager > Aging Settings**):

- **Aging Chunk Size.** The number of CIs or relationships that are sent to the aging mechanism at one time. The default is 5,000.
- **Aging Scheduler Hour of the First Run.** Defines at what time aging first runs after server startup (for example, 2=2:00 AM).
- **Aging Scheduler Interval.** Defines the interval between aging runs. The interval value is in hours.
- **Delay Between Chunks in Milliseconds.** The period between one chunk being deleted by the aging mechanism and the next chunk being sent to the aging mechanism to be deleted. The default is 30 seconds, that is, 30,000 milliseconds.

Related Information

- ["How to Change the Root Context for UCMDB Components" on page 114](#)
- ["How to Enable and Run the Aging Mechanism" on page 268](#)
- ["CI Lifecycle User Interface" on page 271](#)

Configuring Security

Chapter 12: User Permissions for UCMDB

This chapter includes:

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User Permissions in a Single Tenant Environment

Note: When working in a multi-tenancy environment, refer to ["User Permissions in a Multi-Tenancy Environment" on page 287](#).

All resources (queries, views, impact rules, and custom reports) are assigned a **resource owner**. The resource owner is defined as the user who created the resource and cannot be changed to a different resource owner. However it is possible to delete the ownership of the resource, which results in a resource with no resource owner.

Users are assigned roles which define the permissions they have. A user's permission to perform a specific action on a specific resource is determined by the following factors:

- The user who is the resource owner of a resource has all permissions for that resource.
- For a user who is not the resource owner, the user must be assigned a role that includes the requested permission for that resource.

Folders are also considered resources and follow the same permissions rules as other resources. The permissions applied to a folder automatically apply to all the resources contained in the selected folder. In order to delete or update a folder, you need delete or update permission on its parent folder.

An additional type of permission that is relevant for folders is **Create** permission, which enables you to create resources in that folder. **Create** permission can be selected for queries, views, Impact rules, and custom reports. **Create** permission for a folder also enables you to create sub-folders in that folder.

There are also general actions that are not linked to specific resources, such as the general action **Data Update**, which permits the user to update CIs in any view for which he has **Update** permission.

It is often necessary for a user to have a set of different permissions to enable him to perform a specific operation. Thus, for a user to make changes to the CIs in a specific view in IT Universe Manager, he requires the following permissions:

- Permission to access the IT Universe Manager module.
- Update permission for the specific view.
- Permission for the general action **Data Update**. If he is lacking this permission, he cannot update the CIs in the view.

For details on the available resource permissions and general actions, see ["Permissions Summary" on page 324](#).

User Permissions Workflow

Note: When working in a multi-tenancy environment, refer to ["Multi-Tenancy Workflow" on page 294](#).

The following task describes a typical workflow in a single-tenant environment:

1. Create Resource Groups

If relevant, create resource groups in the Resource Groups module to assist in defining permissions during role creation. For details, see ["How to Define a Resource Group" on page 331](#).

2. Create Roles

Create roles in the Roles Management module defining the permissions you want to assign to different users. For details, see ["How to Create a New Role and Define Permissions for the Role" on page 316](#).

3. Create Users and Groups and Assign Roles to Them

Create users and user groups in the Users and Groups module. Assign roles to the users and groups according to the permissions you want to grant each one. For details, see ["Users and Groups Workflow" on page 303](#).

4. Review the Role Assignments

Review the roles assigned to each user and group to ensure that the users have been granted the required permissions. Check the **Permissions Overview** tab in the Users and Groups module. For details, see ["Users and Groups Page" on page 311](#).

User Permissions for the UCMDB Browser Module

To view and update data in the UCMDB Browser module, permissions for specific views and CIs are required. These permissions are assigned in the Browser CI Access Control tab and they are not relevant to the permissions for the UCMDB user interface. Permission for the general action **View CIs** is required in addition to the CI permissions defined in this tab (permission for the **Data Update** general action is not relevant).

TQL query calculation is optimized when a user's world contains fewer than 1000 CIs and links (not including federated data).

Note: The size of a user's world is calculated once in each 24-hour period to see if TQL query calculation can be optimized. Any change in an IT world that reduces a user's world size to less than the threshold will cause the optimization to occur only after that once-per-day calculation is performed.

Defining Permission for All CIs

You can grant permission to view or edit all CIs in the CMDB by selecting one of the check boxes at the top of the page:

- **View All.** Grants permission to view all CIs and relationships in the CMDB.
- **Edit All.** Grants permission to view all CIs and relationships and to edit all CIs in the CMDB.

Defining Permission for CIs by Views

View permission for the views themselves is based on the view permissions granted for the UCMDB UI in the Resources tab. Any view included in the role's permitted views can also be viewed in the UCMDB Browser module. (You can also grant view permission for a view using the **View** option described below.) However, additional permissions are required to edit the CIs of the view.

When **Views** is selected as the resource type (Views mode), you can select a specific view or folder and assign any of the following permissions:

- **View.** Grants permission to view all CIs and relationships returned by the view. (This is equivalent to the view permission granted in the Resources tab.)
- **Edit All CIs.** Grants permission to view all CIs and relationships and to edit all CIs returned by the view.
- **Edit By CIT.** Grants permission to view all CIs and relationships returned by the view and to edit the CIs returned by the view that match the CI types selected in CI Types mode. When you apply this option, a dialog box gives you the option to switch to CI Types mode and select **Edit In View**.

In addition, the user who created a view (the owner of the view) has view permission for the CIs in that view, even if the view is not included in any of the user's roles.

Defining Permission for CIs by CI Types

When **CI Types** is selected as the resource type (CI Types mode), you can select a CI type in the tree and select any of the following actions:

- **View All CIs.** Grants permission to view all CIs of the selected type anywhere in the CMDB.
- **Edit All CIs.** Grants permission to view and edit all CIs of the selected type anywhere in the CMDB.
- **Edit In View.** Grants permission to edit CIs of the selected type in views for which **Edit By CIT** permission was granted in Views mode. When you apply this option, a dialog box gives you the option to switch to Views mode and select **Edit By CIT**.
- **Create CI.** Grants permission to create CIs of the selected type.

Note: Permissions for relationships cannot be assigned by relationship type. A role that has edit or create permissions for two CIs is also granted permission to create relationships between them

according to the templates defined in the Assisted Modeling feature of the UCMDB Browser module.

CI Permissions Example

To demonstrate the CI permissions, consider a view which contains a Node CI, an IP Address CI, and an IP Subnet CI.

The following are possible permission configurations for this view:

- **Edit All CIs** permission for the view in Views mode. This grants view and edit permission for all three CIs in the view, even if no permissions were assigned in CI Types mode.
- **Edit All CIs** permission for the Node, IP Address, and IP Subnet CI types in CI Types mode. This grants view and edit permission for all three CIs in the view, even if no permissions were assigned in Views mode.
- **Edit By CIT** permission for the view in Views mode and **Edit In View** permission for Node and IP Address CI types. This grants view and edit permission for the Node and IP Address CIs, but not for the IP Subnet CI.

Defining Permissions by Calculated Relationship Triplets

In the CI Type Manager, you define triplets in the Triplets tab for calculated relationships. Each triplet consists of a source CI type, a target CI type, and a relationship. Such triplets can be used to add permissions to roles as follows:

- For calculated relationships of type **authorized_relationship_add**, if a role includes permission for both the source and target CI types, the triplet definition also grants it permission to create the specified relationship between CIs of those types.
- For calculated relationships of type **Folding rules**, if a role includes permissions for the source CI type, then the same permissions are granted for the target CI type as well as permission to view the specified relationship between CIs of those types. (This follows the CI composition logic used in Universal CMDB Configuration Manager. For details, see "Content Management Overview" in the *Configuration Manager section of the UCMDB Online Help*.)

For example, if a Folding rule defines a triplet of node CI type related to an IP address CI type via containment, users that have permissions to view or edit a node CI have the same permissions for the

IP address CI related to the node via containment and permission to view the containment relationship between a node CI and an IP address CI.

Note:

- A user who creates a CI or relationship in the Assisted Modeling feature of the UCMDB Browser module (the owner of the object) has all permissions for that object.

Multi-Tenancy Overview

Note: This section is only relevant when multi-tenancy is enabled.

This section includes the following topics:

- ["Introduction" below](#)
- ["Owner and Consumer Tenants" on the next page](#)
- ["Resource Owner" on the next page](#)
- ["Default Tenants for Users and Groups" on the next page](#)
- ["User Ownership and Tenancy Rules" on page 286](#)
- ["Default Tenant Rules - Advanced Information" on page 287](#)

Introduction

Multi-tenancy is the ability for multiple customers or tenants to use the same shared UCMDB environment. UCMDB enables multiple tenants to use an implementation of the UCMDB with layered permissions. This enables tenant users to access only that data and those resources that are relevant to that tenant. This includes CI data and resources such as TQLs, views, reports, snapshots, and so forth. Multi-tenancy is a method of working in UCMDB which allocates the CIs in your IT Universe and the resources in your system to various tenants.

There are two main layers to multi-tenancy, tenants and users. Permissions are applied across UCMDB based on the tenant assigned and the user's permission levels. Both the tenant level and the user's permission level determines what can be created and accessed in the system.

Owner and Consumer Tenants

Each CI, view, query, custom report, or Impact rule can belong to one particular tenant, known as the **owner tenant** of the resource. Other tenants can be designated as **consumer tenants** of the same resource.

Owner tenant status is associated with full permission for the resource (view, update, and delete). Consumer tenant status is associated with partial permission (view only). The owner tenant of a resource is also automatically included as a consumer tenant of that resource.

The owner tenant and consumer tenants can be updated in the Assign Tenants dialog box. When you assign an owner tenant or consumer tenant to a folder, all of the resources in that folder are assigned that tenant as an **inherited owner tenant** or an **inherited consumer tenant** respectively. (Inherited tenants are not relevant for CIs.) There can thus be one owner tenant assigned to a resource, but it can have several inherited owner tenants from its containing folders. A resource can have several consumer tenants and it is possible to select all existing tenants as consumer tenants for a resource.

For details on assigning tenants to resources, see ["Assign Tenants Dialog Box" on page 296](#).


Resource Owner

Every resource, other than CIs, is also assigned a **resource owner**, which is independent of the resource's owner tenant. The resource owner is defined as the user who created the resource and cannot be changed to a different resource owner. However it is possible to delete the ownership of the resource, which results in a resource with no resource owner (the tenancy of the resource is unaffected).

The resource owner is an additional property not related to the tenant property that enables the user that created a resource to 'own' that resource. For example, if a user belonging to a specific tenant has permissions to create TQLs but may not have general view and updates permissions, the user as the resource owner has permissions to view and update only the TQL he created.

Default Tenants for Users and Groups

Every UCMDB user and user group can be assigned a default tenant. The default tenant of the user or the user's group can be used to define the owner tenant and consumer tenants of CIs and resources created by that user.

You can set the default tenant for a user or group by clicking the **Set Default Tenant**  button in the toolbar of the Users and Groups module, or select the tenant in the wizard during creation of the user or group.

For rules and additional information on the default tenant, see ["Multi-Tenancy Overview" on page 284](#).

User Ownership and Tenancy Rules

The following table summarizes the user ownership and tenancy rules for CIs and other resources:

Term	Description	As Applied to Resources	As Applied to CIs
Resource owner	The user that created the resource.	<ul style="list-style-type: none"> Resource can have only one Automatically defined as the user logged in at the time of creation Cannot be changed (but can be deleted) 	N/A
Owner tenant	The tenant that has full permission on the resource or CI.	<ul style="list-style-type: none"> Can have one assigned owner tenant and multiple inherited owner tenants Automatically defined based on the user logged in at the time of creation Can be updated, but there must be an owner tenant defined 	<ul style="list-style-type: none"> Only one Automatically defined based on the user logged in at the time of creation Can be updated, but there must be an owner tenant defined
Consumer tenant	The tenant or tenants that can consume or use the resource or CI.	<ul style="list-style-type: none"> Can be multiple Automatically defined based on the user logged in at the time of creation Can be updated or deleted 	<ul style="list-style-type: none"> Can be multiple Automatically defined based on the user logged in at the time of creation Can be updated or deleted

Default Tenant Rules - Advanced Information

The initial owner tenant and consumer tenants of a new CI or resource are determined according to the following rules:

- When a user creates a resource, the initial owner tenant and consumer tenant of that resource are defined as the user's default tenant.

Note: The same tenant is used for both the initial owner tenant and consumer tenant of the created resource.

- If the user has no default tenant defined and the user is a member of one or more groups, UCMDB checks the default tenant of each group (including a recursive check of the parent groups). If a single default tenant is shared in common by the groups, that tenant is used for the resource.

Note: If some of the user's groups share a common default tenant, and the other groups have no default tenant defined, the common tenant is used for the resource. If any group has a different default tenant, neither tenant is used for the resource.

- If neither of the above criteria were satisfied, UCMDB checks all of the user's role assignments. If all of the role assignments for the user are in connection with the same tenant, that tenant is defined as the initial owner tenant and consumer tenant of the created CI or resource.
- If none of the above conditions are satisfied, the initial owner tenant and consumer tenant are configured in the CMDB settings.

User Permissions in a Multi-Tenancy Environment

Note: This section is only relevant when multi-tenancy is enabled. When working in a single-tenant environment, refer to ["User Permissions in a Single Tenant Environment" on page 279](#).

This section includes the following topics:

- ["Required Permissions for Resources" on the next page](#)
- ["User Permissions for General Actions" on page 290](#)

- ["Required Permissions for Tenant Assignments" on page 291](#)
- ["Multi-Tenancy in Package Manager" on page 291](#)

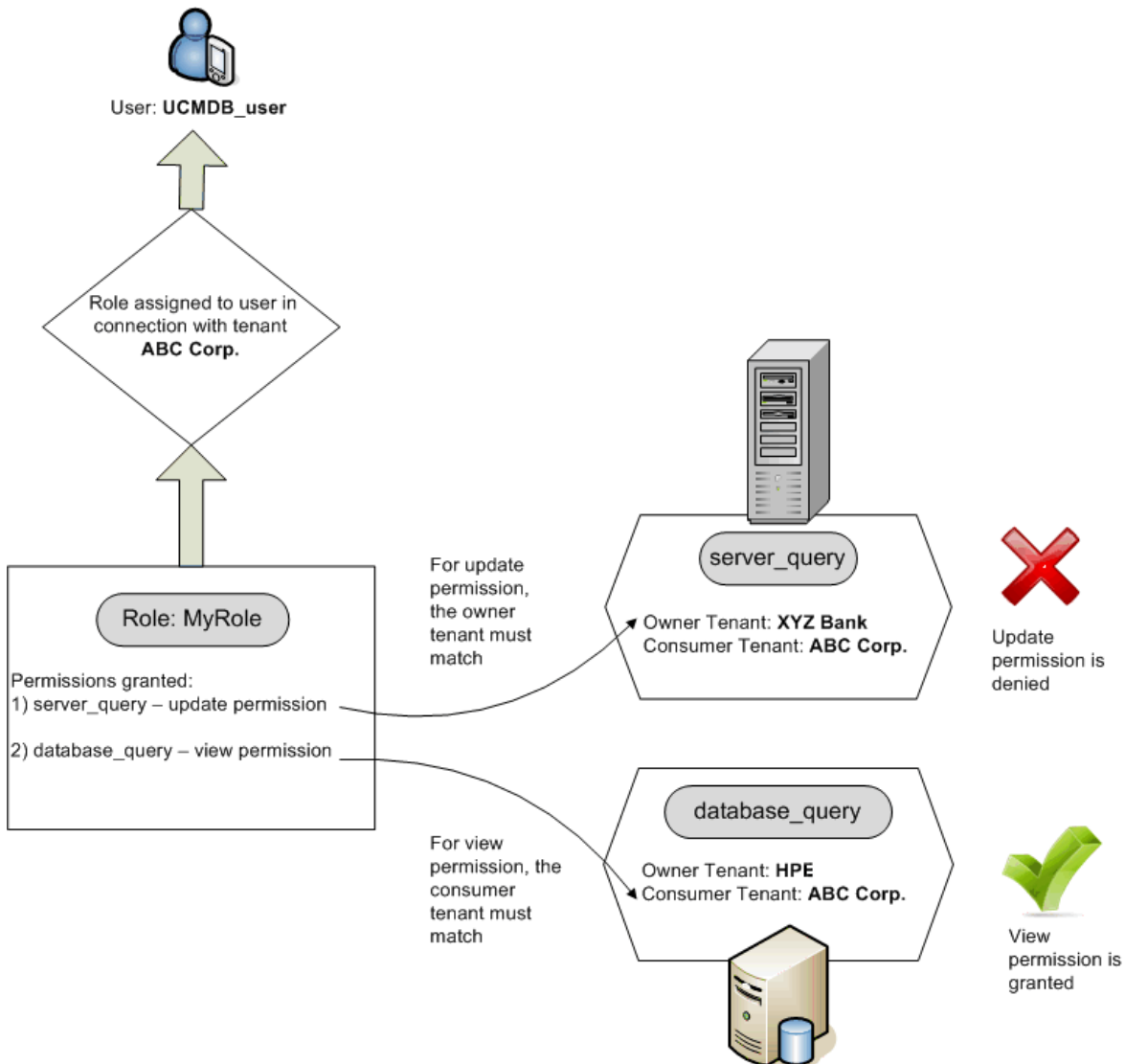
Required Permissions for Resources

Users are assigned roles which define the permissions they have. The role assignments are defined in connection with specific tenants.

A user's permission to perform a specific action on a specific resource is determined by several factors:

- The user who is the resource owner of a resource has all permissions for that resource (except for permission to change the tenant assignment).
- For a user who is not the resource owner, the following conditions must be satisfied for permission to perform a requested action:
 - The user is assigned a role that includes the requested permission for that resource.
 - The tenant associated with that role assignment matches the relevant tenant of the resource. For view permission, it must match one of the consumer tenants (or inherited consumer tenants) of the resource. For update or delete permission, it must match the owner tenant (or one of the inherited owner tenants) of the resource.

For example, consider a role that grants update permission for the query `server_query` and view permission for the query `database_query`. You assign this role to the user `UCMDB_user` in connection with the tenant `ABC Corporation`. (`UCMDB_user` is not the resource owner of either query.) `ABC Corporation` is among the consumer tenants of both `server_query` and `database_query`, but it is not the owner tenant or inherited owner tenant of either query. `UCMDB_user` can thus view `database_query`, because the role grants him view permission in connection with a consumer tenant of that query. However, he cannot update `server_query` despite the update permission granted by the role, because the role was not assigned in connection with the owner tenant of that query.



Folders are also considered resources and follow the same permissions rules as other resources. The permissions applied to a folder automatically apply to all the resources contained in the selected folder. In order to delete or update a folder, you need delete or update permission on its parent folder.

An additional type of permission that is relevant for folders is **Create** permission, which enables you to create resources in that folder. **Create** permission can be selected for queries, views, Impact rules, and custom reports. **Create** permission for a folder also enables you to create sub-folders in that folder. For a user to create resources in a folder, the role assigned to him must be associated with the tenant that is the owner tenant (or inherited owner tenant) of the selected folder. Thus if the owner tenant of a folder is ABC Corporation and a user is assigned a role with **Create Views** permission for that folder in connection with the tenant XYZ Bank, he is unable to create any views in that folder.

Note: For UI Module and CIT Menu Item permissions, the tenant assignment is not relevant.

User Permissions for General Actions

A similar requirement is applied for determining a user's permissions for most general actions. If a user is granted permission for the general action **View CIs** in connection with a specific tenant, he can only view CIs that include that tenant among its consumer tenants or owner tenant. If a user is granted permission for the general action **Update Data** in connection with a specific tenant, he can only update CIs whose owner tenant matches that tenant.

For example, suppose a user is assigned a role which grants him permission for the general actions View CIs and Update Data in connection with tenant_A. The following are the tenancy assignments for three CIs in a view:

- **DB_1.** Owner tenant: tenant_A, Consumer tenants: tenant_A, tenant_B
- **DB_2.** Owner tenant: tenant_C, Consumer tenants: tenant_A, tenant_C
- **CPU_1.** Owner tenant: tenant_B, Consumer tenants: tenant_B, tenant_C

The user thus has update and view permission for DB_1, but view permission only for DB_2. He has no permissions for CPU_1 (the CI is not visible to him).

If the same role was assigned to him in connection with both tenant_A and tenant_B, he would have update and view permission for both DB_1 and CPU_1, but view permission only for DB_2.

It is often necessary for a user to have a set of different permissions to enable him to perform a specific operation. Thus, for a user to view the CIs in a specific view in IT Universe Manager, he requires the following permissions:

- Permission to access the IT Universe Manager module. The tenant assignment is not relevant for this permission.
- View permission for the specific view (or for all views) in connection with a tenant that is among the consumer tenants of that view. If he is lacking this permission, he will not see the view at all.
- Permission for the general action **View CIs** in connection with a tenant that is among the consumer tenants of each CI in the view. If he is lacking this permission, he will see an empty view. If he has this permission in connection with a tenant that is included among the consumer tenants of only some of the view's CIs, he will see only those CIs.

Note: For some general actions, such as **Access to SDK**, the tenant assignment is not relevant.

Required Permissions for Tenant Assignments

To view the tenant assignments for a resource or CI, permission for the general action **View Tenant Assignment** is required, in connection with the owner tenant or inherited owner tenant of the resource. If a user is assigned a role with this permission, he can view the owner tenant and consumer tenants of the resource, but he will only see the resource's consumer tenants that are associated with the role assignment.

For example, a user has permission for the general action View Tenant Assignment in connection with tenants T1 and T2. The following are the tenancy assignments for two resources:

- **Query_1** has owner tenant T1 and consumer tenants T1, T2, and T3.
- **Query_2** has owner tenant T3 and consumer tenants T1, T2, and T3.

The user can view the tenant assignments for Query_1, however he only sees T1 and T2 as the consumer tenants (he has no permission in connection with T3). He cannot view the tenant assignments for Query_2 because his View Tenant Assignment permission is not associated with the owner tenant of that resource.

To modify the tenant assignment for a resource or CI, permission for the general action **Reassign Tenant** is required, in connection with the owner tenant or inherited owner tenant of the resource and with the tenants being modified.

Multi-Tenancy in Package Manager

In a multi-tenancy environment, tenants are considered resources that can be included in a package and then deployed and exported. In addition, when a resource, such as a query, view, or impact rule, is added to a package, the tenant assignment for that resource is also included in the package.

For details on Package Manager, see ["Package Manager" on page 214](#).

Tenant Association Rules

Note: This section is only relevant when multi-tenancy is enabled.

When working in a multi-tenancy environment, it is often necessary to apply the same tenancy definitions to many CIs. A convenient way to do this is by using **Tenant Association rules**, which are a form of Enrichment rules. You define Tenant Association rules in the Enrichment Manager in the same way that you define Enrichment rules.

The Tenant Association rule you define for a query node determines the tenant to be associated with that query node. When the rule is run, all CIs in your IT Universe that match the topology of the Tenant Association rule are assigned the specified owner tenant or consumer tenants, according to the rule definition. The frequency with which a Tenant Association rule runs is determined by the priority assigned to the rule.

The following Tenant Association rules are provided out-of-the-box:

- **SetOwnerTenantOfComposedCI.** Overwrites the owner tenant of the Composed CI with the owner tenant of the Container CI.
- **AppendConsumerTenantsToComposedCI.** Appends the consumer tenants of the Container CI to the consumer tenants of the Composed CI.
- **SetConsumerTenantsOfComposedCI.** Overwrites the consumer tenants of the Composed CI with the consumer tenants of the Container CI.
- **AppendOwnerTenantToImpactedCI.** Appends the owner tenant of the Impacted By CI to the consumer tenants of the Impacted CI.
- **AppendConsumerTenantsToImpactedCI.** Appends the consumer tenants of the Impacted By CI to the consumer tenants of the Impacted CI.

These Tenant Association rules are templates which you can use to build a customized rule for your IT environment.

For example, consider the **SetOwnerTenantOfComposedCI** rule, which has two query nodes, a Container CI and a Composed CI, with a composition relationship from the Container CI to the Composed CI. You can refine the type of the Container CI to IP Subnet, and refine the type of the Composed CI to Computer. The pattern of the rule is then an IP Subnet connected to a Computer by a composition relationship. When the rule runs, all Computer CIs that match this pattern have their owner tenant overwritten with the owner tenant of the related IP Subnet.

Note: The out-of-the-box Tenant Association rules are inactive by default. To activate a rule, select the **Rule is Active** check box in the Tenant Association Rule Properties wizard. It is not recommended to activate the out-of-the-box rules in their original configuration, due to the large size of the query results. First, modify a rule to limit its results and then activate it.

For details on defining Tenant Association rules, see "Define a Tenant Association Rule" in the *Modeling section of the UCMDB Help*.

Configuration Manager in a Multi-Tenant UCMDB Environment

While Configuration Manager itself does not support multi-tenancy, it can connect to a multi-tenant UCMDB environment.

To ensure that end users view UCMDB resources and CIs in a tenant-safe fashion, Configuration Manager should be set up in one of the following ways:

Configuration Manager for UCMDB Administration Only (Recommended)

In a multi-tenant UCMDB environment, Configuration Manager can function as the UCMDB administration tool. In this case, only administrators - who have permission to see all tenant-related information - can define configuration policies and/or track changes, while end-users with permissions associated with a specific tenant can view the resources to which that tenant is assigned, through the UCMDB Browser module.

This is achieved as follows:

- Policies are defined in Configuration Manager, and can be consumed by end-users in a tenant-safe way through the UCMDB Browser module.

A view defined in UCMDB to display data for all tenants can be managed in Configuration Manager and policies can be applied on top of the view. While administrators accessing the Configuration Manager UI can view the policy status for all CIs in this view, end-users accessing the UCMDB Browser module can consume only the policy status of those CIs that they are authorized to see.

- In Configuration Manager, policies can be applied to tenant-specific CIs by specifying the tenant in the **Owner Tenant** attribute in the policy's filter. This ensures that the policy is applied only to CIs whose owner tenant is the specified tenant.

Note: You need to add the **Managed** qualifier to the **Owner Tenant** attribute in the CI Type Manager to make this attribute visible in the Configuration Manager attribute filter.

Configuration Manager for End-User Functionality

In a multi-tenant UCMDB environment, when all end users have direct access to the Configuration Manager UI, views managed in Configuration Manager must contain tenant-specific data, and access to these views must be configured to be limited to the tenants associated with the users' permissions for these views.

While this option enables all end-users to access Configuration Manager, it requires configuration and maintenance of each individual view, per the relevant tenant.

Multi-Tenancy Workflow

Note: This section is only relevant when multi-tenancy is enabled.

The following task describes a typical workflow in a multi-tenancy environment:

1. **Add Tenants**

Begin by adding tenants to the tenant repository in the Tenants Management module. For details, see ["Tenants Management Page" on page 362](#).

2. **Create Resource Groups**

If relevant, create resource groups in the Resource Groups module to assist in defining permissions during role creation. For details, see ["How to Define a Resource Group" on page 331](#).

3. **Create Roles**

Create roles in the Roles Management module defining the permissions you want to assign to different users. For details, see ["How to Create a New Role and Define Permissions for the Role" on page 316](#).

4. **Create Users and Groups and Assign Roles to Them**

Create users and user groups in the Users and Groups module. If relevant, assign default tenants to the users and groups. For details, see ["Multi-Tenancy Overview" on page 284](#). Assign roles to the users and groups according to the permissions you want to grant each one. For details, see ["Users and Groups Workflow" on page 303](#).

When assigning a role to a user, select the tenants associated with that assignment, as described in ["Role Association Page" on page 309](#).

5. Review the Role and Tenant Assignments

Review the roles assigned to each user and group and the tenants associated with each role assignment to ensure that the users have been granted the required permissions. Check the **Permissions Overview** tab in the Users and Groups module. For details, see ["Users and Groups Page" on page 311](#).

6. Change the Tenant Assignment for a Resource or a CI

When a resource or CI is created, the owner tenant and consumer tenant are automatically assigned based on the tenant of the user who created the resource or CI. For details, see ["Multi-Tenancy Overview" on page 284](#).

You can change the automatic assignments for a resource or CI. For details, see ["How to Change the Tenant Assignment for a Resource or a CI" below](#).

7. Define a Tenant Association Rule - Optional

For advanced users working with large amounts of data, you can define rules that determine how tenants are associated with resources and CIs. For details, see *How to Define a Tenant Association Rule* in the *Modeling section of the UCMDB Help*.

How to Change the Tenant Assignment for a Resource or a CI

Note: This section is only relevant when multi-tenancy is enabled.

The following task describes how to change the owner tenant and consumer tenants for a resource or a CI:

1. Locate the Required Resource or CI

For views and queries, go to Modeling Studio and select the required resource in the Resources tab of the left pane. For impact rules, go to Impact Analysis Manager and select the required impact rule. For custom reports, go to the Reports module and select the required custom report. Right-click the resource and select Assign Tenants.

For CIs, go to IT Universe Manager and select the required CI. Right-click the CI and select Assign Tenants.

2. **Update the Owner Tenant**

In the Assign Tenants dialog box, select a tenant from the drop-down list in the **Owner Tenant** field. The selected tenant becomes the owner tenant of the resource or CI. For details, see ["Assign Tenants Dialog Box" below](#).

3. **Update the Consumer Tenants**

In the **Consumer Tenants** section of the dialog box, select the consumer tenants. The selected tenants become the consumer tenants of the resource or CI. For details, see ["Assign Tenants Dialog Box" below](#).

4. **Save the Changes**

Click **Save** to save your changes to the tenant assignment.

User Permissions User Interface




This section includes (in alphabetical order):

Assign Tenants Dialog Box	296
Assign Resources to Roles and Resource Groups Dialog Box	299

Assign Tenants Dialog Box





This dialog box enables you to update the owner tenant and consumer tenants of a resource or a CI.

Note: This section is only relevant when multi-tenancy is enabled.

To access	<p>In Modeling Studio, click the Assign Tenants  button on the toolbar of the TQL Query Editor or right-click a resource in the Resources tab and select Assign Tenants from the shortcut menu.</p> <p>In the Reports module, click the Assign Tenants  button on the Custom Reports toolbar or right-click a custom report and select Assign Tenants from the shortcut menu.</p> <p>In Impact Analysis Manager, click the Assign Tenants  button on the toolbar or</p>
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	<p>right-click an Impact rule and select Assign Tenants from the shortcut menu.</p> <p>In IT Universe Manager, right-click a CI and select Assign Tenants from the shortcut menu.</p>
Important information	<p>The Consumer Tenants section has different functionality depending on the number of resources selected:</p> <ul style="list-style-type: none"> When a single resource is selected, move the required tenants from the Available Tenants pane to the Selected Tenants pane using the arrow buttons. Alternatively, select All tenants to select all the available tenants. When multiple resources are selected, select the check boxes in the Assigned column to assign the required tenants to all the selected resources. Alternatively, select All tenants to assign all the available tenants to all the selected resources. <p>Note: When updating the owner tenant or consumer tenants using the Assign Tenants dialog box, be aware that there may be a Tenant Association rule defined which overrides your manual tenant assignment. In that case the tenant assignments defined in the rule will take effect the next time that the rule runs.</p>
Relevant tasks	<ul style="list-style-type: none"> "How to Change the Tenant Assignment for a Resource or a CI" on page 295 "Multi-Tenancy Workflow" on page 294
See also	"Multi-Tenancy Overview" on page 284

User interface elements are described below:




UI Element (A-Z)	Description
<Arrow buttons>	<p>The following arrow buttons are available:</p> <ul style="list-style-type: none">  Add. Moves the selected tenants in the Available Tenants pane to the Selected Tenants pane.  Remove. Removes the specified tenants from the Selected Tenants pane.  Add All. Moves all the tenants in the Available Tenants pane to the Selected Tenants pane.  Remove All. Removes all the tenants from the Selected Tenants pane. <p>Note: These buttons are only available when a single resource is selected.</p>
All tenants	<p>Select All tenants to assign all tenants to the resource.</p> <p>Note: When you select All tenants, the Consumer Tenants section becomes disabled.</p>
Assigned	The check boxes indicate the assignment status of each tenant as follows:

UI Element (A-Z)	Description
	<ul style="list-style-type: none"> • A selected check box (a blue arrow) indicates that the tenant is assigned to each selected resource as a consumer tenant. • A blank check box indicates that the tenant is not assigned to any selected resource. • A triangle in the check box indicates a mixed status: the tenant is assigned to at least one selected resource, but not to all of them. <p>Select a check box to assign that tenant to all of the selected resources as a consumer tenant. Clear a check box to remove the tenant assignment from all the selected resources. If you leave the mixed status indicator in a check box, the previous consumer tenant assignments for that tenant remain unchanged.</p> <p>If one of the selected resources has All tenants selected, and others do not, the All tenants check box has a mixed indicator and the Consumer Tenants section is disabled. You can clear the check box to enable the Consumer Tenants section, modify the consumer tenant assignments, and then re-select the All tenants check box. The resource with All tenants remains unchanged, but the consumer tenant assignments of the other resources are updated.</p> <p>If a tenant is an inherited consumer tenant for at least one of the selected resources, the check box is disabled.</p> <p>Note: This item is only available when multiple resources are selected.</p>
Available Tenants	<p>Displays the available tenants.</p> <p>Note: This item is only available when a single resource is selected.</p>
Description	<p>Displays the descriptions of the available tenants.</p> <p>Note: This item is only available when multiple resources are selected.</p>
Inherited Owner Tenants	<p>Click the arrow button to expand the pane displaying the inherited owner tenants for the selected resource(s). These are owner tenants of the parent folders of the resource(s). The inherited owner tenants are displayed in tree format (with the relevant resources appearing under each tenant, in the case of multiple resources).</p> <p>Note: This feature only appears in the Assign Tenants dialog box for resources, not for CIs.</p>
Name	<p>Displays the names of the available tenants.</p> <p>Note: This item is only available when multiple resources are selected.</p>
Owner Tenant	<p>Select the owner tenant of the resource from the drop-down list.</p> <p>When multiple resources with different owner tenants are selected, Multiple</p>

UI Element (A-Z)	Description
	Tenants Assigned is the displayed option. If you leave this option selected, the previous owner tenant assignments of the resources remain unchanged.
Selected Tenants	Displays the selected tenants. Inherited consumer tenants appear in gray and cannot be selected. Note: This item is only available when a single resource is selected.

Assign Resources to Roles and Resource Groups Dialog Box

This dialog box enables you to assign specific resources to roles and resource groups from within the resource managers.

To access	<p>In Modeling Studio, click the Manage Security  button on the toolbar of the TQL Query Editor or right-click a resource in the Resources tab and select Manage Security from the shortcut menu.</p> <p>In the Reports module, click the Manage Security  button on the Custom Reports toolbar or right-click a custom report and select Manage Security from the shortcut menu.</p> <p>In Impact Analysis Manager, click the Manage Security  button on the toolbar or right-click an Impact rule and select Manage Security from the shortcut menu.</p>
Important information	<p>You can also assign resources to roles and resource groups in the Security modules. For details, see "Roles Manager" on page 315 and "Resource Groups" on page 331.</p> <p>Note: You need permission for the Administration general action to assign resources to roles and resource groups.</p>
See also	<ul style="list-style-type: none"> • "User Permissions in a Single Tenant Environment" on page 279 • "User Permissions in a Multi-Tenancy Environment" on page 287 • "Permissions Summary" on page 324

Roles Pane

User interface elements are described below:

UI Element (A-Z)	Description
<Permissions>	Select the check boxes for the required permissions in the appropriate rows to assign specific permissions for the resource to the required roles.
Assigned	<p>A green check mark indicates that at least one permission for the resource has been assigned to that role.</p> <p>If you access the dialog box while selecting multiple resources, a square in a permission check box indicates that the relevant permission has been assigned for at least one of the selected resources, but not for all of them.</p>
Description	Displays descriptions of the available roles.
Name	<p>Displays the names of the available roles.</p> <p>Note: Read-only roles do not appear in the list, since they cannot be modified.</p>

Resource Groups Pane

User interface elements are described below:

UI Element (A-Z)	Description
Assigned	<p>Select the check box in the appropriate rows to assign the resource to the required resource groups.</p> <p>If you access the dialog box while selecting multiple resources, a square in a check box indicates that at least one of the selected resources has been assigned to the resource group, but not all of them.</p>
Description	Displays descriptions of the available resource groups.
Name	<p>Displays the names of the available resource groups.</p> <p>Note: The All Resources group does not appear in the list (it already includes all of the resources).</p>

Chapter 13: Users and Groups

You can merge two users into a single user. In the Merge Users dialog box, select one of the users to be the master. The merged user takes the name of the master and includes the role assignments of both users.

In a multi-tenancy environment, the merged user gets the default tenant of the user selected as master. If each of the original users were assigned the same role in connection with different tenants, the merged user is assigned the role in connection with the tenants of both users.

Note:

- Out-of-the-box users cannot be merged.
- The Merge Users functionality is only relevant when exactly two users are selected.

This chapter includes:

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Users and Groups Overview

The Users and Groups module enables you to create users and user groups and to assign roles to them. The roles assigned to a user or group, along with the tenants associated with each assignment (in a multi-tenancy environment), determine the permissions granted to the user or the members of the group.

A user can be associated with more than one group. The roles assigned to a group are automatically assigned to each user in the group. A user's roles include the roles assigned to the individual user, known as **assigned roles**, and the roles assigned to the user's groups, known as **inherited roles**.

It is also possible to associate a group with a parent group. In such a case, the child group inherits the roles of the parent group and the users in the child group inherit the roles of both groups.

Resources, actions, and modules for which a user is not granted permission are not visible to that user or are disabled in the user's environment.

Note: The Users and Groups module is available only to those logged in with administration access rights.

Out-of-the-Box Users

The following users are defined out-of-the-box by UCMDB:

- **Admin.** The UCMDB administrator.
- **Sysadmin.** The system administrator (used to login to the JMX console).
- **UISysadmin.** The user used for performing integrations between UCMDB and other products, and running tasks on the server.

Note:

- Out-of-the-box users appear in bold in the Users pane. You can update their user details but you cannot modify their role assignments or delete the users.
- Out-of-the-box users are not automatically synchronized with the UCMDB data model.

Merge Users

You can merge two users into a single user. In the Merge Users dialog box, select one of the users to be the master. The merged user takes the name of the master and includes the role assignments of both users.

In a multi-tenancy environment, the merged user gets the default tenant of the user selected as master. If each of the original users were assigned the same role in connection with different tenants, the merged user is assigned the role in connection with the tenants of both users.

Note:

- Out-of-the-box users cannot be merged.
- The Merge Users functionality is only relevant when exactly two users are selected.

Users and Groups Workflow

The following steps describe a typical workflow for defining users and groups in your system:

1. **Define a New Group**

Select the Groups tab and create a new group using the New Group wizard. Assign a role or multiple roles to the group on the Roles Association page. For details, see ["New Group Wizard" on the next page](#).

2. **Define a New User**

Select the Users tab and create a new user using the New User wizard. If relevant, associate the user with at least one group on the Group Association page. For details, see ["Group Association Page" on page 309](#).

3. **Assign Roles to the User**

Assign roles to the user on the Roles Association page. For details, see ["Role Association Page" on page 309](#).

4. **Review the User's Roles**

In the User tab, select the user you created. In the Roles tab of the right pane, confirm that the roles you assigned to the user appear in the Assigned Roles section and the roles assigned to the user's groups appear in the Inherited Roles section.

5. **Edit a User's Details**

If a change occurs in a user's details, you can edit his details, including his password, time zone preference, and locale (user interface language). Select the user in the left pane and edit his details in the Details tab.

You can edit the details for the user currently logged in using the User Profile dialog box. Select **Tools > User Profile...** to access the dialog box.

Default Password Policy

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.


Users and Groups User Interface

This section includes (in alphabetical order):

New Group Wizard	304
New User Wizard	306
Select Tenants for Role Dialog Box	310
Users and Groups Page	311

New Group Wizard

This wizard enables you to create a user group.

To access	Select Users and Groups from the Security module on the Navigation Menu or select Managers > Security > Users and Groups > Groups tab. Click the New Group  button.
Relevant tasks	"Users and Groups Workflow" on the previous page
Wizard map	The "New Group Wizard" contains: "Group Details Page" > "Group Association Page" > "Roles Association Page" > "Default Tenant Page"
See also	<ul style="list-style-type: none"> • "Users and Groups Overview" on page 301 • "User Permissions Workflow" on page 280 • "Multi-Tenancy Workflow" on page 294

Group Details Page

This wizard page enables you to add the details of the group.

Wizard map	The " New Group Wizard " contains: "Group Details Page" > "Group Association Page" > "Roles Association Page" > "Default Tenant Page"
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User interface elements are described below:

UI Element (A-Z)	Description
Description	Enter a description of the user group. Note: This field is optional.
Group Name	Enter a name for the new user group.

Group Association Page

This wizard page enables you to associate a user group with one or more parent groups.

Important information	Use the arrow buttons to move the required groups from the Available Groups pane to the Selected Groups pane.
Wizard map	The " New Group Wizard " contains: "Group Details Page" > "Group Association Page" > "Roles Association Page" > "Default Tenant Page"

User interface elements are described below:

UI Element (A-Z)	Description
Available groups	Displays the available groups.
Selected groups	Displays the groups selected for association with the new group.

Roles Association Page

This wizard page enables you to associate a user group with one or more roles.

Important information	Use the arrow buttons to move the required roles from the Available Roles pane to the Selected Roles pane. If multi-tenancy is enabled, the Select Tenants for Role dialog box appears, which enables you to associate tenants with the role assignment.
Wizard map	The "New Group Wizard" contains: "Group Details Page" > "Group Association Page" > "Roles Association Page" > "Default Tenant Page"

User interface elements are described below:

UI Element (A-Z)	Description
Available Roles	Displays the available roles.
Role's Assigned Tenants	Displays the tenants associated with the role selected in the Selected Roles pane. Note: This area is only available when multi-tenancy is enabled.
Selected Roles	Displays the roles selected for assignment to the new group.

Default Tenant Page

This wizard page enables you to assign a default tenant to the group.

Important information	This wizard page is only available when multi-tenancy is enabled.
Wizard map	The "New Group Wizard" contains: "Group Details Page" > "Group Association Page" > "Roles Association Page" > "Default Tenant Page"


User interface elements are described below:

UI Element (A-Z)	Description
Select tenant	Select a tenant from the drop-down list to be the default tenant of the new group.

New User Wizard

This wizard enables you to create a user.

To	Select Users and Groups from the Security module on the Navigation Menu or select
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access	Managers > Security > Users and Groups > Users tab. Click the New User  button.
Relevant tasks	"Users and Groups Workflow" on page 303
Wizard map	The "New User Wizard" contains: "User Name and Password Page" > "User Details Page" > "Group Association Page" > "Role Association Page" > "Default Tenant Page"
See also	<ul style="list-style-type: none"> • "Users and Groups Overview" on page 301 • "User Permissions Workflow" on page 280 • "Multi-Tenancy Workflow" on page 294

User Name and Password Page

This wizard page enables you to assign a name and password for the user.

Important information	<p>When creating a new user, you can either enable the password policy, in which UCMDB automatically assigns the default password to the user, or assign a password of your own.</p> <p>To enable the password policy, go to Managers > Administration > Infrastructure Settings Manager, select Passwords must use default policy and set the value to True. When the password policy is enabled, new users created are given the password defined in the Default user password setting.</p> <p>Note: The UCMDB administrator must specify the password for the new users in the Default user password setting .</p> <p>The new users must change the password on first login (you can also change the password in the wizard).</p> <p>The default password policy requires the password to include at least one of each of the four following types of characters:</p> <ul style="list-style-type: none"> • Uppercase alphabetic characters • Lowercase alphabetic characters • Numeric characters • Symbol characters ,\!/. _?&%+=-[]() <p>It also requires the password to adhere to the minimum length, which is set by the Password minimum length infrastructure setting.</p>
Wizard map	The "New User Wizard" on the previous page contains:

	"User Name and Password Page" > "User Details Page" below > "Group Association Page" on the next page > "Role Association Page" on the next page > "Default Tenant Page" on page 310
--	--

User interface elements are described below:

UI Element (A-Z)	Description
Confirm Password	<ul style="list-style-type: none">• If the Passwords must use default policy setting in Managers > Administration > Infrastructure Settings Manager is set to True, UCMDB automatically confirms the password defined in Default user password.• If the Passwords must use default policy setting is set to False, confirm the password you entered in the Password box.
Password	<ul style="list-style-type: none">• If the Passwords must use default policy setting in Managers > Administration > Infrastructure Settings Manager is set to True (default), UCMDB automatically assigns the password defined in Default user password.• If the Passwords must use default policy setting is set to False, assign a password of your own.
User Name	Enter a unique user name.

User Details Page

This wizard page enables you to add the details of the user.

Wizard map	The "New User Wizard" contains: "User Name and Password Page" > "User Details Page" > "Group Association Page" > "Role Association Page" > "Default Tenant Page"
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User interface elements are described below:

UI Element (A-Z)	Description
User Details	Enter the user's information. Use the Locale field to select the language of the user interface for the user. If no locale is selected, the locale of the web browser is used to define the language. If no locale is selected for the browser, the Operating System locale is used. If the locale specified in the browser or Operating System is not supported by UCMDB, the default language of the user interface is English.
Time Zone Preferences	In the Time zone drop-down list, select the time zone preference for the user.

UI Element (A-Z)	Description
Server Administrator Privileges	Select Enabled if you want the user to have server administrator privileges. Otherwise leave the checkbox unselected. Note: Only users with Server Administrator Privileges can impersonate to other users.

Group Association Page

This wizard page enables you to associate a user with one or more groups.

Important information	Use the arrow buttons to move the required groups from the Available Groups pane to the Selected Groups pane.
Wizard map	The "New User Wizard" contains: "User Name and Password Page" > "User Details Page" > " Group Association Page " > "Role Association Page" > "Default Tenant Page"

User interface elements are described below:

UI Element (A-Z)	Description
Available groups	Displays the available groups.
Selected groups	Displays the groups selected for association with the new user.

Role Association Page

This wizard page enables you to associate a user with one or more roles.

Important information	Use the arrow buttons to move the required roles from the Available Roles pane to the Selected Roles pane. If multi-tenancy is enabled, the Select Tenants for Role dialog box appears, which enables you to associate tenants with the role assignment.
Wizard map	The "New User Wizard" contains: "User Name and Password Page" > "User Details Page" > "Group Association Page" > " Role Association Page " > "Default Tenant Page"

User interface elements are described below:

UI Element (A-Z)	Description
Available Roles	Displays the available roles.
Role's Assigned Tenants	Displays the tenants associated with the role selected in the Selected Roles pane. Note: This area is only available when multi-tenancy is enabled.
Selected Roles	Displays the roles selected for assignment to the new user.

Default Tenant Page

This wizard page enables you to assign a default tenant to the user.

Important information	This wizard page is only available when multi-tenancy is enabled.
Wizard map	The "New User Wizard" contains: "User Name and Password Page" > "User Details Page" > "Group Association Page" > "Role Association Page" > "Default Tenant Page"

User interface elements are described below:

UI Element (A-Z)	Description
Select tenant	Select a tenant from the drop-down list to be the default tenant of the new user.

Select Tenants for Role Dialog Box

This tab enables you to select tenants to associate with the role assigned to a user or group.

To access	Click the Edit link in the Assigned Roles section of the Roles tab. Select a role or roles in the Available Roles pane and move it to the Selected Roles pane using the arrow buttons. The dialog box opens. Alternatively, when you run the New User wizard or the New Group wizard, the dialog box opens when you move roles to the Selected Roles pane.
Important information	This dialog box is only available when multi-tenancy is enabled.

User interface elements are described below:

UI Element (A-Z)	Description
All Tenants	Select All Tenants to associate all tenants with the role assigned to the user or group.
Available Tenants	The list of all available tenants.
Selected Tenants	The tenants selected for the role assignment to the user or group.
Specified Tenants	Select Specified Tenants to associate only the specified tenants with the role assigned to the user or group.


Users and Groups Page









This tab enables you to define new users and groups or edit existing ones.

To access	Select Users and Groups from the Security module on the Navigation Menu or select Managers > Security > Users and Groups .
Relevant tasks	"Users and Groups Workflow" on page 303
See also	<ul style="list-style-type: none">• "Users and Groups Overview" on page 301• "User Permissions Workflow" on page 280• "Multi-Tenancy Workflow" on page 294

Left Pane

User interface elements are described below (unlabeled elements are shown in angle brackets>):

UI Element (A-Z)	Description
	<p>New User/New Group. When the Users tab is selected, enables you to create a user. When the Groups tab is selected, enables you to create a user group.</p> <p>Note: When LDAP is enabled, the users created with the New User button are integration users.</p>

UI Element (A-Z)	Description
	Edit User/Edit Group. Enables you to edit the name of the selected user or group.
	Delete. Deletes the selected user or group.
	<p>Reset Password. Opens the Reset Password dialog box. This dialog box is only available for administrators. It enables you to change the user's password without entering the old password.</p> <p>Note: This button is only relevant when the Users tab is selected.</p>
	<p>Set Default Tenant. Enables you to change the default tenant of the user or group.</p> <p>Note: This button is only available when multi-tenancy is enabled.</p>
	<p>Create Person CI from selected user. Creates a CI of type Person for the selected user. This enables the synchronization of UCMDB users to the UCMDB data model.</p> <p>Note: Ensure that the key attributes for a Person CI are supplied; otherwise, duplicate CIs may be created. For more information, see "CI Type Manager" in the <i>Modeling section of the UCMDB Help</i>.</p>
	<p>Create Person CIs from all users. Creates CIs of type Person for all users. This enables the synchronization of UCMDB users to the UCMDB data model.</p> <p>Note: Ensure that the key attributes for a Person CI are supplied; otherwise, duplicate CIs may be created. For more information, see "CI Type Manager" in the <i>Modeling section of the UCMDB Help</i>.</p>
	Refresh. Refreshes the list of users or groups.
	Save. Saves the changes you have made.
<List of users>	Contains the list of default and custom users. LDAP users are indicated by a green check mark in the External User column.
<Search feature>	To search for a phrase in the list of users or groups, enter the phrase in the Find box. Use the arrow buttons to find the next and previous occurrences of the phrase. Click the Highlight button to highlight all occurrences of the phrase.
Groups tab	Displays the existing groups.
Users tab	Displays the existing users.

The following options are available by right-clicking a user or group:

UI Element (A-Z)	Description
Delete	Delete the selected user or group.
Edit User/Edit Group	Edit the name of the selected user or group.
Merge Users	<p>Merge the selected users into one user. In the Merge Users dialog box, select one of them to be the master. The merged user takes the name of the master and includes the role assignments of both users.</p> <p>Note: This option is only available when two users are selected.</p>
New User/New Group	Create a new user or group.
Refresh	Refresh the list of users or groups.
Reset Password	<p>Opens the Reset Password dialog box. This dialog box is only available for administrators. It enables you to change the user's password without entering the old password.</p> <p>Note: This option is only available for users.</p>
Save	Save the changes you have made.
Set Default Tenant	<p>Enables you to change the default tenant of the user or group.</p> <p>Note: This option is only available when multi-tenancy is enabled.</p>

Right Pane

User interface elements are described below:

UI Element (A-Z)	Description
Details tab	<p>When the Groups tab is selected, displays details for the selected group.</p> <p>When the Users tab is selected, displays details for the selected user. The Change Password button enables you to change the user password. Enter the user's old password and the new one in the Change User Password dialog box.</p> <p>Use the Locale field to select the language of the user interface for the user. If no locale is selected, the locale of the web browser is used to define the language. If no locale is selected for the browser, the Operating System locale is used. If the locale specified in the browser or Operating System is not supported by UCMDB, the</p>

UI Element (A-Z)	Description
	<p>default language of the user interface is English.</p> <p>Under Time Zone Preferences, you can change the time zone for the selected user.</p> <p>Note: When you update the time zone for the user currently logged in, the change takes effect after 5 minutes. When you update the time zone using the User Profile dialog box (accessed by Tools > User Profile...), the change takes effect immediately.</p> <p>Under Server Administrator Privileges, you can select the Enabled check box to grant the user permission to access the JMX console.</p>
Permissions Overview	<p>Displays a summary of the selected user or group's permissions.</p> <p>Select a resource type in the Resource Types pane. The resources of the selected type are displayed in the Permissions Summary pane. If you select a resource in the tree, the roles from which the permissions derive are displayed in the Permission Origin pane.</p>
Roles tab	<p>The following areas are displayed:</p> <ul style="list-style-type: none"> • Assigned Roles. Displays the roles assigned directly to the selected user or group. Click the Edit link to edit the assigned roles. For details on assigning roles, see "Role Association Page" on page 309. • Inherited Roles. Displays the roles assigned to a parent group of the selected user or group. • Parent Groups. Displays the parent groups of the selected user or group. Click the Edit link to edit the parent groups. For details on associating groups, see "Group Association Page" on page 309. • Group Members. Displays the members of the selected group (only relevant for the Groups tab). Click the Edit link to edit the members. Use the arrow buttons to move users or groups from the Available Users/Groups pane to the Selected Users/Groups pane.

Chapter 14: Roles Manager

Merge Roles

You can merge two roles into a single role. In the Merge Roles dialog box, select one of the roles to be the master. The merged role takes the name of the master and includes the permissions of both roles. Users that were assigned either of the original roles are now assigned the merged role.

In a multi-tenancy environment, the tenants associated with the role assignment of the merged role to a user are the same as the tenants associated with the original role to that user. If a user was assigned both of the original roles in connection with different tenants, he is assigned the merged role in connection with the tenants of both role assignments.

Note:

- Out-of-the-box roles cannot be merged.
- The Merge Roles functionality is only relevant when exactly two roles are selected.

This chapter includes:

Roles Manager Overview

Roles enable you to assign permissions to users according to their responsibilities in the organization. You define roles in the Roles Manager module and assign roles to users in the Users and Groups module. You can assign multiple roles to a user, which grants him the combined permissions of all the assigned roles.

There are several ways to define the permissions of a role:

- You can select specific actions for specific resources, such as view, update, and delete permission for one TQL query and view only permission for another one.
- You can select specific actions for the resources in a previously defined resource group, such as view and update permission for all TQL queries in the resource group and view and delete

permission for all the custom reports in the resource group. Resource groups are defined in the Resource Groups module.

- You can select general actions such as Create Views.

It is possible to define permissions using combinations of the above options. For details on defining the permissions of a role, see ["Roles Manager Page" on page 318](#).

Note: The Roles Manager module is available only to those logged in with administration access rights.

Merge Roles

You can merge two roles into a single role. In the Merge Roles dialog box, select one of the roles to be the master. The merged role takes the name of the master and includes the permissions of both roles. Users that were assigned either of the original roles are now assigned the merged role.

In a multi-tenancy environment, the tenants associated with the role assignment of the merged role to a user are the same as the tenants associated with the original role to that user. If a user was assigned both of the original roles in connection with different tenants, he is assigned the merged role in connection with the tenants of both role assignments.

Note:

- Out-of-the-box roles cannot be merged.
- The Merge Roles functionality is only relevant when exactly two roles are selected.

How to Create a New Role and Define Permissions for the Role

The following task describes how to create a role and define permissions for it:

1. **Create a Role**

Click the **New Role** button in the Roles pane to open the New Role dialog box. Enter the name and description for the role and click **OK**. For details, see ["New Role Dialog Box" on page 318](#).

2. **Define Permissions for the Role Using the Resources Tab**

Your new role is selected by default in the Roles pane. Select the **Resources** tab in the right pane and follow these steps:

- a. Select a resource type in the Resource Types pane (for example, Views).
- b. Select a resource (for example, a specific view from the view tree in the Available View pane) and click the right arrow button. The Set Permissions dialog box opens. (For UI Modules and CIT Menu Items, the Set Permissions dialog is not relevant.)
- c. In the Set Permissions dialog box, select the required permissions for the resource you selected. You can choose **Select All** to assign all the available permissions. Click **Apply**.
- d. Your selected resource appears in the right pane with the check boxes for the assigned permissions selected.
- e. Repeat this procedure for other resources of this type and for other resource types, as required.

For details, see ["Roles Manager Page" on the next page](#).

3. Define Permissions for the Role Using the Resource Groups Tab

Select the **Resource Groups** tab in the right pane and follow these steps:

- a. Select a resource group in the Resource Groups pane.
- b. Select actions from the tree in the Available Actions pane (for example, Update permission under Views) and click the right arrow button.

Note: You can make multiple selections by holding the **CTRL** key.

- c. The actions you selected appear in the Selected Actions pane. Each selection defines permission for that action for every resource of that type in the resource group (for example, Update permission for every view in the resource group).

For details, see ["Roles Manager Page" on the next page](#).

4. Define Permissions for the Role Using the General Actions Tab

Select the **General Actions** tab in the right pane and follow these steps:

- a. Select actions in the Available Actions pane.

Note: You can make multiple selections by holding the **CTRL** key.

- b. Click the right arrow button to move them to the Selected Actions pane.
- c. The general actions selected are permitted for the role (they are not linked to a specific

resource or resource type).

For details, see ["Roles Manager Page" below](#).

5. Save the Role

Click the **Save**  button in the Roles pane to save your changes.


Roles Manager User Interface

This section includes (in alphabetical order):

New Role Dialog Box	318
Roles Manager Page	318

New Role Dialog Box

This dialog box enables administrators to create roles.

To access	Click the New Role  button in the Roles tab.
Relevant tasks	"How to Create a New Role and Define Permissions for the Role" on page 316
See also	<ul style="list-style-type: none">• "Roles Manager Overview" on page 315• "Permissions Summary" on page 324

User interface elements are described below:

UI Element (A-Z)	Description
Description	Enter a description of the role you are defining.
Role Name	Enter a unique name for the role.

Roles Manager Page







This page enables you to create and delete roles and to edit their permissions.

To access	Select Roles Manager from the Security module on the Navigation Menu or select
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	Managers > Security > Roles Manager.
Important information	<p>For each role, you can assign permissions for actions on resources using the following tabs:</p> <ul style="list-style-type: none"> • Resources. Select specific actions for specific resources. • Browser CI Access Control. Select permissions to view and edit CIs or CI types in the UCMDB Browser module. • Resource Groups. Select specific actions for the resources in specific resource groups. • General Actions. Select specific general actions (such as Run Discovery and Integrations or Create Views). <p>You can select actions for permissions from each tab. The role is assigned permissions based on the combined results of selections in all of the tabs.</p> <p>The Role Details tab displays the name and description of the selected role.</p> <p>The Permissions Overview tab displays the selected role's permissions.</p>
Relevant tasks	"How to Create a New Role and Define Permissions for the Role" on page 316
See also	<ul style="list-style-type: none"> • "Roles Manager Overview" on page 315 • "Permissions Summary" on page 324

Roles Pane

User interface elements are described below (unlabeled elements are shown in angle brackets>):

UI Element (A-Z)	Description
	New Role. Creates a role. Opens the New Role dialog box.
	Edit Role. Enables you to edit the name of the selected role.
	<p>Delete. Removes the selected role(s).</p> <p>Note: You can make multiple selections to delete multiple roles.</p>
	Refresh. Refreshes the list of roles.
	Save. Saves the changes you have made.
	Save As. Saves the role with a different name.

UI Element (A-Z)	Description
<List of roles>	Displays the names of the existing roles.
<Search feature>	To search for a phrase in the list of roles, enter the phrase in the Find box. Use the arrow buttons to find the next and previous occurrences of the phrase. Click the Highlight button to highlight all occurrences of the phrase.

The following options are available by right-clicking a role:

UI Element (A-Z)	Description
Delete	Removes the selected role(s).
Edit Role	Edit the name of the selected role.
Merge Roles	Merge the selected roles into one role. In the Merge Roles dialog box, select one of them to be the master. The merged role takes the name of the master. Users that were assigned either of the original roles are now assigned the merged role. Note: This option is only available when two roles are selected.
New Role	Create a new role.
Refresh	Refresh the list of roles.
Save	Save the changes you have made.
Save As	Save the role with a different name.

Right Pane

The Right Pane contains the Resources tab, the Resource Groups tab, the General Actions tab, and the Role Details tab.

Resources Tab

Important information	Select a Resource type and use the arrow buttons to move resources from the Available <resources> pane to the Selected <resources> pane to assign permissions for those resources to the current role. When moving resources, you must select the permissions for the selected resources, using the Set Permissions dialog box.
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User interface elements are described below:


UI Element (A-Z)	Description
Available <Resource>	Displays the available resources for the selected resource type in tree format.
Resource Types	Select a resource type from the list.
Selected <Resource> with Permissions	<p>Displays the selected resources and their respective permissions for the current resource type. The available permissions differ for different resource types, as follows:</p> <ul style="list-style-type: none"> • Queries have view, update, delete, and snapshot permissions. • Views have view, update, delete, snapshot, and archive permissions. • Impact Analysis and Custom Reports have view, update, and delete permissions. • UI Modules have access permission. • For CIT Menu Items, you select a CIT from the tree and then select specific actions from the Available Actions pane and move them to the Selected Actions pane. You can also right-click a CIT and select the actions from the pop-up dialog box. If no permissions are assigned for any CIT, all the menu items are permitted by default (in accordance with the permissions granted in the General Actions tab). <p>Note: The above principle remains valid when there are multiple roles with menu items permissions/general actions. Both the menu items permissions and the general actions are accumulated. If there are NO menu items permissions accumulated from all the user's roles, all the menu items are permitted by default (in accordance with the permissions granted by accumulating all the General Actions from all the user's roles). In the opposite way, if there are menu items permissions accumulated from all the user's roles, they will be taken into account and the UI will enforce them, even in the case when a role with no CIT Menu Items is aggregated with a role with CIT Menu Items.</p> <ul style="list-style-type: none"> • UCMDB Browser Widgets have view permission. • Restricted Data have view and edit permissions on CITs that have the Sensitive Data attribute set in the CI Type Manager.

Browser CI Access Control Tab

Important information	<p>The Browser CI Access Control tab enables you to define view and edit permissions for the UCMDB Browser module. These permissions are not relevant in the UCMDB user interface.</p> <p>Select Views as the resource type to access Views mode and assign</p>
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	<p>permissions according to the selected views and folders.</p> <p>Select CI Types as the resource type to access CI Types mode and assign permissions according to the selected CI types.</p> <p>Alternatively, select one or both of the check boxes to assign permissions for all CIs.</p> <p>For details on the possible permission combinations, see "User Permissions for the UCMDB Browser Module" on page 281.</p>
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User interface elements are described below:

UI Element (A-Z)	Description
<CI Types mode>	<p>When CI Types is selected as the resource type, select a CI type in the Resources pane. For each CI type selected, use the arrow buttons to move actions from the Available Actions pane to the Selected Actions pane.</p> <p>When you assign direct permission for a CI type, a green check mark appears next to the CI type in the tree in the Resources pane. Children of the selected CI types are assigned permission by inheritance, and they are indicated by a small red T. If one or more children of a CI type are assigned permission but the subtree is collapsed, the CI type is indicated by a small red T with a green border .</p>
<Views mode>	When Views is selected as the resource type, select a view in the Available Views pane. For each view selected, use the arrow buttons to move the view to the Selected Views with Permissions pane. When moving views, you must select the permissions for the selected views, using the Set Permissions dialog box.
Edit All	Grants permission to view all CIs and relationships and to edit all CIs in the CMDB.
Resource Types Pane	Select Views or CI Types .
View All	Grants permission to view all CIs and relationships in the CMDB.

Resource Groups Tab

Important information	Select a resource group and use the arrow buttons to move actions from the Available Actions pane to the Selected Actions pane to assign permissions for those actions for the resources in the selected resource group to the current role.
------------------------------	--

User interface elements are described below:

UI Element (A-Z)	Description
Available Actions	Displays the available actions per resource.
Resource Groups	Displays the available resource groups. Resource groups used by the selected role are marked with a green asterisk.
Selected Actions	<p>Displays the permitted actions selected for the resources in the selected resource group for the current role.</p> <p>Note: The selected actions are permitted for the resources relevant to that action. If you select the Create action under Queries, the role receives permission to create folders and queries in all of the query folders in the resource group.</p>

General Actions Tab

Important information	Use the arrow buttons to move actions from the Available Actions pane to the Selected Actions pane to assign them to the current role.
------------------------------	--

User interface elements are described below:

UI Element (A-Z)	Description
Available Actions	Displays the available general actions.
Selected Actions	Displays the general actions selected for permissions for the current role.

Role Details Tab

User interface elements are described below:

UI Element (A-Z)	Description
Description	<p>Enter a description of the role.</p> <p>Note: This field is optional.</p>
Name	Displays the role name.

Permissions Overview Tab

Important information	<p>Displays a summary of the selected role's permissions.</p> <p>Select a resource type in the Resource Types pane. The resources of the selected type are displayed in the Permissions Summary pane. If you select a resource in the tree, the roles from which the permissions derive are displayed in the Permission Origin pane.</p>
------------------------------	---

Permissions Summary

The following section describes the hierarchy of required permissions for working in UCMDB. It begins with the most fundamental permission and continues through the different levels of permission needed for various actions. At each level of permission, the permissions of all the previous levels are also required.

- The most basic permission required is the general action **Access to UI** permission. Without this permission, the user cannot log in. This permission is added by default when a new role is created.
- The next level of permission needed to use UCMDB functionality is the permission for the individual UI modules, located in the Resource Types pane of the Resources tab. If a user lacks permission for a specific module, that module is not visible to him.

Note: For some modules, you can assign permission for specific subsections of the module. For example, under Modeling Studio, you can select Views, Queries, and Models each individually for permission in the role.

- The next level of permission depends on the specific functionality required. These are assigned by the general actions described in the table below and by the permissions granted for individual resources in the Resources tab.

When multi-tenancy is enabled, one specific general action, **View CIs** permission, is necessary for a broad category of functionality, including other general actions such as View History and Allow Search. Without this permission, the user cannot see the CIs in a view even if he has permission for that view. This permission is also added by default when a new role is created.

Note:

- For queries, views, impact rules, and custom reports, **View** permission is the base permission. For all other permissions (update, delete, snapshot, and archive), you must also assign view permission for the selected resource.
- If a role includes view permission for a view or an impact rule, it also automatically includes view permission for the base query of the view or impact rule. If the role includes update permission for a view or impact rule, it does not automatically include update permission for the base query.
- **View** permission for a view includes permission to view a saved snapshot of the view or an archived report of the view. When multi-tenancy is enabled, the CIs visible in the snapshot or archived report are the ones whose tenant assignments at the time of the snapshot or archive,

match the current tenant assignment of the user's View permission (even though there may have been changes in both tenant assignments).

- Instance-based models are treated as ordinary CIs in terms of permissions. **View CIs** permission enables a user to view such models (in a multi-tenancy environment) and **Data Update** permission enables him to create, modify, and delete them.
- In a multi-tenancy environment, **View CIs** permission enables you to view pattern-based models whose tenants match the tenant assignment for the permission. You are automatically granted **View** permission for the queries on which the pattern-based models are based. **Data Update** permission enables you to create, modify, and delete the models, but you need **update** permission for the query to modify it. To create a model based on a new query, you must have **Create Queries** permission for the folder where the query will reside. To create a model based on an existing query, you must have **view** permission for that query.
- If a user has **Create Views** permission on a specific folder, he can create views in the folder based on existing TQL queries for which he has view permission as well as views based on new queries.
- All permissions for Universal CMDB Configuration Manager are managed in the UCMDB Security modules.

Resources Tab Permissions

The following table specifies the actions permitted for the selected resources by the Set Permissions options in the Resources tab:

Permission	Actions Permitted
Create	Create resources in the selected folders.
View	View the selected queries, views, impact rules, custom reports, or UCMDB Browser widgets.
Update	Modify the selected queries, views, impact rules, or custom reports.
Delete	Delete the selected queries, views, impact rules, or custom reports.
Create Snapshot	Create and view snapshots of the selected queries or views. Note: Snapshots for views can be created from the UI. Snapshots for queries can be created using the API.
Archive	Archive the topology reports of the selected views.

Permission	Actions Permitted
Manage in CM	Manage, unmanage, and edit the selected views in Universal CMDB Configuration Manager.
Authorize in CM	View and authorize changes to the selected views in Universal CMDB Configuration Manager.

Create permission is only relevant for folders. If you create a new resource, you can only save it in a folder for which you have **Create** permission.

The other permissions can be applied to individual resources or to folders. When they are applied to a folder, they automatically apply to all the resources contained in the selected folder. For example, **View** permission for a folder enables you to view all the resources contained in that folder.

General Actions Permissions

The following table specifies the actions permitted by the different general actions permissions.

Permission	Actions Permitted
Access to Authorized State	Access data in the authorized state.
Access to SDK	Run the Java API.
Access to UCMDDB Browser	Access the CMS UI.
Access to UI	Access the UCMDDB UI.
Administration	Create users, groups, roles, resource groups and assign roles to users and groups.
Allow Search	Search for CIs in the Search tab of the CI Selector.
Automation Execution	Execute any Operations Orchestration flow in Configuration Manager (only relevant for Universal CMDB Configuration Manager). For more information, see "Automation Execution Dialog Box" in the <i>Configuration Manager section of the UCMDDB Online Help</i> .
Automation Policies	Define automation policies in Configuration Manager (only relevant for Universal CMDB Configuration Manager). For more information, see "Automation Policies" in the <i>Configuration Manager section of the UCMDDB Online Help</i> .

Permission	Actions Permitted
Automation Setup	Configure Operations Orchestration flows in Configuration Manager (only relevant for Universal CMDB Configuration Manager). For more information, see "Automation Setup" in the <i>Configuration Manager section of the UCMDB Online Help</i> .
Class Model Modifier	Add, delete, and update CI types in the CI Type Manager.
Data Update	Create, update, and delete CIs and relationships.
Deploy Packages	Deploy packages in Package Manager.
Get Related CIs	Access the Related CIs functionality.
Gold Master Archive	Archive a Gold Master report.
Policies Admin	Create, edit, and delete baseline, topology, and similarity policies in Universal CMDB Configuration Manager.
Reassign Tenant	<p>Change the tenant assignment for a resource or CI in the Assign Tenants dialog box.</p> <p>Note: This permission is only available when multi-tenancy is enabled.</p>
Remote Deployment	Deploy a package that exists on the local UCMDB to a remote UCMDB server that is defined by the selected integration point.
Run Discovery and Integrations	Run discovery in the Universal Discovery module and integrations in the Integration Studio.
View Discovery Status and Error	View discovery status and errors of a CI in IT Universe Manager when the Show Discovery Progress permission is also enabled. Or, view discovery status and errors of a CI in Universal Discovery module when both the Show Discovery Progress permission and the Universal Discovery module are enabled.
Run Impact Analysis	Run Impact Analysis in the IT Universe Manager.
Run Legacy API	Run the client APIs.
Run Query by Definition	Preview a view in the Modeling Studio.
Service Modeling	Create service models in the UCMDB Browser module.

Permission	Actions Permitted
Settings Management	Update the infrastructure settings using the API.
View CIs	View CIs. Note: This permission is only available when multi-tenancy is enabled.
View History	View CI history.
View Recipients	View recipients in the Recipients Manager.
View Tenant Assignment	View the tenant assignment for a resource or CI in the Assign Tenants dialog box. Note: This permission is only available when multi-tenancy is enabled.
View UI Scheduler Jobs	View Scheduler jobs in the Scheduler.

Out-of-the-Box Roles

The following roles are provided out-of-the-box by UCMDB for assigning to different users:

- **DataConsumer.** Read only permission for resources and CIs and access to IT Universe Manager and the Reports module only.
- **Discovery and Integrations Admin.** Full permission for all Data Flow Management modules, without tenant assignment permissions. Includes permissions for all actions that are required to perform any discovery-related flows and to deploy packages on remote integration points. It also includes permission for discovery-related tasks such as managing probes, credentials, and adapters and for viewing discovery-related reports.
- **SuperAdmin.** All permissions for all modules.

When multi-tenancy is not enabled, the following additional out-of-the-box roles are available:

- **Viewer.** Read only permission for resources and CIs and access to all Modeling modules except for Enrichment Manager, without tenant assignment permission (only relevant when multi-tenancy is not enabled).
- **Admin.** Full permission for resources and CIs and access to all Modeling modules except for Enrichment Manager, without tenant assignment permission (only relevant when multi-tenancy is not enabled).

not enabled). Also includes all permissions associated with Universal CMDB Configuration Manager.

When multi-tenancy is enabled, the following additional out-of-the-box roles are available:

- **TenantViewer.** Read only permission for resources and CIs and access to all Modeling modules except for Enrichment Manager. Also includes read only permission for tenant assignment (only relevant when multi-tenancy is enabled).
- **TenantAdmin.** Full permission for resources and CIs and access to all Modeling modules except for Enrichment Manager, including tenant assignment permission (only relevant when multi-tenancy is enabled).

Note: Out-of-the-box roles cannot be edited or deleted.

Chapter 15: Resource Groups

This chapter includes:

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Resource Groups Overview

A **resource group** is a collection of resources that you define for the purpose of assigning permissions to users. The Resource Groups module enables you to select specific resources of different types and define the collection as a resource group. When you assign permissions to roles in the Roles Manager, you can select a resource group, along with specific actions, as the permission for that role. This can be useful when you need to assign permissions for the same collection of resources to several different roles.

There is one default, out-of-the-box resource group, the **All Resources Group**, which includes all the existing resources. This resource group cannot be edited or deleted.


For details on defining resource groups, see ["Resource Groups Page" on page 333](#).

Note: The Resource Groups module is available only to those logged in with administration access rights.

How to Define a Resource Group

The following task describes how to define a new resource group:

1. Create a New Resource Group

Click the **New Resource Group**  button in the Resource Groups pane to open the New Resource Group dialog box. Enter a name and description for your resource group. For details, see ["New Resource Group Dialog Box" below](#).

2. Select Resources

In each tab, select the resources you want to include in the resource group. For details, see ["Resource Groups Page" on the next page](#).

Note: Select the **All Resources** check box to include all the resources of the tab in the resource group, including resources of the selected type created in the future.

3. Save the Resource Group

Click the **Save**  button in the Resource Groups pane to save your changes.


Resource Groups User Interface

This section includes (in alphabetical order):

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New Resource Group Dialog Box

This dialog box enables you to define a new resource group.

To access	Click the New Resource Group  button in the Resource Groups pane.
Relevant tasks	"How to Define a Resource Group" on the previous page
See also	"Resource Groups Overview" on the previous page

User interface elements are described below (unlabeled elements are shown in angle brackets>):

UI Element (A-Z)	Description
Description	Enter a description of the resource group you are defining.
Resource group name	Enter a unique name for the resource group.







Resource Groups Page

This page enables you to create, edit, and delete resource groups.

To access	Select Resource Groups from the Security module on the Navigation Menu or select Managers > Security > Resource Groups .
Important information	Select a resource group in the Resource Groups pane and select the specific resources to include in the group from the resource tabs in the right pane.
Relevant tasks	"How to Define a Resource Group" on page 331
See also	"Resource Groups Overview" on page 331

Resource Groups Pane

User interface elements are described below (unlabeled elements are shown in angle brackets):

UI Element (A-Z)	Description
	New Resource Group. Creates a resource group. Opens the New Resource Group dialog box.
	Edit Resource Group. Enables you to edit the name of the selected resource group.
	Delete. Removes the selected resource group(s). Note: You can make multiple selections to delete multiple resource groups.
	Refresh. Refreshes the list of resource groups.
	Save. Saves the changes you have made.
	Save As. Saves the resource group with a different name.
<List of resource groups>	Contains the names of the existing resource groups.
<Search feature>	To search for a phrase in the list of resource groups, enter the phrase in the Find box. Use the arrow buttons to find the next and previous occurrences of the phrase. Click the Highlight button to highlight all occurrences of the phrase.

Right Pane

Important information	<p>The tabs represent different resources. The following tabs are available:</p> <ul style="list-style-type: none">• Queries• Views• Impact Analysis• Custom Reports• UI Modules• UCMDB Browser Widgets <p>In each tab, use the arrow buttons to move resources from the Available Resources pane to the Selected Resources pane. You can move individual resources or folders containing resources.</p>
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User interface elements are described below:

UI Element (A-Z)	Description
All Resources	<p>Select All Resources to move all available resources to the Selected Resources pane.</p> <p>Note: Selecting this option ensures that resources of the selected type that are created in the future are also included in the Selected Resources.</p>
Available Resources	Displays the available resources for the selected tab.
Selected Resources	Displays the selected resources for the selected tab.

Chapter 16: Ownership Management

This chapter includes:

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Ownership Management Overview

The Ownership Management module provides a directory of resources and their user owners. The user owner is automatically defined as the user logged in at the time the resource is created. The user owner of a resource cannot be changed, but you can delete the ownership of resource. In such a case, the resource remains without a user owner.

When working in a multi-tenancy environment, note that resource ownership is independent of tenancy. For details on multi-tenancy, see ["Multi-Tenancy Overview" on page 284](#).

Note: The Ownership Management module is available only to those logged in with administration access rights.

Ownership Management User Interface

This section includes:




Ownership Management Page	335
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Ownership Management Page

This page enables you to view the resource ownership data and to delete the ownership for a resource.

To access	Select Ownership Management from the Security module on the Navigation Menu or select Managers > Security > Ownership Management .
See also	"Ownership Management Overview" above

User interface elements are described below:

UI Element (A-Z)	Description
	Delete Selected Item(s). Removes the ownership from the selected resource. You can make multiple selections.
	Refresh displayed data. Refreshes the list of resources.
	Clear Filter. Clears the text entered in any of the filters.
Resource Name	Enter a resource name to filter the displayed resources by name.
Resource Type	Select a resource type from the drop down list to filter the displayed resources by type.
User Name	Select a user name from the drop down list to filter the displayed resources by user owner.

Chapter 17: LDAP Mapping

This chapter includes:

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LDAP Mapping Overview

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 using the LDAP Mapping module in the Security section of the Navigation bar. The LDAP Mapping module only appears if the user has the required permissions. For details, see ["Roles Manager" on page 315](#).

For details on synchronizing LDAP groups with Universal CMDB groups, see ["Synchronize Universal CMDB User Groups with LDAP Groups" on the next page](#).

For details on configuring 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.

Synchronize Universal CMDB User Groups with LDAP Groups

This task describes how to synchronize LDAP user groups with Universal CMDB user groups:

1. Configure an LDAP synchronization strategy
 - a. Go to **JMX Console > UCMDB:service=LDAP Services > configureLDAPServer**, enter the values for the relevant settings, and click **Invoke**. For details, see "How to Define LDAP Servers and Enable the LDAP Authentication" in the *Hardening section of the UCMDB Help*.
 - b. Go to **UCMDB > Managers > Administration > Infrastructure Settings**, select **LDAP General**, and set the **Enable User Permissions Synchronization** and the **Remote users repository** settings to **True**.

Note: Any changes you make for **LDAP General > Remote users repository** and **LDAP General > Enable User Permissions Synchronization** remain in effect for all future Web sessions.

- c. Select **Managers > Security > LDAP Mapping** and verify that the list of the LDAP groups that are configured on the LDAP server appear in the LDAP Repository pane. If the list of LDAP groups do not appear, verify your LDAP settings.


For details on Infrastructure Settings, see ["Infrastructure Settings Manager Overview" on page 208](#).

2. Create Universal CMDB groups

You can create Universal CMDB user groups and assign roles to them. For details on creating groups, see ["Users and Groups" on page 301](#).

3. Map LDAP groups to Universal CMDB groups

You map user groups on the LDAP server to groups in Universal CMDB to synchronize the groups and enable management of your Universal CMDB groups via the LDAP server, as follows:

- a. Select **Managers > Security > LDAP Mapping**.
- b. In the LDAP Repository pane, select a remote group.
- c. Move the required groups from the Available groups pane to the Selected groups pane using the arrow buttons or by dragging and dropping the required groups into the Selected groups pane.
- d. Click **Save** .

Caution: When defining mappings, make sure to map at least one LDAP group to an Admin group in the CMDB before logging out. If this is not done, you may not have any remaining group with administration permissions.

4. Log out and log in to Universal CMDB
 - a. Select **LDAP General > Enable LDAP authentication** and set the value to **True**.
 - b. Log out of Universal CMDB and then log in again with the LDAP user name and password.

How to Configure LDAP for Active Directory

This task describes how to configure LDAP for Active Directory.

To enable LDAP login and user permissions synchronization, edit the following parameters in JMX console > UCMDb:service=LDAP Services > configureLDAPserver method:

Note: For all other parameters, you can use either the default values or, if required, LDAP-specific values.

LDAP Integration Settings	Comment
LDAP search user	CN=AD Connector CN=Users DC=consult DC=example DC=com
Enable User	true: Enables permission synchronization for LDAP group mapping with

LDAP Integration Settings	Comment
Permissions Synchronization	Universal CMDB user groups (when Enable LDAP Authentication is set to true).
Group class object	group
Groups base DN	CN=Users DC=consult DC=example DC=com
Groups member attribute	member
Group base filter	((objectclass=groupOfNames) (objectclass=group) (objectclass=groupOfUniqueNames)(objectclass=groupOfUrls) (objectclass=access Group)(objectclass=accessRole))
LDAP URL	The URL to your LDAP server, including port: ldap://LDAP-SERVER:389/DC=consult,DC=example,DC=com??sub
Password of Search-Entitled User	*****
Remote users repository mode	Enable LDAP authentication.
Root group	Defines the parent LDAP node of all users to be synchronized. A Synchronization User List base DN includes all users in that DN—unless the users are excluded by the Synchronization User List's filter or the user's DN is matched in a more specific Synchronization User List. CN=Users DC=consult DC=example DC=com
Root groups filter	((objectclass=groupOfNames)

LDAP Integration Settings	Comment
	(objectclass=group) (objectclass=groupOfUniqueNames)(objectclass=groupOfUrls) (objectclass=access Group)(objectclass=accessRole))
Users filter	Defines an LDAP filter used to include or exclude users from a Synchronization User List: (&(sAMAccountName=*) (objectclass=user))
Users object class	user
UUID attribute (User Unique ID attribute)	sAMAccountName

For configuration examples, see the following:

- ["Example: How to Configure LDAP for Sun ONE Directory Server in UCMDB Server" on page 343](#)
- ["Example: How to Configure Dynamic LDAP Groups" on page 348](#)

Search LDAP Users

The JMX console provides a **getLDAPGroupUsersChunk()** method that allows you to search LDAP users. The method returns matched users in one or multiple chunks, and each chunk contains 100 users at most.

Note: To search LDAP users, the LDAP server must support Virtual List View (VLV) and Server Side Sorting.

Follow these steps to search LDAP users from the JMX console:

1. Launch your web browser and enter the following address: **https://<server_name>:8443/jmx-console**, where **<server_name>** is the name of the machine on which Micro Focus Universal CMDB is installed.

You may need to log in with a user name and password.

- Under **UCMDB**, click **UCMDB:service=LDAP Services** to open the Operations page.
- Locate **getLDAPGroupUsersChunk**, and then specify the following parameters.

Parameter	Value
ldapHost	Enter the host name of the LDAP server. This parameter is mandatory.
searchInGroup	Enter the group's name if you want to search in a specific group. Default: search all groups.
searchByField	Specify one of the following fields: uid , displayname . The method then searches in the specified field. Default: uid .
searchValue	Enter the search value.
sortByField	Specify one of the following fields: uid , displayname . The method then sorts the search result by the specified field. Default: uid .
sortOrder	Specify the sort order of the search result. Default: True (in ascending order).
requestedChunkNumber	Specify which chunk of result that the method returns. Default: the first chunk.
multipleChunksRequest	Specify how many chunks of result that the method returns. The method returns the specified number of chunks starting from the first chunk. This parameter works only when requestedChunkNumber is not specified. Otherwise, the method only returns the chunk as specified in requestedChunkNumber .

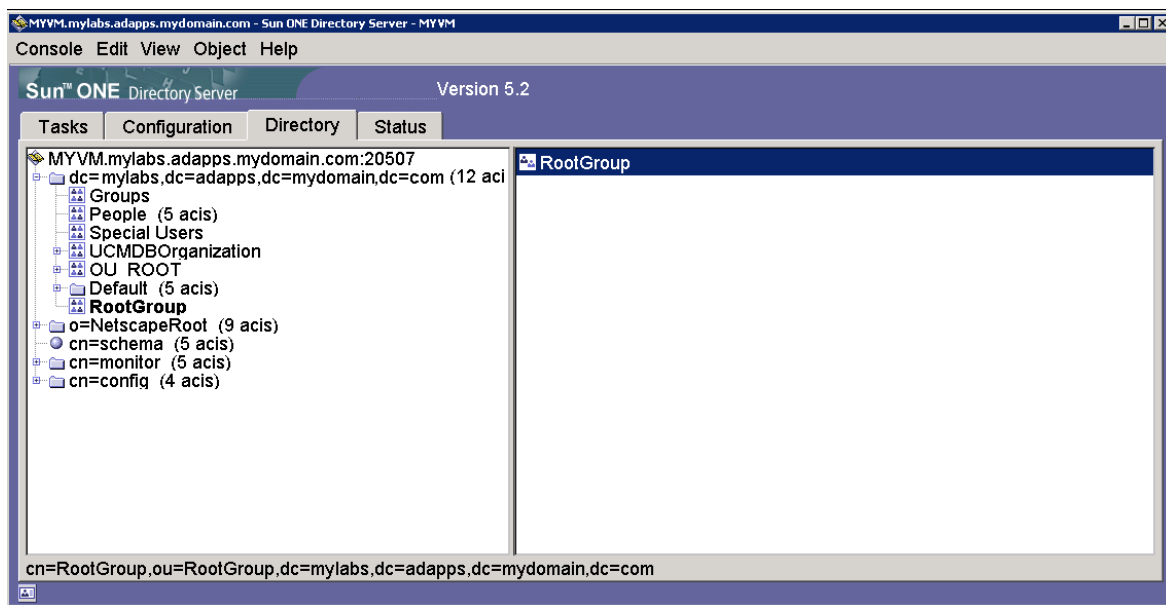
Note: If only **ldapHost** is specified, the method returns the first chunk of all users in all groups in the ascending order of the **uid** field.

- Click **Invoke**.

Note: The method can return the group information of LDAP users. To enable this functionality, you need to configure the LDAP server by using the **configureLdapServer()** method and set the **displayUsersGroup** parameter to True.

Example: How to Configure LDAP for Sun ONE Directory Server in UCMDB Server

This example focuses on Sun ONE Directory Server.



Not everything from the server will be used. Focus on the following:

HM: The host machine: myvm.mylabs.adapps.mydomain.com

PORT: The port of the Active Directory server: **20507**

DC: The domain component (path to the organization units):
dc=mylabs,dc=adapps,dc=mydomain,dc=com

OU: In this example, the following organizational units will be used:

- **Groups:** The non-root groups
- **People:** The users
- **RootGroup:** The root groups

Your Active Directory server does not have to be exactly like this one. This is just an example to help you understand what the configurations required by UCMDB mean.

In what follows if we use upper case it means we refer to the above fields.

In UCMDB there are a big list of parameters that need to be set for connection to an LDAP server.

configureLdapServer

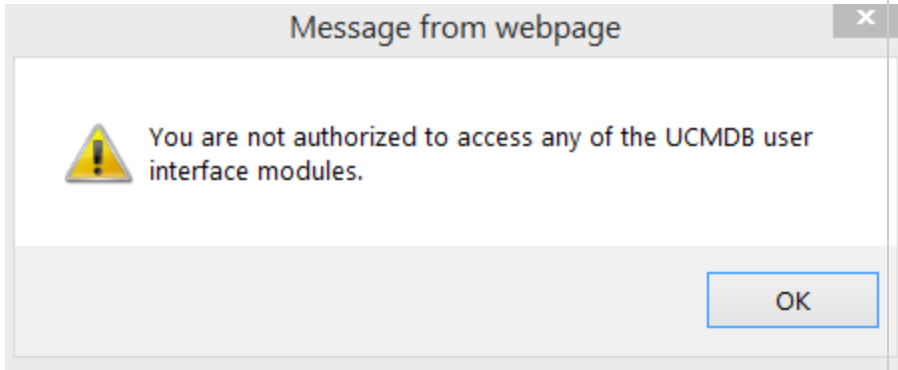
Add or edit a LDAP server settings. To edit some configurations you need to enter the full LDAP URL of a server that is already configured.

Name	Type	Value	Description
ldapURL	java.lang.String	<input type="text"/>	LDAP connection string
groupBase	java.lang.String	<input type="text"/>	Group Base (Empty to leave current value)
groupBaseFilter	java.lang.String	<input type="text"/>	Group Base Filter (Empty to leave current value)
rootGroup	java.lang.String	<input type="text"/>	Root Group (Empty to leave current value)
rootGroupFilter	java.lang.String	<input type="text"/>	Root Group Filter (Empty to leave current value)
isUseBottomUpAlgorithm	boolean	<input checked="" type="radio"/> True <input type="radio"/> False	Use bottom up algorithm for find parent groups
searchUser	java.lang.String	<input type="text"/>	LDAP Search User (Empty to leave current value)
searchUserPassword	java.lang.String	<input type="text"/>	LDAP Search User Password (Empty to leave current value)
defaultGroup	java.lang.String	<input type="text"/>	Default Group (Empty to leave current value)
userFilter	java.lang.String	<input type="text"/>	Users filter (Empty to leave current value)
isEnabledSearchForDN	boolean	<input checked="" type="radio"/> True <input type="radio"/> False	Distinguished Name (DN) Resolution
rootScope	java.lang.String	<input type="text"/>	Root groups scope (Empty to leave current value)
groupScope	java.lang.String	<input type="text"/>	Scope for groups search (Empty to leave current value)
groupClass	java.lang.String	<input type="text"/>	Group class object (Empty to leave current value)
groupDescAttribute	java.lang.String	<input type="text"/>	Groups description attribute (Empty to leave current value)
groupDisplayNameAttribute	java.lang.String	<input type="text"/>	Groups display name attribute (Empty to leave current value)
groupMemberAttribute	java.lang.String	<input type="text"/>	Groups member attribute (Empty to leave current value)
groupName	java.lang.String	<input type="text"/>	Groups name attribute (Empty to leave current value)
userDisplayNameAttribute	java.lang.String	<input type="text"/>	User display name attribute (Empty to leave current value)
userClass	java.lang.String	<input type="text"/>	Users object class (Empty to leave current value)
userUID	java.lang.String	<input type="text"/>	UID attribute (Empty to leave current value)
priority	java.lang.Integer	<input type="text"/>	The priority of the LDAP server: 1 highest, 10 lowest.
displayUsersGroup	java.lang.Boolean	<input checked="" type="radio"/> True <input type="radio"/> False	Display users' group (will increase the time in which the users are retrieved)
splitRepositoryFromLoginName	java.lang.Boolean	<input checked="" type="radio"/> True <input type="radio"/> False	When authenticating with a user does the login name contain the ldap host name as domain?
nrOfUsersRetrievedAtOnce	java.lang.Integer	<input type="text"/>	Number of users to be retrieved at once, 0 for unlimited search (default). Change only when search results are limited by LDAP Server.(Empty to leave current value)
distinguishedNameAttr	java.lang.String	<input type="text"/>	Distinguished Name Attribute as it is defined on current LDAP Server. It will be used for limited search for retrieving multiple users at once.(Empty to leave current value)

Here let's take each of them and see what they mean and how to configure them.

LDAP server setting name	What the setting means and how to configure it
ldapURL	<p>This parameter consists of four parts:</p> <ol style="list-style-type: none"> 1. The protocol: ldap 2. The LDAP host name. In this case HM: myvm.mylabs.adapps.mydomain.com 3. The port of the Active Directory you use. In this example we have PORT: 20507 4. Lastly the path to our users (ou=People,DC): ou=People,dc=mylabs,dc=adapps,dc=mydomain,dc=com <p>The value for this parameter should follow the following format:</p> <p><Protocol>://<HM:PORT>/<ou=People,DC></p> <p>In this example, it results in:</p> <p>ldap://myvm.mylabs.adapps.mydomain.com:20507/ou=People,dc=mylabs,dc=adapps,dc=mydomain,dc=com</p>

LDAP server setting name	What the setting means and how to configure it
	<p>Note: Having multiple user repositories (LDAP servers) on the same machine is not supported. We use the host name as the unique identifier for those resources. This means that we cannot have multiple LdapServers with the same host name (myvm.mylabs.adapps.mydomain.com in this example).</p>
groupBase	<p>This represents the path to the groups. In this example there are two different OUs, one for the root groups (ou=RootGroup,DC) and one for other groups (ou=Groups,DC), therefore the groupBase parameter needs to be set to the parent of both: DC.</p> <p>So it results in something like the following:</p> <p>dc=mylabs,dc=adapps,dc=mydomain,dc=com</p>
groupBaseFilter	<p>Set the filter for the groups. In SunONE a static group inherits from the groupOfUniqueNames object class, so the value for the groupBaseFilter parameter should be the following:</p> <p>(objectclass=groupOfUniqueNames)</p>
rootGroup	<p>This represents the path to the root groups:</p> <p>ou=RootGroup,dc=mylabs,dc=adapps,dc=mydomain,dc=com</p>
rootGroupFilter	<p>Set the filter for the root groups. We use the groups filter again:</p> <p>(objectclass=groupOfUniqueNames)</p> <p>If we would have all the groups (root groups + other groups) in the same OU, then we could use this filter to define which groups are the root ones, for example groups whose name start with "Group":</p> <p>(&(objectclass=groupOfUniqueNames)(cn=Group*))</p>
isUseBottomUpAlgorithm	<p>The algorithm used to traverse the groups. In this example, it is set to:</p> <p>False</p>
searchUser	<p>This represents the admin user that will be used to connect to the LDAP server. In this case:</p> <p>cn=Directory Manager</p>
searchUserPassword	<p>Specify the password for the admin user:</p> <p>mypw</p>
defaultGroup	<p>If we login with an LDAP user on UCMDB, what permissions will it have? Here we specify the UCMDB group that will be used if no other permissions are set for an LDAP user. So we need a valid UCMDB group name:</p>

LDAP server setting name	What the setting means and how to configure it
	<p>UCMDBGroup</p> <p>If this group does not exist or it does not have enough permissions, when trying to log in on UI, you will see an error message:</p>  <p>Note: The UCMDB group can be created after the LDAP Server is configured.</p>
userFilter	<p>Like we had a filter for groups, we also have one for users. This defines which entities from the LDAP server we consider to be users. In our case the users inherit from the inetOrgPerson object class:</p> <p>(objectclass=inetOrgPerson)</p>
isEnabledSearchFor DN	<p>If true when searching for information on the LDAP server, it resolves a distinguished name to a domain controller that holds the entry for that name. Here we set it to:</p> <p>True</p>
serchRetriesCount	<p>Let's say we want to search for a user but the LDAP server is down for 1 millisecond. This field specifies how many times we will retry the search if the connection is down. We set it to:</p> <p>5</p>
rootScope	<p>The scope of the search for the root groups. We use:</p> <p>sub</p>
groupScope	<p>The scope of the search for the non-root groups. We use again:</p> <p>sub</p>
groupClass	<p>Here we set the class from which the groups inherit. As we have already seen in our case this is:</p> <p>groupOfUniqueNames</p>

LDAP server setting name	What the setting means and how to configure it
groupDescAttribute	The attribute that defines the description of the groups. For us it is: desc
groupDisplayNameAttribute	The attribute that defines the display name of the groups. For us it is: cn
groupMemberAttribute	The group members are found using this attribute. In our case: uniqueMember
groupName	The attribute that defines the group name. For us it is: cn
userDisplayNameAttribute	The attribute that defines the user display name. For us it is: cn
userClass	The class from which the users inherit. We use: inetOrgPerson
userUID	The attribute that defines the user unique ID. We have: uid
priority	Each user repository has a priority defined. This field is used every time a host name is not specified in an operation. For example if we log in with a user without specifying the server that contains the user, we will go on all user repositories in priority order. If multiple LDAP Servers are configured with the same priority, they will be checked in the order they were configured. If a user with that name is found on a server we will not go further. For UCMDB internal store the out-of-the-box priority is 1. Here we will use: 5
displayUsersGroup	This is related to the new feature of querying the users using chunks. If this field is on true and we search for users when we get the results we will also receive the name of the group that contains that user. This will obviously impact performance because we request more data from the LDAP server. We will set it on: False
splitRepositoryFromLoginName	When authenticating with a user, whether the user login name should contain the LDAP host name as domain or not. Here we set it on: True
nrOfUsersRetrieved	When the LDAP server has a size limit configured for the search results, this

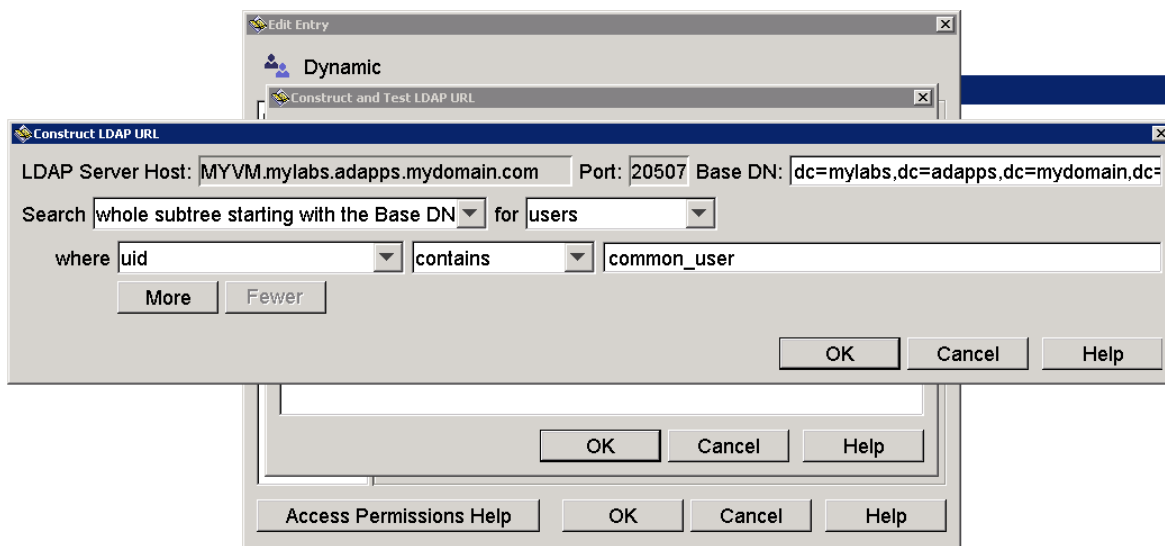
LDAP server setting name	What the setting means and how to configure it
AtOnce	<p>setting allows you to specify the number of users that may be retrieved at once from the LDAP server. In our case, the LDAP server does not have a size limit defined, so we will use the default value:</p> <p>0</p> <p>For more information, see Number of users requested from the LDAP server in CMS UI Help.</p>
distinguishedNameAttr	<p>The distinguishedNameAttr setting is relevant only in combination with the nrOfUsersRetrievedAtOnce setting.</p> <p>The Distinguished Name Attribute as it is defined on the current LDAP Server. In our case, the LDAP server does not have a size limit defined, so we will leave this field empty.</p> <p>For more information, see Number of users requested from the LDAP server in CMS UI Help.</p>

Example: How to Configure Dynamic LDAP Groups

Starting with version 10.32, support for dynamic groups is available. This example shows how to configure dynamic LDAP groups in UCMDB server.

In the LDAP server we have created a user with the ID **common_user**.

Next we add a dynamic group containing this user:



This group is in the same organization unit **OU:Groups** with our previous non-root groups.

We add this group to the root group members.

We have the LDAP server configuration previously set.

In SunONE the dynamic groups have the group class different from the static groups: **groupOfURLs**.

So first we must update the Group Base Filter attribute. In this case the new value will be:

((objectclass=groupOfUniqueNames)(objectclass=groupOfURLs))

If our root group is dynamic we must also update the root group filter to contain the:

(objectclass=groupOfURLs)

To configure the dynamic groups, use the following JMX Method:

configureLdapDynamicGroups

Configure an LDAP server dynamic groups settings.

Name	Type	Value	Description
ldapHost	java.lang.String	<input type="text"/>	LDAP Server Host Name
dynamicGroupsClass	java.lang.String	<input type="text"/>	Dynamic group class object (Empty to leave current value)
dynamicGroupsDescAttribute	java.lang.String	<input type="text"/>	Dynamic groups description attribute (Empty to leave current value)
dynamicGroupsDisplayNameAttribute	java.lang.String	<input type="text"/>	Dynamic groups display name attribute (Empty to leave current value)
dynamicGroupsMemberAttribute	java.lang.String	<input type="text"/>	Dynamic groups member attribute (Empty to leave current value)
dynamicGroupsNameAttribute	java.lang.String	<input type="text"/>	Dynamic groups name attribute (Empty to leave current value)

Invoke

Parameter Name	Parameter description and how to configure the parameter
ldapHost	The host name of an already configured LDAP server. In our case HM : myvm.mylabs.adapps.mydomain.com
dynamicGroupsClass	The class from which the groups inherit. In SunONE a static group inherits from the groupOfUniqueNames object class, so in our case it is: groupOfUniqueNames
dynamicGroupsDescAttribute	Defines the description of the dynamic groups. In our case it is the same as for static groups: desc
dynamicGroupsDisplayNameAttribute	Defines the display name of the dynamic groups. We have: cn

Parameter Name	Parameter description and how to configure the parameter
dynamicGroupsMemberAttribute	The group members are found using this attribute. For dynamic groups our value is: memberURL
dynamicGroupsNameAttribute	Defines the dynamic group name. We have the same value as for the static groups: cn

Now you have successfully configured the dynamic groups.

In case you want to enable/disable the dynamic group configurations for an LDAP server, you need invoke the **useDynamicGroups** JMX method by filling the host name and set the **isEnabled** flag to **true/false**.

Test if it works:

Now that you have dynamic groups enabled, you can map the dynamic groups to UCMDB groups.

If you authenticate with an LDAP user that is a member of a dynamic group and that group was mapped to a UCMDB group, the user created in UCMDB should now be a member of the mapped UCMDB group.

For example:

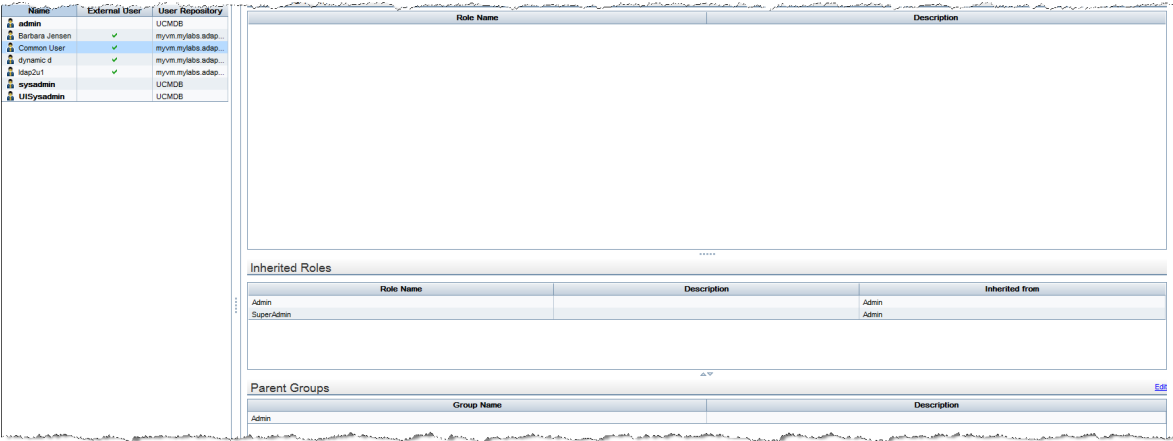
We map the LDAP group **Dynamic** to the UCMDB groups we want. We mapped it to a group named **Admin** with the **admin** and **superadmin** roles.

We have our user **common_user**. With the dynamic groups disabled, we authenticate with the **common_user**. Because the user cannot be found in the **Dynamic** group, he/she will be mapped to the default **UCMDB** group configured in the LDAP setting. In our case **UCMDBGroup**:

Name	External User	User Repository
admin		UCMDB
Barbara Jensen	✓	myvm.mylabs.adap...
Common User	✓	myvm.mylabs.adap...
dynamic d	✓	myvm.mylabs.adap...
ldap2url	✓	myvm.mylabs.adap...
sysadmin		UCMDB
UITSysadmin		UCMDB

</

Now we enable dynamic groups. If the settings are right and we authenticate again with the **common_user**, now we will be mapped to the mapped UCMDB group (**Admin**):




LDAP Mapping User Interface

This section includes:

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Remote Group Users Dialog Box	353

LDAP Groups to UCMDB Groups Mappings Dialog Box

This dialog box displays all the LDAP user groups that have been mapped to Universal CMDB user groups.

To access	Click the Show LDAP Groups to UCMDB Groups Mapping  button on the toolbar.
See also	"LDAP Mapping Overview" on page 337

User interface elements are described below:

UI Element (A-Z)	Description
LDAP Group	The name of the LDAP user group.
UCMDB	The Universal CMDB user roles that are mapped to the corresponding LDAP





UI Element (A-Z)	Description
Groups	group.

LDAP Mapping Page

This page enables you to map groups configured in Universal CMDB to groups configured on the LDAP server.

To access	Select LDAP Mapping from the Security module on the Navigation Menu or select Managers > Security > LDAP Mapping .
Relevant tasks	<ul style="list-style-type: none">• "How to Configure LDAP for Active Directory" on page 339• "Synchronize Universal CMDB User Groups with LDAP Groups" on page 338
See also	"LDAP Mapping Overview" on page 337

User interface elements are described below:

UI Element (A-Z)	Description
	Save Mapping. Saves your changes to the LDAP mapping.
	Show Users. Enables you to view the list of users associated with the selected LDAP group. Opens the Remote Group Users dialog box. Note: You can also select this option by right-clicking a group.
	Show LDAP Groups to UCMDB Groups Mappings. Displays the LDAP groups that have been mapped to UCMDB groups.
	Toggle between displaying all LDAP groups and displaying only groups with mapped UCMDB groups.
Drop-down list of LDAP servers	Allows you to select an LDAP server from multiple LDAP servers. Note: This drop-down list is available only when multiple LDAP servers are configured.

LDAP Repository Pane

UI Element (A-Z)	Description
<LDAP Groups Tree>	<p>Displays a list of the LDAP groups that are configured on the LDAP server in tree format.</p> <p>Note: Begin typing the name of the required group to search for it in the tree.</p>

UCMDB Groups For LDAP Group: <group name> Pane


This enables you to select the Universal CMDB groups to map to the selected LDAP group.

User interface elements are described below:

UI Element (A-Z)	Description
Available Groups	Displays the available UCMDB groups.
Selected Groups	Displays the UCMDB groups selected for mapping to the selected LDAP group.

Remote Group Users Dialog Box

This dialog box displays all the users in the selected LDAP group.

To access	Click the Show Users  button on the toolbar.
See also	"LDAP Mapping Overview" on page 337

User interface elements are described below:

UI Element (A-Z)	Description
Login Name	Displays the login names of the users in the group.
User Name	Displays the user names of the users in the group.

Chapter 18: Tenants Management

The Tenants Management module enables you to manage your tenants. You can add new tenants, delete tenants, and edit existing tenants.

For details on multi-tenancy, see ["User Permissions for UCMDB" on page 279](#).

Note:

- The Tenants Management module is available only to those logged in with administration access rights.
- The Tenants Management module is only available when multi-tenancy is enabled. This option is enabled when installing/upgrading UCMDB.
- A multi-tenancy environment cannot be reconfigured as a single tenancy environment.

This chapter includes:

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Multi-Tenancy Architecture vs. Multi-Customer Architecture	355
Modeling in a Multi-Tenant Environment	360
How Scheduler Runs in a Multi-Tenant Environment	360
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Tenants Management Overview

The Tenants Management module enables you to manage your tenants. You can add new tenants, delete tenants, and edit existing tenants.

For details on multi-tenancy, see ["User Permissions for UCMDB" on page 279](#).

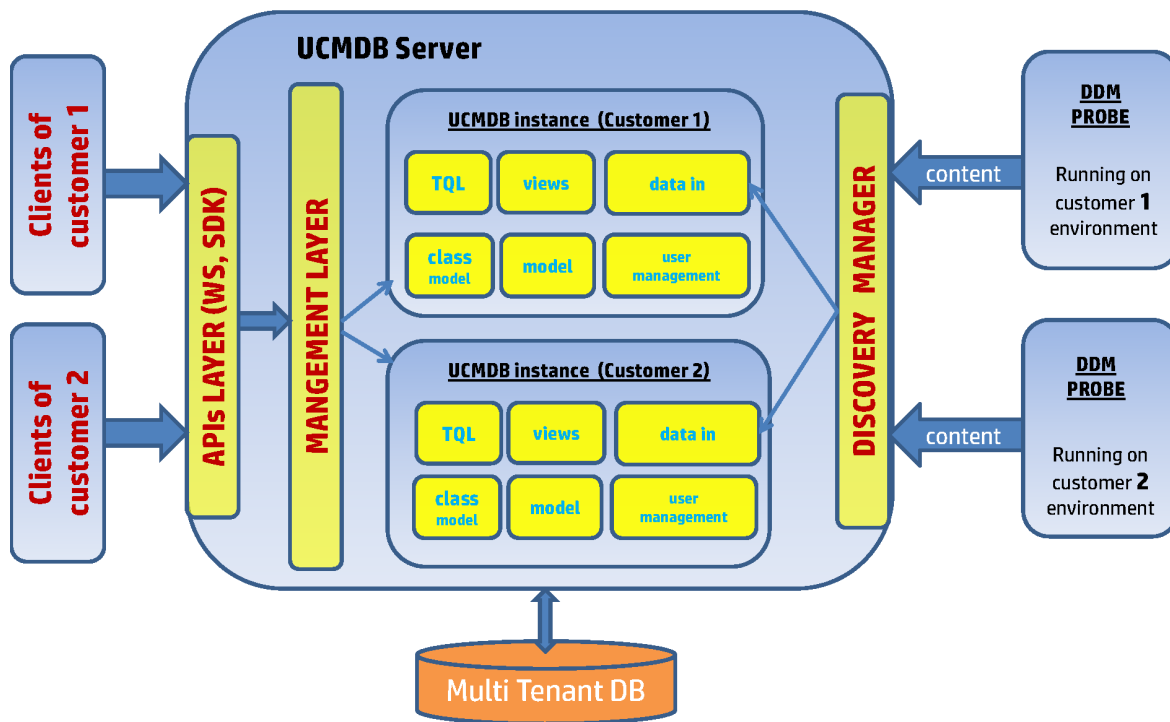
Note: The Tenants Management module is available only to those logged in with administration access rights.

Multi-Tenancy Architecture vs. Multi-Customer Architecture

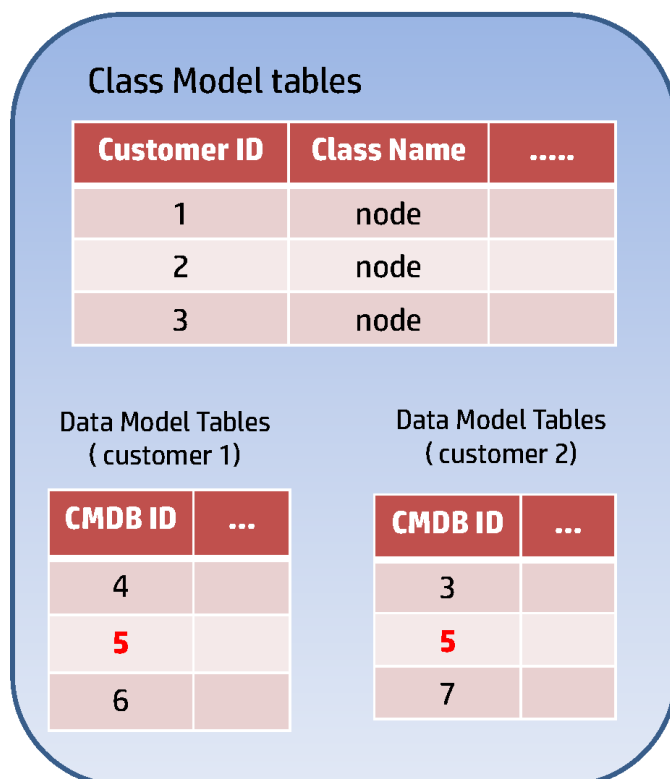
This section highlights the differences between the multi-customer and multi-tenant architectures in UCMDB. While the terms **customer** and **tenant** may in some cases be interchangeable, in UCMDB jargon they represent two different solutions, which will be explained below.

Multi-Customer (MC) Architecture

In the MC architecture each customer has its own data model (CIs) and class model (CITs).



The data is segregated into different tables, one table (for each CIT) per customer.



This model is very efficient in handling disparate data models that have few (if any) CIs in common. For such scenarios this is the most *scalable* solution because each customer's data model is isolated to its own (smaller and more manageable) DB tables.

The downside of the MC architecture is that multiple customers' data cannot be viewed in a unified view (for example, you cannot execute a TQL query in the UCMDB UI and receive the data from both customer 1 and customer 2).

A typical scenario for using the MC architecture would be a SaaS (Software as a Service) deployment where one UCMDB stores data for multiple unrelated customers.

Multi-Tenant (MT) Architecture

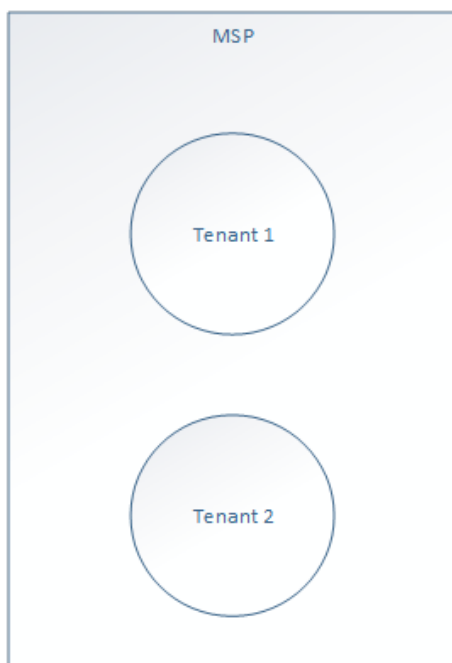
The MT architecture is designed to provide a logical separation of the data model into tenants. With the data model and the class model stored in UCMDB, the MT solution tags each CI and resource (TQL query, View) as being owned/used by certain tenants.

In such a solution all the Windows CIs in UCMDB will be stored in the same table (CDM_NT_1) and there is an extra construct which keeps track of each CI's "owning" and "using" tenants. When a query is executed (for example, by User 1, which is assigned to Tenant 1 and Tenant 2), the result sent by

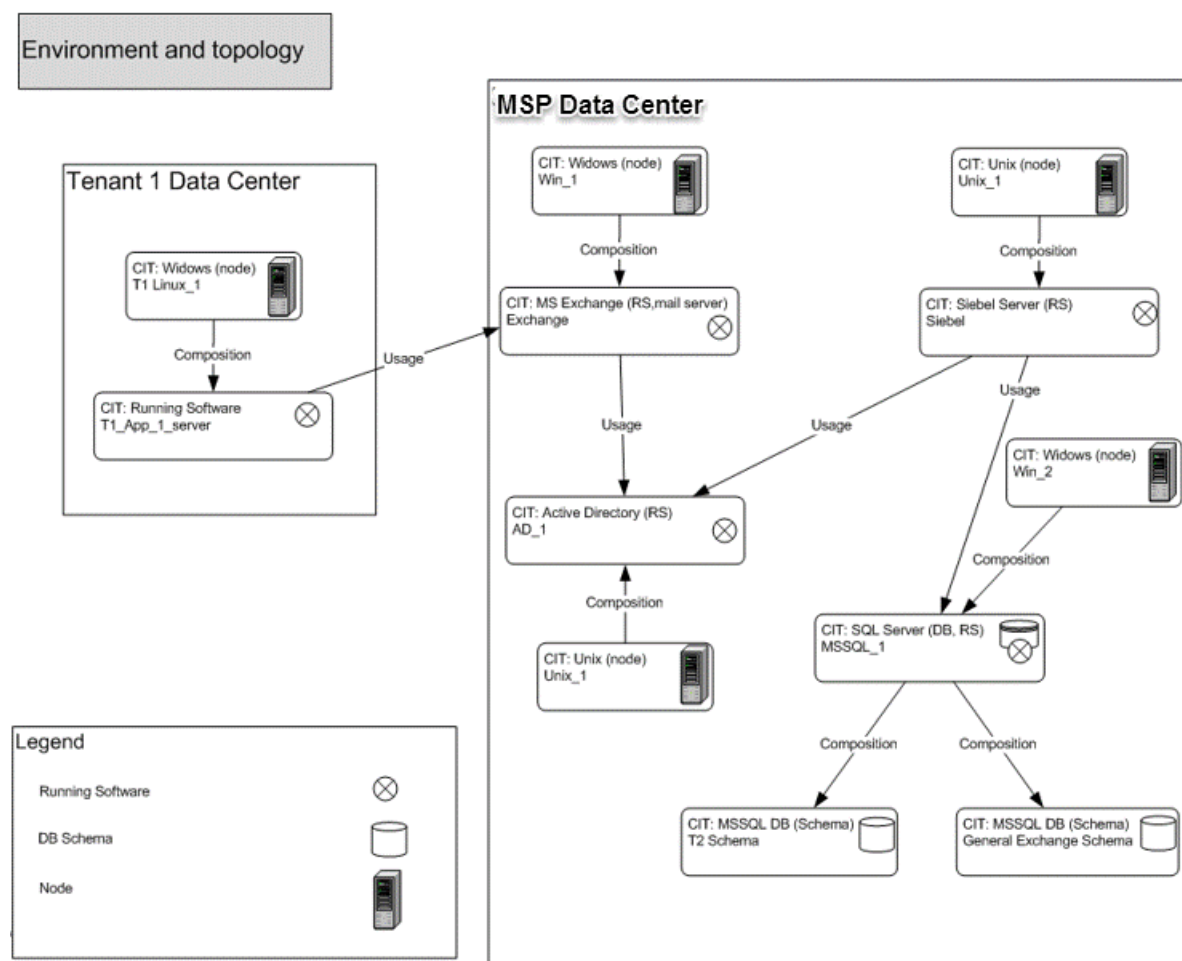
UCMDB is given by all the CIs that match the query, **filtered** by the condition that each CI should be associated to Tenant 1 or Tenant 2.

A typical scenario for the MT architecture would be a Managed Service Provider's UCMDB deployment in which many CIs belong to the Managed Service Provider (MSP) (the core infrastructure), and these core CIs are also used by the specific infrastructure that is dedicated to certain customers of the MSP.

For example, as shown below, we may have 3 tenants defined in UCMDB: **MSP**, **Tenant 1** and **Tenant 2**. The MSP tenant covers the entire data model while Tenant 1 and Tenant 2 have access to disjoint CI sets from the MSP's data model.



Here is a sample CI topology in this environment:



Through the correct tenant associations UCMDb can ensure that users of the MSP can see all the CIs, while users of Tenant 1 can only see Tenant 1's data center.

The key observation here is that it is possible for a Running Software of Tenant 1 and another Running Software of Tenant 2 to depend on the same core infrastructure CIs belonging to the MSP. These dependencies can be modeled in a MT UCMDb and running an impact analysis on the shared infrastructure CIs will reveal to the MSP administrators that the 2 Running Software CIs of Tenant 1/Tenant 2 are impacted.

Such flexibility is impossible to achieve in the MC architecture which separates CIs into different data models.

Multi-Tenant Architecture with Tenant-Aware Reconciliation

UCMDB (since version 10.21) supports a new setting **reconciliation.tenantaware.citytypes** that ensures CIs of the types defined in the setting cannot be matched to CIs with different tenant owners. This only affects CIs that inherit from the CI types declared in the setting.

By checking the Tenant Owner as a verification criterion during reconciliation, a MT UCMDB can behave similarly to a MC UCMDB, because data reported for Tenant 1 will not be able to merge with data reported for Tenant 2 even if all other attributes are equal. There are a few considerations when implementing such a solution:

1. In such a configuration data reported from Tenant 1 and Tenant 2 should never need to be merged – in other words, there should be no valid use-case where Tenant 1 and Tenant 2 data have common, shared CIs as shown in the MSP example.
2. The other consideration is whether the tenant-aware reconciliation should be done across all CIs in UCMDB (simulating the MC approach) or whether tenant-aware reconciliation should be done only for a certain CI type (which would result in a hybrid approach) – either can be achieved through the right selection of the CI types declared in the setting (tenant aware reconciliation CITs, final name TBD)

Migration from Single-Tenant Architecture to Multi-Tenant or Multi-Customer Architecture

This section describes whether the following migration scenarios are possible and the required steps for each scenario.

- Migration from the standard (Single-Tenant) architecture to Multi-Tenant (MT) architecture is not possible at the moment. It requires reinstall.
- Migration from the standard (Single-Tenant) architecture to Multi-Customer (MC) architecture is possible. You just need to call the JMX methods that are used to add customers.
- Migration from MT to MC or from MC to MT is possible by integrating two UCMDB servers (one MT, the other MC) and running a UCMDB to UCMDB integration between them. There is no support to directly switch a UCMDB server from one architecture to the other.

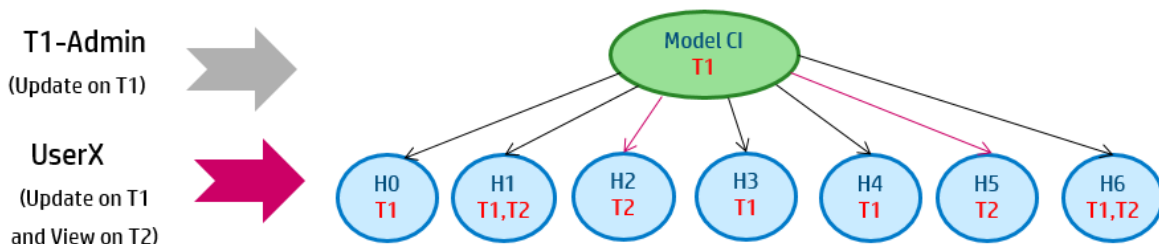
Probe Connection Address in MT and MC Architectures

In both MT and MC architecture, the probe is connecting to the same address as when connecting to a standard system. The only difference is as follows:

- In MT, the tenant is configured to be reported on the probe.
- In MC, the customer is configured to be reported on the probe.

Modeling in a Multi-Tenant Environment

A user can link a model CI to CIs on which the user has the View permission. As shown in the following diagram, UserX has the Update permission on tenant 1 (T1) and the View permission on tenant 2 (T2), and the CIs (H0 – H6) have different tenant associations. UserX can make the linkages as shown below.



When you assign a tenant on a pattern-based model from the Modeling Studio, the tenant will be assigned to both the pattern-based model and the enrichment business view definition. If you assign a tenant from the IT Universe Manager, the tenant will only be assigned to the pattern-based model, and will be overridden in 12 hours during the next pattern-based model calculation.

The permissions for a pattern-based model are checked in the context of tenants assigned to both the pattern-based model and the enrichment definition.

How Scheduler Runs in a Multi-Tenant Environment

The scheduler on a Multi-Tenant environment runs in the context of the user's tenant owner and calculates data from available tenants set as consumers. For the admin and sysadmin user, the

scheduler runs in the context of the System Default Tenant and calculates data that can be consumed by all tenants.

A pattern-based model created by a custom tenant is owned by that custom tenant and on calculation gets results from all available tenants that are set as consumers for this pattern-based model. Scheduler for this pattern-based model runs in the context of the custom tenant and the business enrichment calculation will have result CIs from tenants allowed to be consumed by this user. You can check the tenant owner and tenant consumer to deduct the context that the scheduler runs. This information is available in the Assign Tenant dialog box for the pattern-based model.

The scheduler does not consider the CIs that have no tenant during the calculation. If some CIs have no tenant owner or tenant consumer, even if a user can see the related result from the UI, the result of the scheduler will be different.



Tenants Management User Interface

This section includes (in alphabetical order):

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New Tenant/Edit Tenant Dialog Box

This dialog box enables administrators to create and edit tenants.

To access	<p>Do one of the following:</p> <ul style="list-style-type: none">Click the Add new tenant  button in the Tenants tab to open the New Tenant dialog box.Click the Edit tenant description  button in the Tenants tab to open the Edit Tenant dialog box.
See also	<ul style="list-style-type: none">"Multi-Tenancy Overview" on page 284"Tenants Management Overview" on page 354

User interface elements are described below (unlabeled elements are shown in angle brackets>):

UI Element (A-Z)	Description
Description	Enter a description of the tenant you are defining.
Tenant Name	Enter a unique name for the tenant.






Tenants Management Page

This tab enables you to create, edit, and delete tenants.

To access	Select Tenants Management from the Security module on the Navigation Menu or select Managers > Security > Tenants Management .
Important information	The multi-service provider default tenant appears in bold in the list of tenants.
Relevant tasks	"Multi-Tenancy Workflow" on page 294
See also	<ul style="list-style-type: none">• "Multi-Tenancy Overview" on page 284• "Tenants Management Overview" on page 354

Tenants Pane

User interface elements are described below (unlabeled elements are shown in angle brackets):

UI Element (A-Z)	Description
	Add new tenant. Creates a tenant. Opens the New Tenant dialog box.
	Edit tenant description. Opens the Edit Tenant dialog box.
	Delete Selected Item(s). Removes the selected tenant. You can make multiple selections.
	Refresh displayed data. Refreshes the list of tenants.
	Denotes a tenant.
<List of tenants>	Displays the name and on-board date for each existing tenant.
<Search feature>	To search for a phrase in the list of tenants, enter the phrase in the Find box. Use the arrow buttons to find the next and previous occurrences of the phrase. Click the Highlight button to highlight all occurrences of the phrase.

Shortcut Menu

Menu Option (A-Z)	Description
Delete	Removes the selected tenant.
Edit	Opens the Edit Tenant dialog box.

Details Pane

User interface elements are described below:

UI Element (A-Z)	Description
Description	Displays a description for the selected tenant.

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