HP Universal CMDB

Software Version: 10.10

Administration Guide

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Contents

Introduction

Chapter 1: Configuration Management Database (CMDB)

This chapter includes:

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 HP 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 *HP UCMDB Discovery and Integrations Content Guide*.

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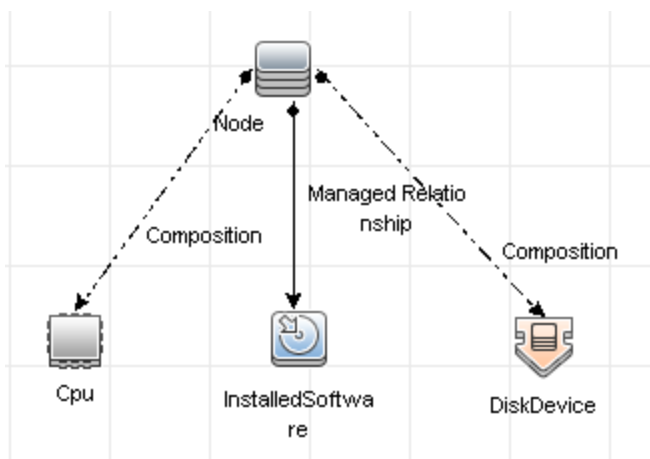
The CMDB also contains the TQL query definitions that are used to query and retrieve data from the CMDB for presentation in the view, and the configuration item type (CIT) model, a repository for the CI types used to define the CIs and relationships. For information on TQL queries, see Topology Query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

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 UCMDB Browser 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 *HP Universal CMDB Data Flow Management Guide*.

- 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 discovery jobs and integrations that support IPv6, see the section on IPv6 support in the *HP UCMDB Discovery and Integrations Content Guide*.

- 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 (CI)

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 HP Universal CMDB are called relationships.

Each CI belongs to a configuration item type (CIT). The CIT defines a category of CIs used in HP 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 HP Universal CMDB, see "Working with CIs" in the *HP Universal CMDB Modeling Guide*.

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 *HP Universal CMDB Modeling Guide*.

> **Note:** When working in views, query nodes are called **view nodes** in the HP 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 *HP Universal CMDB Modeling Guide*.

History Storage and Purging in UCMDB

History Storage

HP 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 *HP Universal CMDB Modeling Guide*.

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 **hp\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.

History Purging

HP 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.

- **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.

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 *HP Universal CMDB Data Flow Management Guide*.

> **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

This chapter includes:

How to Log In to UCMDB

1. In the Web browser, enter the URL of the HP Universal CMDB Server, 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 HP Universal CMDB Server.

   If HP 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.

   - **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.

   - **UCMDB Browser.** Opens the UCMDB Browser. The UCMDB Browser is a web-based tool for displaying UCMDB information quickly and easily. For the link to be active, UCMDB Browser 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 UCMDB Browser 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 HP 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 HP UCMDB API Reference documentation.

> **Note:** You must have a valid license to access UCMDB, UCMDB Configuration Manager, and UCMDB Browser. 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 **http://<server name or IP address>.<domain name>:8080/ucmdb**.

3. Enter your login parameters.

4. If HP Universal CMDB is installed in a multiple customer or multiple state environment (for example, HP Software-as-a-Service or HP 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.

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

> **Note: HP 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 HP Universal CMDB.

When automatic login is enabled from the login page, the next time you enter the URL to access HP Universal CMDB, 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 HP 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 window.

Guidelines for Using Automatic Login

Using the **Logout** option at the top of the HP Universal CMDB page cancels the option. If you log out using the Logout button, the next time you try to log in, the Login page opens and you must enter a login name and password again. This can be useful if more than one UCMDB user must log in on the same machine using a different user name and password.

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**, located under the environment's temporary directory. 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.

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

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

HP Universal CMDB 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).

Login Troubleshooting

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 21

Possible Causes for Failure to Log In to UCMDB

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

Problem/Possible Causes	Solutions
HP Universal CMDB is not started successfully. **Indication:** The **startup.log** file does not include the following line: ======== All components started ========	**Solution 1:** Verify that the HP Universal CMDB Server is up and running by accessing the Web console **http://<Server name>:8080/web-console** where **<server name>** is the name of the HP Universal CMDB Server to which you are connecting. **Solution 2:** Check the database connection: To check that the database server is up and running: 1. Launch the Web browser and navigate to: **http://<Server name>:8080/jmx-console**, where **<Server name>** is the name of the machine on which HP Universal CMDB is installed. 2. Under **UCMDB**, click **UCMDB:service=Dal Services** to open the JMX MBean View. 3. Invoke the function **getDbContext** with a **customerID** parameter value of **1**. 4. Check that the operation result shows no problems. **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. **Solution 4:** Use the log file **C:\hp\UCMDB\UCMDBServer\runtime\log\cmdb.dal.log** to verify the database connections. **Solution 5:** To verify that the database connection is valid, in the Windows command interpreter (cmd.exe), type `sqlplus cmdb/cmdb@skazal.`
The CMDB is corrupted (for example, a user record may have been deleted accidentally from the CMDB).	Import a previously backed up database file. For details, see the *HP Universal CMDB Database Guide*. **Important:** The HP Universal CMDB server must be down while importing the database. **Note:** When you import a previously backed up database file, you lose all data previously existing in the system.
The HP Universal CMDB login fails. This may be due to an incorrect login name/password combination.	Ensure that you enter a correct login user name/password combination.

Problem/Possible Causes	Solutions
HP Universal CMDB login fails due to unexpected errors.	**Solution 1**: Select **Start > Programs > HP UCMDB > HP Universal CMDB Server Status** and ensure that the service is running. **Solution 2**: Look for errors in the following log files: ● **C:\hp\UCMDB\UCMDBServer\runtime\log\error.log** ● **C:\hp\UCMDB\UCMDBServer\runtime\log\ui-server.log** If you find errors that are unfamiliar to you, contact HP Software Support.

Java Not Installed on Client Machine

If Java is not installed on your machine or you have an version older than 6.u10, during login a message is displayed asking you whether to install the correct Java Runtime Environment version. JRE is needed to view HP Universal CMDB applets.

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

Updating the Java Configuration

The following message is displayed when HP Universal CMDB detects problems with initial memory:
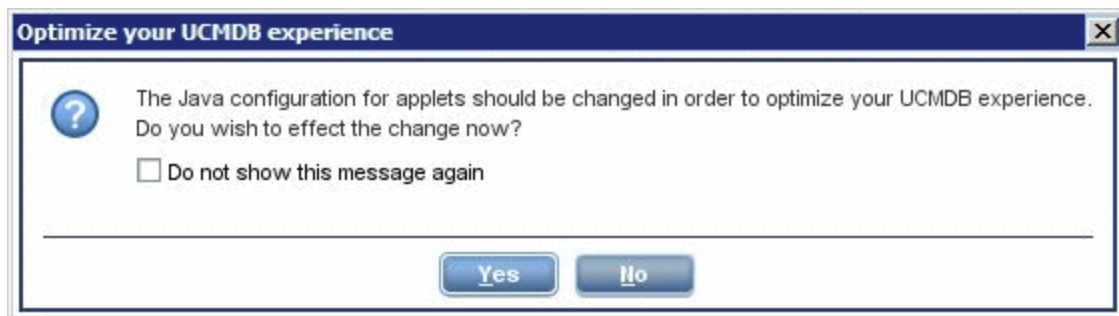
Note: From Java version 6 update 10, this message is no longer displayed as it is no longer relevant.

Chapter 3: Navigating HP Universal CMDB

This chapter includes:

Navigating the HP Universal CMDB User Interface

HP Universal CMDB runs in a Web browser. You move around HP 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**.
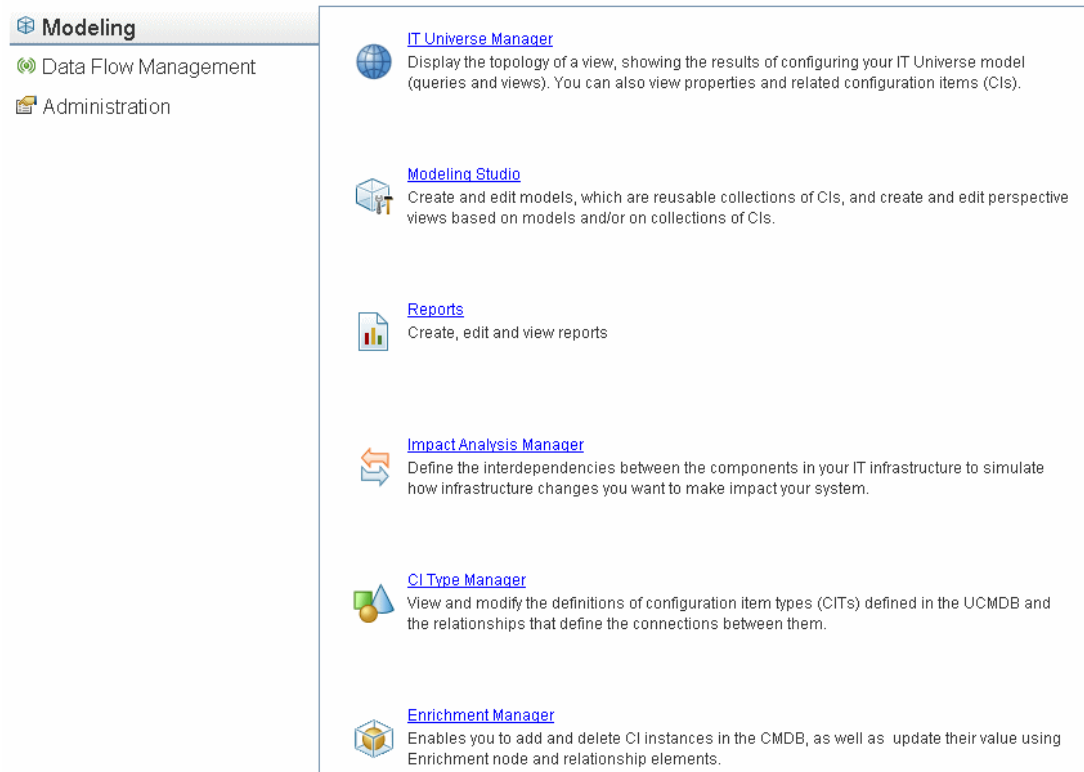
- **Status Bar.** Provides information on the CMDB application and enables you to configure certain aspects of your interface.

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

Note: The Web browser **Back** function is not supported in HP 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 HP 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 *HP Universal CMDB Modeling Guide*.
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 *HP Universal CMDB Data Flow Management Guide*. For details on DFM content, see the *HP UCMDB Discovery and Integrations Content Guide*.
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 HP 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 home page. The home page provides quick links to the main help topics.

- **Troubleshooting & Knowledge Base.** Opens the HP Software Support Web Site directly to the HP Software Self-solve knowledge base landing page. The URL for this Web site is **http://support.openview.hp.com**.

- **HP Software Support**. Opens the HP Software Support Web Site. 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 Web site is **http://support.openview.hp.com**.

- **HP Software Web Site.** Opens the HP Software Web site, which contains information and resources about HP Software products and services. The URL for this Web site is **http://www.hp.com/managementsoftware**.

- **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 an HTML page with direct links and information about the following:

  - HP Live Network where the Best Practice documentation is accessed.

  - Support site where all documentation and knowledge base articles can be accessed.

  - Guidance videos and feature movies.

  - HP UCMDB online documentation.

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

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

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 HP 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.
<License status>	Indicates the current status of the licenses. Click to display a window showing the license summary, available licenses, and selected license.
<Server status>	Indicates the current status of the server. Click to display a balloon with the server 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" on the next page.
	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).

UI Element	Description
?	**Help on Status Bar.** Opens the HP 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	• The annotation options are located on the left side of the annotation window.
	
	• When saving the annotation:
	
	  ▪ 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.

UI Element (A–Z)	Description

	Shape Tool. Click and drag to add a shape to the snapshot. Clicking the shape tool button enables the following shape buttons:
	
	• **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.
	
	Customization. After clicking this button, you can customize your line appearance through the following parts of the interface:
	
	• **Line Type.** Choose the type of line you want to add. Options include:
	
	  ▪ Solid Line
	
	  ▪ Jagged Line
	
	• **Line Width.** Select the width of the line, in pixels, in the annotation.

UI Element (A–Z)	Description

	Line Tool. Click and drag to enable the line tool, which marks the selected area of the snapshot with a line.
	
	Customization. After clicking this button, you can customize your line appearance through the following parts of the interface:
	
	• **Line Style.** Choose the style of line you want to add. Options include:
	
	    ▪ Regular line
	
	    ▪ Line with endpoints
	
	    ▪ Line with arrows
	
	• **Line Type.** Choose the type of line you want to add. Options include:
	
	    ▪ Solid Line
	
	    ▪ Jagged Line
	
	• **Line Width.** Select the width of the line, in pixels, in the annotation.

	Text Tool. Click and drag to open a box where you can add text to the snapshot. **Example:** Add the syntax: `This is the problematic item` above a line marking an area of the snapshot.
Border and Fill Colors	Select the relevant square to choose the color of the border and fill of your annotations. The available squares are: • **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. Clicking either of the squares generates a dialog box with the following tabs where you choose the color: • Swatches • HSB • RGB

UI Element (A–Z)	Description
Opacity	Slide the opacity bar to choose the darkness level of the selected shape line, text line, or shape color in the annotation. **Note:** • 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 information	The menu bar contains elements which enable you to: • Change the appearance of the snapshot. • Customize the appearance of text annotated onto your snapshot. These elements are enabled only when the **Text Tool** [T] 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:** • 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.

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

Chapter 4: UCMDB Browser

This chapter includes:

UCMDB Browser Overview

UCMDB Browser is a lightweight web-based client to access UCMDB data. The UCMDB Browser 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 Browser 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. The Browser has backward compatibility and works with different versions of the UCMDB server by using only the UCMDB SDK.

To grant a user access to the UCMDB Browser UI, 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 Browser 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 Browser from a web browser.

The UCMDB Browser is HTML-based and runs on the following web browsers: IE8, IE9, FireFox, and Chrome. It also runs on a Safari browser on an Apple iPad 2 tablet with iOS 4 or iOS 5, and a Chrome browser on a Motorola Xoom tablet with Android 3.1 OS (Honeycomb).

Note: When running the UCMDB Browser on the Xoom tablet with the Chrome browser, the optimal text size resolution is Normal.

The UCMDB Browser 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 update your version of UCMDB Browser from the versions released on HP Live Network, refer to the updated documentation provided with the UCMDB Browser installation for the latest information.

Initial Setup for Working with the UCMDB Browser

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

- **Enable access to the UCMDB Browser**

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

  For details, see "How to Grant Access to the UCMDB Browser" on the next page.

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

  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 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 UCMDB Browser for the first time.

For details, see "Roles Manager Page" on page 186.

- **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" below.

> **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 UCMDB Browser

For a user to access the UCMDB Browser, 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 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 assign 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 .

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.

- 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 Cases

Enable a user to view or edit all CIs

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

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

Enable a user to view or edit only specific CIs

- Read only:

  - Assign **View** permission to specific views.

  - Assign **View All CIs** permission to a particular CI type.

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

- Read/Write:

  Do one of the following:

  - To edit all CIs that you can view, assign **Edit All CIs** permission on all views.

  - To edit CIs in a specific view, assign **Edit All CIs** permission on only that view.

  - To edit only specific CI types in relevant views, assign **Edit By CIT** permission to the views and **Edit In View** permission to a particular CI type.

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

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

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

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

Do one of the following:

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

- To edit only specific CIs:

  - To edit all CIs that you can view, assign **Edit All CIs** permission on all views.

  - To edit CIs in a specific view, assign **Edit All CIs** permission on only that view.

  - To edit only specific CI types in relevant views, assign **Edit By CIT** permission to the views and **Edit In View** permission to a particular CI type.

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

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

How to Change the UCMDB Integration User Credentials

The UCMDB Browser 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** tile 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.

3. Restart the Tomcat server.

   Caution: For multiple UCMDB configurations (as described in "How to Configure Multiple UCMDB Servers" on page 39), the same integration user should be defined on all UCMDB servers.

   Note: After restarting the Tomcat server and then logging in to the UCMDB Browser, 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 UCMDB Browser with LW-SSO settings, as described in the section about LW-SSO authentication in the *HP Universal CMDB Deployment Guide* (for UCMDB 9.05 and earlier versions) or in *Hardening the HP Universal CMDB and Configuration Manager* (for UCMDB 10.0 and later versions).

   > **Note:** If you access the UCMDB Browser by IP address (not by FQDN), you should add the UCMDB Browser 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 UCMDB Browser IP address value.

2. Open the **ucmdb_browser_lwsso_config.xml** file in the **/conf** folder in an XML editor and make the following changes:

   ■ For the **domain** tag, enter the domain name of the UCMDB Browser (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 *HP Universal CMDB Deployment Guide* (for UCMDB 9.05 and earlier versions) or in the *HP Universal CMDB and Configuration Manager Hardening Guide* (for UCMDB 10.0 and later versions).

   > **Note:**
   > ● In the case of an embedded UCMDB Browser, 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 UCMDB Browser should also contain the domain name (for example http://UCMDB-SERVER.com:8088/ucmdb-browser/).

How to Configure SSL

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 executing 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.

  Note: For a full description on how to configure **server.xml** to use SSL, see the Apache Tomcat official site: http://tomcat.apache.org/tomcat-7.0-doc/ssl-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 UCMDB Browser 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 executing 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 UCMDB Browser 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>http</protocol>
        <host_name>ucmdb-server-1</host_name>
        <host_port>8080</host_port>
        <context_name>/</context_name>
</ucmdb_configuration>
<ucmdb_configuration name="configuration-2">
        <protocol>http</protocol>
        <host_name>ucmdb-server-2</host_name>
        <host_port>8080</host_port>
        <context_name>/</context_name>
</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.

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 UCMDB Browser with a given UCMDB server, you cannot

open another instance of the UCMDB Browser with a different UCMDB server with the same web browser. You can, however, open another instance of the UCMDB Browser with a different UCMDB Server if you use a different web browser. For example, if you opened the UCMDB Browser with Internet Explorer with a given UCMDB server, you can open the UCMDB Browser using Google Chrome with another UCMDB server.

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

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. If this flag is set to **False** (this is the default value), the legacy search engine, enhanced search engine, Properties widget, Environment widget, and Impact Simulation widget all 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 enhanced search engine, and also when data is loaded for the Properties, Environment, and Impact Simulation 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 menu.

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

or

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

3. Change the Connector port="8080" port to any other port number.

   For example:

```
<Connector port="8181" protocol="HTTP/1.1"
   connectionTimeout="20000"
   redirectPort="8443" />
```

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

How to Deploy the UCMDB Browser 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 the UCMDB Browser

If you have a version of the UCMDB Browser that is older than the current version, you can upgrade to the latest version as follows:

1. Download the file **ucmdb-browser-install-for-ucmdb.zip** from HP Live Network (labeled **UCMDB Browser for UCMDB installation** on HP Live Network).

2. Stop the web application (Tomcat or UCMDB Server).

3. Delete the old **ucmdb-browser.war** file as follows:

   - **If the Browser is installed on the same machine that runs the UCMDB server:** Delete the file **ucmdb-browser.war** from the folder **%UCMDB-Server%deploy/**, where **%UCMDB-Server%** is the UCMDB server root folder.

   - **For all other installations:** Delete **ucmdb_browser.war** from **<Tomcat installation path>\webapps**. Also, in **<Tomcat installation path>\webapps** delete the **ucmdb_browser** folder.

4. Copy the new **ucmdb-browser.war** file to the appropriate locations as follows:

   - **If the Browser is installed on the same machine that runs the UCMDB server:** Copy the file **ucmdb-browser.war** to **%UCMDB-Server%deploy/**. Clear the **ucmdb-browser.war** folder from **C:\hp\UCMDB\UCMDBServer\runtime\jetty-cache** before starting the UCMDB server.

   - **For all other installations:** Copy **ucmdb_browser.war** 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).

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

5. 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 UCMDB Browser with Preconfigured Apache Tomcat Server on Linux, copy the **setenv.sh** file to the **bin** folder.

   - If you installed the UCMDB Browser 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.

6. Read the release notes for the latest version to determine which features and functionality you want to use and update your Browser settings accordingly.

7. Start the Tomcat server or UCMDB server (depending on your installation).

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 UCMDB Browser instance through multiple reverse proxies, the UCMDB Browser needs to know each client's frontend URL to build correct direct links to the HP Enterprise Collaboration, HP Configuration Manager, and HP Service Manager servers. For example, a client who accesses the UCMDB Browser 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 UCMDB-Browser 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 UCMDB-Browser 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 UCMDB Browser 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.

How to Configure the Enhanced Search Engine

The Enhanced CI search engine (available with UCMDB versions 10.00 and later) 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 file (as described below) and also with the Search_Ranking_Configuration_XML file (also described below).

  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.** cCnfigure 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, as described below.

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

- **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, as described below.

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

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

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

Modify the currently indexed list

1. On the UCMDB login page, click **JMX Console** and enter your user credentials.

2. In the UCMDB section of the console, click **UCMDB:service=URM Services**.

3. On the **UCMDB:service=URM Services** page, go to **listResourceTypes**.

4. Click the **Invoke** button.

5. From the list that appears, choose one of the following:

- Topology_INDEXER_CONFIGURATION

- Topology_PARSER_CONFIGURATION

- Topology_RANKING_CONFIGURATION

6. In the screen that follows, choose one of the following (depending on your selection in the previous step):

    - Search_Indexer_Configuration_XML

    - Search_Parser_Configuration_XML

    - Search_Ranking_Configuration_XML

7. In the xml editor that opens, edit the xml file according to your needs.

Enable/Disable the Enhanced Search Engine

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

To change the enable/disable setting:

1. Go to **JMX Console > UCMDB:service=Settings Services > setSettingValue**.

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 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 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

Follow the instructions in the section "How to Specify Data Stores Used for Data Loading" on page 41.

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 91.

```
<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 minimu
m"/>
    <cardinalitySynonym cardinalityType="EQUAL" cardinalityPhrase="with"/>
    <cardinalitySynonym cardinalityType="MAX" cardinalityPhrase="max"/>
    <cardinalitySynonym cardinalityType="MAX" cardinalityPhrase="with maximu
m"/>
    <cardinalitySynonym cardinalityType="MIN" cardinalityPhrase="minimum"/>
    <cardinalitySynonym cardinalityType="MAX" cardinalityPhrase="before"/>
    <cardinalitySynonym cardinalityType="MAX_EXCLUDED" cardinalityPhrase="with
less than"/>
    <cardinalitySynonym cardinalityType="EQUAL" cardinalityPhrase="with exact
ly"/>
    <cardinalitySynonym cardinalityType="MIN" cardinalityPhrase="with at leas
t"/>
    <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 mos
t"/>
    <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 the UCMDB. In the following example, the CI attribute **display_label** has four different synonyms defined for it:

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

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

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

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

Note: Units and numbers are rounded according to the range definitions defined by the **Use Update Value Policy** qualifier. For more information on setting range definitions, see the description of the **Use Update Value Policy** qualifier in the *HP Universal CMDB Modeling Guide*.

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. With the code example below, if the user enters "virtual node" the search engine converts this to "node host_isvirtual 1". 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    1</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 .

User-Defined Enriching Queries

To create user-defined enriching queries:

1. In UCMDB, go to **Modeling > Modeling Studio** and click **New** ![New icon].

2. From the drop-down menu, select **Query**. The Query Definition editor opens.

3. Click **Query Definition Properties** ![icon]. 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** ![icon].

6. From the Bundles list, select **search_result_enriching_tqls** and click **OK**.

7. Define the query according to your system needs.

8. Define one of the nodes of the query as **Set as Contact Query Node**. The query definition is similar to the perspective definition and therefore should include at least one contact node, where the contact node is the CI that should be enriched.

There are also two out-of-the-box enriching queries provided in the Modeling Studio. You can view and edit them as follows:

1. Go to **Modeling > Modeling Studio**, and select the **Resources** tab.

2. From the **Resources Type** drop-down list, select **Queries**.

3. In the list of queries, go to **Search Engine > Enriching TQLs**.

4. Under Enriching TQLs, choose one of the enriching queries. You can view it and edit it according to you system needs.

Enriching Queries Based on Existing Folding Rules

As mentioned above, in addition to the user-defined enriching queries, there is an existing set of pre-defined 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 .

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.

Configure Redundant Words

There is a set of words that the search engine ignores when parsing the search query. To configure this list, go to the **Search_Parser_Configuration_XML** file and go to the `<blacklist>` section. Add to or edit the list as needed.

The current list of redundant words is a follows:

```
<blacklist>
    <blacklistItem>to</blacklistItem>
    <blacklistItem>such as</blacklistItem>
    <blacklistItem>with</blacklistItem>
    <blacklistItem>for</blacklistItem>
    <blacklistItem>or</blacklistItem>
    <blacklistItem>a</blacklistItem>
    <blacklistItem>the</blacklistItem>
    <blacklistItem>like</blacklistItem>
    <blacklistItem>in</blacklistItem>
    <blacklistItem>and</blacklistItem>
    <blacklistItem>of</blacklistItem>
    <blacklistItem>if</blacklistItem>
    <blacklistItem>an</blacklistItem>
    <blacklistItem>on</blacklistItem>
    <blacklistItem>linked</blacklistItem>
    <blacklistItem>all</blacklistItem>
</blacklist>
```

Configure Search of CIs Changed in a Specific Time Period

In the **Search_Parser_Configuration_XML** file, there are a sets of words defined as month-name synonyms and day-name synonyms. For example:

```
<monthSynonym>
    <monthName>january</monthName>
    <monthNumber>0</monthNumber>
</monthSynonym>
<monthSynonym>
    <monthName>jan</monthName>
    <monthNumber>0</monthNumber>
</monthSynonym>
.
.
.
<daySynonym>
    <dayName>sunday</dayName>
    <dayNumber>1</dayNumber>
</daySynonym>
<daySynonym>
    <dayName>sun</dayName>
    <dayNumber>1</dayNumber>
</daySynonym>
```

Values in the tags `<monthNumber>` and `<dayNumber>` should not be modified. These configurations allow support of search queries like "all windows created last Sunday" and "all nodes changes between August 8th 1980 and 25/5/2011".

Configure Date Format

The search engine supports two dates formats: day-month-year (DMY) and month-day-year (MDY), which can be configured as follows:

1. Go to **JMX Console > UCMDB:service=Settings Services > setSettingValue.**

2. In the **name** field enter: **cmdb.search.date.format**.

3. In the **value** field enter the desired date format: **DMY**, **MDY**, or **both**.

4. Click **Invoke**.

5. Restart the UCMDB server.

Configure Number of CIs Returned in Search Results

You can configure the number of presentable CIs that the UCMDB Browser returns in search results (default=1000). To change this, go to **Administration > Infrastructure Settings Manager** and set the value for the setting **cmdb.search.autocompletion.from.model.items**.

Configure Autocompletion

In the **Search_Autocompletion_Configuration_XML** file, you can expand the UCMDB Browser'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**.

Troubleshooting

UCMDB doesn't start because of the search subsystem manager. What do I do?

Stop UCMDB, delete the folder **<UCMDB installation folder>/search**, then restart UCMDB.

If the search still does not start, disable it, as explained in "Enable/Disable the Enhanced Search Engine" on page 46 and revert to the legacy search engine.

The search doesn't return any results

1. Check that UCMDB Search Engine is enabled.

2. If the search engine is enabled, then in Topology Search JMX, perform the following:

   ▪ **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).

The search doesn't find CI types that I want.

There are several different possible causes for this. Check the following:

● Check that the attribute and CI type are indexable according to the indexing configuration. If they are not, add the class attributes configuration item as explained "Modify the currently indexed list" on page 45.

● 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**.

Search presents too many unwanted results

● Check if you are you using queries with natural language. This can limit results of the "best guess" of what the user intended.

● If you need to be 100% certain that your query returns results only of one specific CI type, use type: **ci-type** filter in the query.

● If the two suggestions above don't help, contact the R&D team with your use case and status report from JMX.

Problem with configuration - restore factory defaults

To restore the default configuration XML files from the factory content, go to **JMX Console > UCMDB:service=Topology Search Services** and invoke the **restoreFactoryDefaults()** method.

Caution: This method overwrites the current configuration. You should back up the configuration files before invoking it.

Logs and debugging info

Logs

search.log logs everything related to searches. Default log level is INFO, only statistics are printed. The log level and number of logs are configured with the **search.loglevel** variable in **conf/log/cmdb.properties**.

Status Report

The topology search JMX status report displays all current configuration tables and statistics for the search engine component. It is useful to include it when reporting issues to R&D.

Content of Solr Database

The Solr search engine is embedded inside UCMDB server. To query it directly, go to **JMX Console > UCMDB:service=Topology Search Services** and invoke the **debugSolrQuery()** method.

Example queries:

- empty query returns all CIs

- "id:a6693cd46cfd1b4fab0c3551bac9289e" returns a CI with cmdbId a6693cd46cfd1b4fab0c3551bac9289e. This uses Solr/Lucene syntax.

How to Brand the UCMDB Browser

The majority of UCMDB Browser installations are delivered with Hewlett-Packard branding. However, you have the ability to apply a header and footer, add custom text and an icon in the header of the UCMDB Browser, and replace the image that appears on the landing page.

In all UCMDB Browser installations, the **<UCMDB_Browser_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:

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.
Custom icon for masthead	The URL of the icon that will appear in the masthead of the UCMDB Browser.
Custom image for landing page	The URL of the image that will appear on the landing page of the UCMDB Browser. **Note:** For the best visual effect, use a graphic with a transparent background.
Custom product name	The name of the product that will appear on the landing page of the UCMDB Browser.

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

3. Click **Save** 💾.

Administration

Chapter 5: UCMDB Server Administration

This chapter includes:

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 HP Universal CMDB system.

1. **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 the *HP Universal CMDB Data Flow Management Guide*.

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

- Operating system credentials

- Network protocol credentials

- Application credentials

2. **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 150 for a single tenant environment and "Multi-Tenancy Workflow" on page 162 for a multi-tenancy environment.

3. **Configure recipients of scheduled reports, including method of delivery**

   For details, see "Reports" in the *HP Universal CMDB Modeling Guide*.

4. **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 *HP Universal CMDB Modeling Guide*

   - "Modeling Studio" in the *HP Universal CMDB Modeling Guide*

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: **http://localhost:8080/jmx-console**.

2. Enter the JMX console authentication credentials, which by default are:

   - Login name = **sysadmin**

   - Password = **sysadmin**

   The UCMDB 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.

> **Note:** Enter **Log:** before a log name to return JMX methods related to that log.

3. Click the **UCMDB 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 **UCMDB JMX 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.

Data Flow Probe JMX Console

1. On the probe machine, launch the Web browser and enter the following address: **http://<Data Flow Probe machine name or IP address>:1977**. If you are running the Data Flow Probe locally, enter **http://localhost:1977**.

2. Enter the JMX console authentication credentials, which by default are:

   - Login name = **sysadmin**

   - Password = **sysadmin**

   The JMX console opens.

3. Locate the required service and click the link to open the operations page. Select the required operation.

> **Note:**
>
> - There is no search feature for the Data Flow Probe JMX console.
>
> - 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 **Administration > 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**.

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 see the interactive *HP Universal CMDB Deployment Guide*.

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: **http://localhost:8080/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 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 > suggestNewWriterServer** method where you can suggest which server (serverID) should replace the Writer server. 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.	**Default**: 240 secs
ha.writer.inactivity.period.threshold	Defines how long to wait after the Writer server stops responding, before selecting a new Writer server. **Note:** Changing this time also affects the time it takes to select the new Writer after restarting the previous Writer server.	**Default**: 120 secs

Infrastructure Setting	Description	Value
ha.load.balancer.force.close.connection	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. 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.	**Default:** false

How to Configure the UCMDB Mail Server

To configure the UCMDB Mail server:

1. In UCMDB, select **Administration > Infrastructure Settings > Mail Settings**.

2. Define the **SMTP server** setting: enter the name of the SMTP server.

3. Edit the **SMTP server port** setting: the default value is **25**.

4. As a backup for the main SMTP server, you can provide information about an alternative server. Repeat steps 2 and 3 but provide the name of the **Alternate SMTP server** and the **Alternate SMTP server port**.

5. Edit the setting for **Email sender** with the name to appear in reports that HP Universal CMDB sends.

6. To enable users to change the **Email sender** name inside the form that sends mail, change the value of **Sender editability** to **True**. Otherwise, leave its value as **False**.

How to Change the Root Context for UCMDB Components

The default root context for all HP 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 HP 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: **http://<server name or IP address>.<domain name>:8080/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

HP 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 HP 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:\hp\UCMDB\UCMDBServer\tools\dbscripts\newDbTool.bat

3. At the prompt, run the required command.

The Database tool operates in the following modes:

- Consistency Mode

- Deletion Mode

- Preview Mode

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 137.

- **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 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:
   http://localhost:8080/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 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:\hp\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: **http://<UCMDB Server Host Name or IP>:8080/jmx-console**.

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

3. Under UCMDB, click **UCMDB:service=Server services** to open the JMX MBEAN View page.

4. Locate the **executeLogGrabber** operation.

5. Click **Invoke**.

   A Server snapshot file with the name **LogGrabber_serverSnapshot_ <current date and time>.txt** is created in the following location: **C:\hp\UCMDB\UCMDBServer\runtime\log\threadDumps**. This is a thread dump that includes the threads of the Server framework only.

6. 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:\hp\UCMDB\UCMDBServer\tools\logGrabber.

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

   The **LogGrabber_<current time>.zip** file is created in the following location:
   C:\hp\UCMDB\UCMDBServer\runtime. This is a thread dump that includes the threads of the Server framework only.

Accessing Support Using the JMX Console

HP Universal CMDB provides Supportability JMX methods to help HP Software 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, HP 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:
   http://localhost:8080/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.

4. To run all the handlers, invoke the **runSupportHandlersForAllCategories** method.

5. To run specific handlers, invoke the **selectAndRunSupportHandlers** method and select the handlers you want to run.

6. 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:

- **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**

- **URM Counters.** Records each of the registered URM types and the number of instances of each one in the **Basic URM Counters.properties** file.

- **Settings.** Records the infrastructure settings and their values for this customer in the **Settings <customer ID>.properties** 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.

- **Basic History.** Records the last date that the baseline process ran for each CI type in the **Basic History.properties** file.

- **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.)

- **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

- **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 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 HP 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:
   http://localhost:8080/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.

UCMDB Services

View the Status of HP Universal CMDB Server Services

Open your client browser and enter **http://<*server name*>:8080/status** where **<server name>** is the name or IP address of the UCMDB Server machine. The **Status** and **Detailed Status** of all services are displayed, indicating whether the HP Universal CMDB services are running (Up) or are down (Not Started).

> **Note:** If some services are not running, contact HP Software Support.

Status		
Customer Name	Customer ID	**labm3amrnd82_1351426641250**
Default Client	1	Up

Detailed Status	
Component	Default Client **labm3amrnd82_1351426641250**
model_transformation	Up
reconciliation_conf	Up
topology-search-sync	Up
model	Up
classModel	Up
enrichment	Up
cmdb_widget_tracker	Up
tql	Up
cmdb_mod_not	Up
folders	Up
authorization	Up
histDB	Up
topology-search	Up
impact	Up
model_update	Up
autodiscovery	Up
content-install	Up
grouping	Up
packaging	Up
model_topology	Up
browser_resources	Up
model_statistics	Up

HP Universal CMDB Services

The HP 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.
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).
configuration	Responsible for snapshots, CI change queries, and TQL/View History queries.
content-install	Responsible for managing the content packs.
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.
framework	Responsible for dispatching operations within the UCMDB server.
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 HP Universal CMDB impact, root cause, and correlation subsystems.
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.

Service Name	Description of Service
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.
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 HP Universal CMDB.
Reconciliation_ conf	Handles the reconciliation configuration such as identification rules and reconciliation priority configuration
report	Responsible for HP 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.
state_ management	Responsible for managing states.
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.
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 HP Universal CMDB and third-party applications and tools. This information is used to build HP 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.

Protocol	Port	Process	Description
TCP	8443	ucmdb_ server.exe	Default Jetty HTTPS port.
TCP	8444	ucmdb_ server.exe	Default Jetty HTTPS port with client authentication.
TCP	8009	ucmdb_ server.exe	Default Jetty AJP port.
TCP	7800 – 7810	ucmdb_ server.exe	Default JGroups port (HA).
UDP	7600 – 7610	ucmdb_ server.exe	Multicast JGroups port (HA).
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.

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.

Log files are located in:

- **Windows: C:\hp\UCMDB\UCMDBServer\runtime\log**

- **Linux: /opt/hp/UCMDB/UCMDBServer/runtime/log**

This section includes the following topics:

- "General Log Files" below

- "Class Model Log Files" on page 80

- "TQL Log Files" on page 80

- "Data-In Log Files" on page 81

- "History Log Files" on page 82

- "Enrichment Log Files" on page 84

- "Dal Log Files" on page 85

- "Authorization Log Files" on page 85

- "UCMDB UI Log Files" on page 86

- "Data Flow Management Log Files" on page 87

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.
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**.

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: ● Server version and CUP version ● Database vendor and version ● 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.

Class Model Log Files

CI Type Model Log

The log name is **cmdb.classmodel.log**.

Log File	Description
Purpose	CI Type Model errors and debug messages.
Information Level	When a CI Type Model is loaded, incorrect definitions are logged as informational messages. An example of an incorrect definition is `duplicate attributes`.
Error Level	Not available.
Debug Level	Every CI Type update includes the following: • Original CIT in XML format • New CIT in XML format • Differences between the CITs If the CI Type Model update is rejected, the reason is logged.
Basic Troubleshooting	Compares the differences that the server finds between the original CIT and the new CIT. This is useful to understand the following scenarios: • 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	Notification messages from the time of the component's creation in the CMDB until the client's listener receives a message. Most components receive configuration changes from the CMDB in push mode, by the notification mechanism, rather than in pull mode.

Log File	Description
Information Level	• Startup and shutdown of publishers • Register and unregister remote and internal listeners
Error Level	• Errors when messages are published • Errors when messages are received
Debug Level	• 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) • JMS header properties
Basic Troubleshooting	If an application does not receive a notification, check the following: • 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	Information about a CI Type operation: type of operation, data received as input, and what happened to the data in each CIT. Also contains information about the caller application, execution times, and persistency time.
Information Level	Operation details.
Error Level	Not available.
Debug Level	Not available.

Log File	Description
Basic Troubleshooting	If there are no changes when there should be, check the following: • Whether the operation exists. • Whether the input is correct. • What happened to the data. There may have been a false update. This is especially useful when running DFM to trace the input.

History Log Files

History Log

The log name is **history.log**.

Log File	Description
Purpose	Records general history events
Information Level	• Auto completion events • Auto complete table lock/unlock messages • Tenants bitmask column size handling • Delete customer fuse notice
Debug Level	• 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	• 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	• Records history partition data. • Records the Baseline process events.
Information Level	• Add/Remove partition history tables • Baseline events • Baseline statistics
Error Level	• 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	• Query condition • Query results summary
Error Level	Fuse exceeded
Debug Level	• 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	- 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	- 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	- 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	- Connection pool errors - Database errors - Command execution errors
Debug Level	- All DAL commands executed - All SQL commands executed
Basic Troubleshooting	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. Exception details and ID are entered into the log. The exception ID appears in the exception itself.

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.

Log File	Description
Information Level	- 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**.

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	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. It is not recommended to keep this log at debug level, because it generates a large amount of printed output.

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

Data Flow Management Log Files

Data Flow Management log files store information about data flow activity (discovery and integations), 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	- User requests - Probe requests to read DFM tasks. - Probe access of 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.

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, etc.).
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, etc.), the error log is included in this log file also.

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".

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.

- **Warning.** 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 HP 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 HP 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 HP Universal CMDB logs and change the log level.

To access	In 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
Appender	The name of the appender.
File	Click the link to open the log file in an editor.
Apply	Click to apply the selected log level to the log.
Loggers pane	An expandable list of HP Universal CMDB logs. Select the required log from the list: the details of the log appear in the lower pane.

UI Element	Description
Logger's appender	A string defining the log category. For internal use only.
Log level	Select a log level from the drop-down list.

Troubleshooting and Limitations

This section describes troubleshooting and limitations for UCMDB.

- If the **wrapper.java.additional.10=-XX:+HeapDumpOnOutOfMemoryError** parameter in the **wrapper.conf** file is set, 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.

- When working in a Firefox browser using Linux, if you get an **OutOfMemoryError: PermGen space** error, follow these steps:

  a. Go to the bin directory of the Java installation directory and open the Control Panel.

  b. In the **Java** tab, select **View**.

  c. In the Java runtime environment settings, under Runtime parameters, increase the **-XX:MaxPermSize**.

- 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 [\ ] ^ ` { | } ~ " # % & + , / : < = > ? @

Chapter 6: Infrastructure Settings Manager

This chapter includes:

Infrastructure Settings Manager Overview

You can define the value of settings that determine how HP Universal CMDB and its applications run.

Caution: By modifying certain settings, you may adversely affect the performance of HP Universal CMDB. It is strongly recommended not to modify any settings without first consulting HP Software Support or your HP Services representative.

Infrastructure Settings Manager User Interface

This section includes (in alphabetical order):

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 HP Universal CMDB.

Infrastructure Settings Manager Page

This page enables you to view and edit infrastructure settings.

To access	Select **Infrastructure Settings Manager** from the Navigation Menu or select **Managers > Administration > Infrastructure Settings Manager**.
See also	"Infrastructure Settings Manager Overview" on the previous page

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 value for selected settings. 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.

UI Element (A-Z)	Description
Filter by	Enables you to define the criteria for which infrastructure settings you want to appear in the Infrastructure Settings Manager page. • In the **Filter** box, select the required filter criteria. • In the **by** box, enter the text or part of the text for which to search. **Note:** If you want to filter the parameter settings by **<Was modified>**, do the following: • Enter **false** in the **by** box to display the parameters which were not modified. • Enter **true** in the **by** box to display the parameters which were modified.
Name	The name of the infrastructure setting.
Refresh Rate	Indicates when the change takes effect in HP 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

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 105.

Package Manager fulfills several functions:

- Enables the discovery of specific IT infrastructure assets. For example, HP 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 HP Universal CMDB.

By default, factory packages are located in: **C:\hp\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 108.

> **Caution:** If you create custom packages for the resources or tools you develop, do not place them in the **C:\hp\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 98.

- 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 97.

Package Locations

There are three pre-defined folders with out-of-the-box, automatically deployed packages under **C:\hp\UCMDB\UCMDBServer\content**:

- basic_packages
  Internal packages

- adapters
  Adapter packages

- CPx.zip
  Content Pack packages

Package Manager User Interface

Each package in the Package Manager User Interface includes the following:

- 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)

- 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 114). 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.
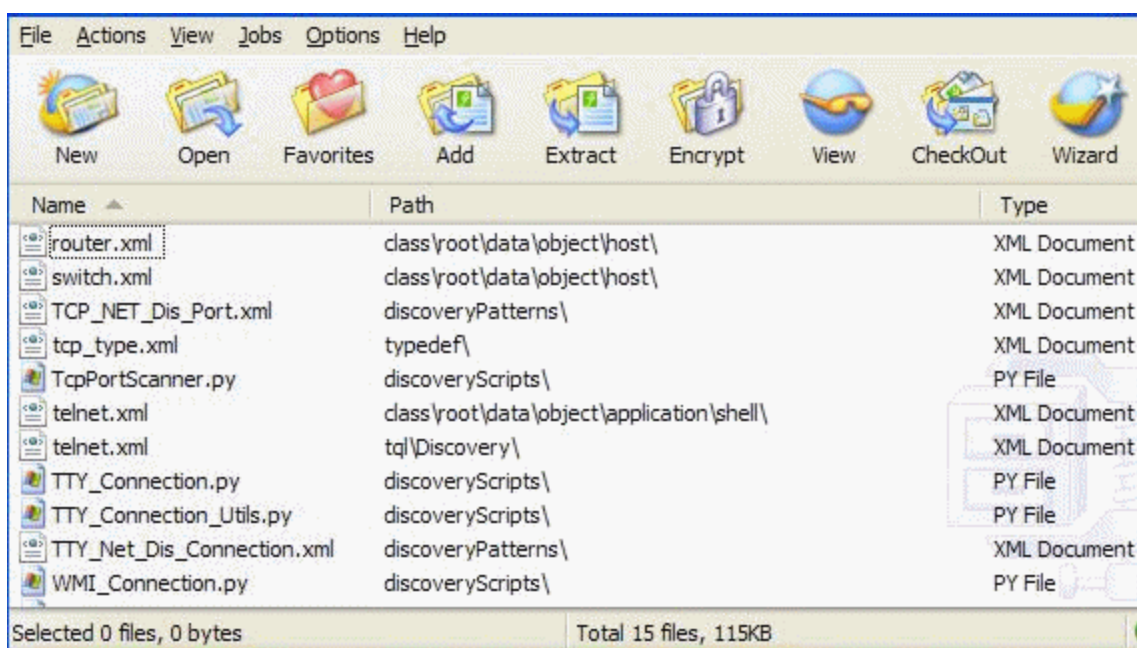
Packages for Integration Adapters

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 *HP Universal CMDB Developer Reference Guide*.

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 108.

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:

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.

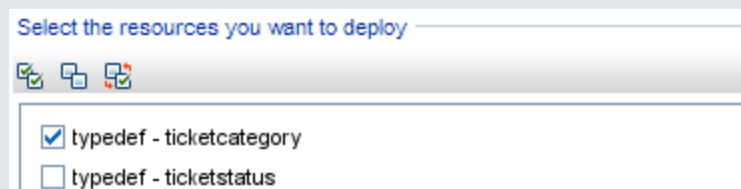**Example of Deploying Only Specific Resources in a Package:**

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 .

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 [zip] button. In the Export Package dialog box, select the **Export Resources** option and select the resources you want to export. See the following illustration:
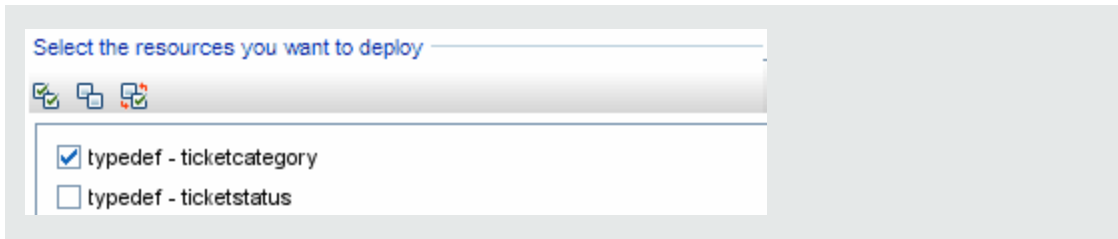
Exporting User Permissions in a Package

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 .

How to Install a Discovery and Integration Content Pack

HP Universal CMDB is released together with the latest version of Discovery and Integration Content Pack. You can install a later Content Pack release by performing the following procedure:

1. If the required Content Pack is available on the local file system of the UCMDB server, access

   Package Manager: **Administration > Package Manager**. Click **Install Content Pack** 🔲 to open the **Install Content Pack** dialog box. For details, see .

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 HP Live Network site. To access the site: **Data Flow Management > UD Community**.

5. Download the zip file and extract it to the HP 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:

-

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Deploy a Package

Follow these steps to deploy a package using the JMX console.

1. Launch your Web browser and enter the following address: **http://<server_name>:8080/jmx-console**, where **<server_name>** is the name of the machine on which HP 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 103.

7. Select **True** to override job configurations changed in Universal Discovery. For details, see "Discovery Modules/Jobs Tab" in the *HP Universal CMDB Data Flow Management Guide*.

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>:8080/jmx-console**, where **<server_name>** is the name of the machine on which HP 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: **http://<server_name>:8080/jmx-console**, where **<server_name>** is the name of the machine on which HP 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 103.

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: **http://<server_name>:8080/jmx-console**, where **<server_name>** is the name of the machine on which HP 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 HP Universal CMDB is installed using the JMX console.

1. Launch the Web browser and navigate to: **http://<server_name>:8080/jmx-console**, where **<server_name>** is the name of the machine on which HP 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 **packagesName**, 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 HP 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 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 105.

- **acl**. The definition of a role such as Administrator or Guest. For details, see "Roles Manager" on page 183.

- **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 *HP Universal CMDB Developer Reference Guide*.

- **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 122. For details on Impact Analysis, see "Impact Analysis Manager" in the *HP Universal CMDB Modeling Guide*.

- **class.** CI type descriptions, such as host, file, switch, and so on. For details, see "CI Type Manager" in the *HP Universal CMDB Modeling Guide*.

- **cmdbview**. Contains the hierarchy rules defined for the base TQL query of each view. For details, see "Modeling Studio" in the *HP Universal CMDB Modeling Guide*.

- **correlation**. Impact rule definitions. For details, see "Impact Analysis Manager" in the *HP Universal CMDB Modeling Guide*.

- **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 defintion.

- **discoveryConfigFiles**. Configuration files include properties and parameters that are needed to discover components on the system. For details, see "Adapter Configuration" in the *HP Universal CMDB Data Flow Management Guide*.

- **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 *HP Universal CMDB Data Flow Management Guide*.

- **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 *HP Universal CMDB Data Flow Management Guide*.

- **discoveryPatterns**. DFM adapters define which code to run and in which order, declare the input and output CI Types and parameters to be configurable on the DFM jobs related to them. The adapater can be used as an integration adapter or a Discovery adapter. For details, see "Adapter Configuration" in the *HP Universal CMDB Data Flow Management Guide*.

- **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 *HP Universal CMDB Data Flow Management Guide*.

- **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 *HP Universal CMDB Data Flow Management Guide*.

- **discoveryWizard**. Used to define the Discovery Activity dialog box contents. For details, see the section on discovery activities in the *HP UCMDB Discovery and Integrations Content Guide*.

- **enrichment**. Enrichment rule definitions. For details, see "Enrichment Manager" in the *HP Universal CMDB Modeling Guide*.

- **identification**. Contains the identification defintion 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 *HP Universal CMDB Modeling Guide*.

- **schedulerJob.** Tasks that have been defined to run in the Scheduler. For details, see "Scheduler" on page 125.

- **singletqlref**. Contains TQL template and perspective instances. For details, see "Modeling Studio" in the *HP Universal CMDB Modeling Guide*.

- **tql**. TQL query definitions. For details, see "Topology Query Language (TQL) Overview" in the *HP Universal CMDB Modeling Guide*.

- **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 *HP Universal CMDB Modeling Guide*.

- **users.** The definition of a user and the user's role. For details, see "Users and Groups" on page 170.

- **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 103.

Model

- **Configuration Item Types**. The CITs defined in the CI Type Manager. For details, see "CI Types Overview" in the *HP Universal CMDB Modeling Guide*.

- **Identifications**. The configuration files containing the identification rules for CIs. For details, see "Identification Service" in the *HP Universal CMDB Data Flow Management Guide*.

- **Relationships**. The relationships defined in the CI Type Manager. For details, see "CI Type Relationships" in the *HP Universal CMDB Modeling Guide.*

- **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 *HP Universal CMDB Modeling Guide*.

Query

- **Queries**. The TQL queries defined in the TQL Editor in the Modeling Studio. For details, see "Topology Query Language" in the *HP Universal CMDB Modeling Guide*.

- **Views**. The views defined in the View Editor in the Modeling Studio. For details, see "View Formats" in the *HP Universal CMDB Modeling Guide*.

- **Enrichments**. The Enrichment rules defined in the Enrichment Manager. For details, see "Enrichment Manager" in the *HP Universal CMDB Modeling Guide*.

- **Impact Rules**. The Impact Analysis rules. For details, see "Impact Analysis Manager" in the *HP Universal CMDB Modeling Guide*.

- **Policies.** The policies used in HP Universal CMDB Configuration Manager. For details, see "Policies" in the *HP Universal CMDB Configuration Manager User Guide*.

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 *HP Universal CMDB Modeling Guide*.

- **Job Scheduler**. Tasks that have been defined to run in the Scheduler. For details, see "Scheduler" on page 125.

- **State Categories**. The states defined in the State Manager. For details, see "State Manager" on page 122.

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 *HP Universal CMDB Data Flow Management Guide*.

- **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 *HP Universal CMDB Data Flow Management Guide*.

- **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 *HP Universal CMDB Data Flow Management Guide*.

- **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 *HP Universal CMDB Data Flow Management Guide*.

- **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 *HP Universal CMDB Data Flow Management Guide*.

- **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 *HP Universal CMDB Data Flow Management Guide*.

- **Discovery Wizard Resource**. Used to define the Discovery Activity dialog box contents. For details, see the section on discovery activities in the *HP UCMDB Discovery and Integrations Content Guide*.

- **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 *HP UCMDB Discovery and Integrations Content Guide*.

- **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 *HP UCMDB Discovery and Integrations Content Guide*.

- **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 *HP UCMDB Discovery and Integrations Content Guide*.

Administration

- **Users.** The users defined in the Users and Groups module. For details, see "Users and Groups" on page 170.

- **User Groups.** The user groups defined in the Users and Groups module. For details, see "Users and Groups" on page 170.

- **Resource Groups.** The resource groups defined in the Resource Groups module. For details, see "Resource Groups" on page 197.

- **Roles.** The roles defined in the Roles Manager module to assign permissions to users. For details, see "Roles Manager" on page 183.

- **Tenants.** The tenants added in the Tenants Management module. For details, see "Tenants Management" on page 210. (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 170.

Package Manager User Interface

This section includes (in alphabetical order):

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	Select 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	Click the **Create Custom Package** ✳ button on the Package Manager page to create a new package or 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 97
Wizard map	The "Create Custom Package/Edit Package Wizard" contains: "Package Properties Page" > "Resource Selection Page" > "Selection Summary Page"
See also	• "Package Administration Overview" on page 94 • "Package Resources" on page 103 • "Resource Types" on page 105

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
Factory package	Indicates a default package that is deployed with the installation. **Note:** This check box is always disabled.
Hidden package	Indicates a package that is deployed with the installation but is not visible in the list of packages that appear in the Package Manager page. **Note:** • This check box is always disabled. • To display the hidden packages, right-click anywhere in the Package Manager page and select **Show Hidden Packages**.
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.

UI Element (A-Z)	Description
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
✔	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 105. 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.

UI Element (A-Z)	Description
<Resources in the right pane>	Select the resources you want to add to the package. You can select multiple resources. **Note:** • 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 ▣ 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.) **Important information**: 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. • 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. For details on calculated relationships and triplets, see "Using Calculated Relationships" and "Triplets Page" in the *HP Universal CMDB Modeling Guide*.

Selection Summary Page

This wizard page enables you to view the resources to be included in 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 (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** ![zip] 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 98
See also	"Package Administration Overview" on page 94

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** ![filter] button on the Package Manager page.

Important information	A description of the filter condition you defined appears above the table columns on the Package Manager page. For example, the following illustration shows that a filter condition was created to display a package called **Network**. **Filter:** Package Name[Equal Network];
See also	"Package Administration Overview" on page 94

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" on page 1 in the *HP Universal CMDB Modeling Guide*.
<Right-click a column header>	For details, see "Sort Column Content Dialog Box" on page 1 in the *HP Universal CMDB Modeling Guide*.
Condition	Click inside the box and select the required operator. For details, see "Attribute Operator Definitions" on page 1 in the *HP Universal CMDB Modeling Guide*.
Display Name	Filter the task list according to one of the following: • **Package name** • **Category** • **Readme** • **Version** • **Build Number** • **Description** For details, see "Package Manager Page" on the next page.
Value	Click inside the box to open the Edit box. Enter the required value. **Note:** • 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 105

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 subsysytem containing the resource you want the package to contain. For details, see "Resource Types" on page 105.

Package Manager Page

This page enables you to create a package out of existing resources or edit an existing package to suit your IT management needs.

To access	Select Package Manager from the **Administration** module in the Navigation Menu or select **Managers > Administration > Package Manager**.
Relevant tasks	• "How to Deploy a Package" on page 97 • "How to Export a Package" on page 98 • "How to Create a Custom Package" on page 97 • "How to Install a Discovery and Integration Content Pack" on page 99
See also	• "Package Administration Overview" on page 94 • "Package Resources" on page 103 • "Resource Types" on page 105

User interface elements are described below:

UI Element (A-Z)	Description
✳	**Create custom package.** Enables you to create a package out of existing resources. Opens the Create Custom Package Wizard. For details, see "How to Create a Custom Package" on page 97.
✏	**Edit package.** Enables you to edit an existing package. Opens the Edit Package Wizard.
✖	**Delete.** Deletes a package from the Package Manager while the resources from the package remain in the system. The package that is deleted is removed from the list of packages on the Package Manager page.
🔍	**View package resources.** Enables you to view the resources included in the selected package. Opens the View package resources dialog box.

UI Element (A-Z)	Description

	Export package table. Enables you to generate a report displaying a list of the packages that are deployed in the system. Choose the export format for the table data. The available options are:
	
	• **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. In Linux, you can specify the list separator in the application that opens the CSV file.
	
	• **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 Excel (.xls) 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.
	
	    Tip: To extract HTML code from the report:
	
	    ▪ Save the file as HTML
	
	    ▪ Open the file in an HTML editor
	
	    ▪ Copy the relevant table into the target file

UI Element (A-Z)	Description
⊹	**Deploy packages to server.** Deploys a package's resources to the CMDB from your local directory. In the upper pane, click the ✚ button to open the Deploy Packages to Server dialog box. Browse to the required package. The resources from that package appear in the lower pane of the dialog box. Select the resources that you want to deploy. **Note:** When deployment is finished and it is not successful, a Deploy Package dialog box is displayed indicating which resources within the package are not successfully deployed.
⊹	**Undeploy resources.** Deletes the resources from the system and removes them from the selected package. Opens the Undeploy Package Resource Wizard.
⊟zip	**Export package.** Exports some or all of the package's resources to your local directory. Opens the Export Package dialog box.
🔍	**Find.** Enables you to search for a package that contains a specified resource. Opens the Find dialog box.
🔄	**Refresh.** Refreshes the contents of the table.
⧉	**Install Content Pack.** Enables you to install the latest Discovery and Integration Content Pack from the local file system. This button is enabled from Content Pack 7.00 onwards. For details, see "How to Install a Discovery and Integration Content Pack" on page 99. **Note:** This feature is only relevant when the latest content pack is available in the local file system of the UCMDB Server.
⧉	**Upload Content Pack.** Enables you to upload and install a Discovery and Integration Content Pack. In the **Upload and Install Content Pack** dialog box, select the required content pack from your local file system to upload and install on the server. **Note:** Editing the Content Pack file using 7-Zip may result in the file being saved with an incorrect version.
🗎	**View UCMDB Class Model.** Opens the UCMDB Class Model Reference, which contains information on all packages, CI types and relationships in the class model.
▽	**Filter.** Opens the Filter dialog box. You use the Filter dialog box to show only the packages you want displayed on the Package Manager page.

UI Element (A-Z)	Description
[icon]	**Clear.** Clears the filter definitions you created in the Filter dialog box. This is enabled only if filter definitions were created.
[icon]	**Customize Columns.** Opens the Select Columns dialog box where you can change the display order of the columns, hide a column, or display a hidden column. For details on the Select Columns dialog box, see Select Columns Dialog Box in the *HP Universal CMDB Modeling Guide*.
[icon]	Represents a factory package.
[icon]	Represents a hidden package.
[icon]	Represents a custom package.
Build Number	The build number of the package.
Category	The free text you want to associate with the package, as displayed in the Package Properties page of the Create Custom Package Wizard.
Description	The description of the package, as displayed in the Package Properties page of the Create Custom Package Wizard.
Package Name	The name of the package.
Readme	Click to read a description of the package, as well as other relevant information.
Version	The version of the package.

Shortcut Menu

Menu Item	Description
Delete	Deletes a package from the Package Manager while the resources from the package remain in the system. The package that is deleted is removed from the list of packages on the Package Manager page.
Edit	Edit the selected package. Opens the Edit Package Wizard.
Export Package	Exports some or all of the package's resources to your local directory. Opens the Export Package dialog box.

Menu Item	Description
Show hidden packages	Toggle between displaying and hiding hidden packages.
Undeploy	Deletes the resources from the system and removes them from the selected package. Opens the Undeploy Package Resource Wizard.
View package resources	View the resources included in the selected package. Opens the View package resources dialog box.

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	• "Package Administration Overview" on page 94 • "How to Use the JMX Console to Perform Package Manager Tasks" on page 100

Remove Resources Page

This wizard page enables you to select the resources you want to delete.

Important information	If you delete all the resources from the package, the package is automatically deleted and removed from the list of packages on the Package Manager page.
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

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" below

- "Datamodel Resources Cannot Be Undeployed" below

- "Additional Information on Package Deployment Failure" below

- "Package Creation and Deployment in a Non-English Locale" on the next page

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 103.

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:\hp\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

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 *HP Universal CMDB Modeling Guide*.

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 *HP Universal CMDB Modeling Guide*.

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 HP 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 *HP Universal CMDB Modeling Guide*.

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 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 in the Navigation Menu or select **Managers > Administration > State Manager.**
Important information	• The **change** and **operation** states are default states that cannot be edited. • It is recommended to consult with HP Software Support before defining a state.
Relevant tasks	"How to Define a State" on the previous page
See also	• "State Manager Overview" on the previous page • Create an Enumeration Definition – Workflow in the *HP Universal CMDB Modeling Guide*

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.
Apply	Saves the changes you have made.
New Enumeration	Creates an Enumeration definition. Opens the Create Enumeration Definition dialog box. For details, see "Create/Update List/Enumeration Definition Dialog Box" in the *HP Universal CMDB Modeling Guide*. 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 *HP Universal CMDB Modeling Guide*.

UI Element (A-Z)	Description
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	Click in the box to display a list of the Enumeration definitions. **Note:** The **Type Definition** list only displays the Enumeration 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

This task describes how to run jobs on a periodic basis.

This section includes the following tasks:

- "Create a Job Definition" below

- "Choose an Action" below

- "Schedule a Task" below

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 128.

   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
☑	CUSTOM_ENRICHMENT_JOB	Run an Enrichment rule	Weekly ([Sunday][07:30])		Sun Apr 25 2010 07:30 ...

2. **Choose an Action**

   Select the actions that you want the Scheduler to run. For details, see "Action Definition Dialog Box" on page 127.

3. **Schedule a Task**

   Set the schedule for activating a task in the Scheduler pane. For details, see "Job Definition Dialog Box" on page 128.

   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

○ Once ○ Interval ⦿ Daily ○ Weekly ○ Monthly ○ Cron

Time zone: US/Central   ▼   Reset server time zone

Invocation hour   01:00, 06:00   >>

Scheduler User Interface

This section includes (in alphabetical order):

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	After selecting the required action, click **Next** to display a list of actions. The list of action details depends on which action you choose. 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.
Relevant tasks	"How to Define Tasks That Are Activated on a Periodic Basis" on page 125

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 *HP Universal CMDB Modeling Guide*.
<Right-click a column header>	For details, see Sort Column Content Dialog Box in the *HP Universal CMDB Modeling Guide*.
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 *HP Universal CMDB Modeling Guide*.

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 125

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 *HP Universal CMDB Modeling Guide*.
<right-click a column header>	For details, see Sort Column Content Dialog Box in the *HP Universal CMDB Modeling Guide*.
Condition	Click inside the box and select the required operator. For details, see Attribute Operator Definitions in the *HP Universal CMDB Modeling Guide*.
Display Name	Filters the task list according to one of the following: • **Active** • **Job Definition** • **Last Run Time** • **Name** • **Next Run Time** • **Schedule** For details, see the Job Scheduler page.
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 125

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 125

User interface elements are described below:

UI Element (A-Z)	Description
![add]	**Add.** Adds an action to the task. Opens the Action Definition dialog box.
![edit]	**Edit.** Enables you to edit an existing action.
![delete]	**Delete.** Deletes an action.
![up]	**Up.** Moves a selected row up.
![down]	**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	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).
Relevant tasks	"How to Define Tasks That Are Activated on a Periodic Basis" on page 125
See also	"Cron Expressions" in the *HP Universal CMDB Modeling Guide*

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

UI Element (A-Z)	Description
Reset server time zone	Automatically set the time zone to the correct one for the server.
Validate Expression	(Appears when you choose **Cron**) Click to validate the Cron expression you entered.
<Schedule options>	Select the required option for scheduling the task. The available options are: ● **Once.** Activates the task only once. ● **Interval.** Activates the action at a set time interval. ● **Daily.** Runs a task on a daily basis. ● **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 *HP Universal CMDB Modeling Guide*.
Cron Expression	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 *HP Universal CMDB Modeling Guide*.
Days of month	(Appears when you choose **Monthly**) Click the ⟩⟩ button to the right of the **Days of month** box to choose the day of the month on which you want to run the action. Opens the Select Days dialog box.
Days of the week (Sunday - Saturday)	(Appears when you choose **Weekly**). Select the day or days on which you want the action to run.
End by	(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. **Note:** This step is optional. If you do not want to specify an ending date, leave the **End by** check box unselected.

UI Element (A-Z)	Description

Invocation Hour	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.
	
	Note: You can enter the time manually in the **Invocation hour** box once you have chosen a time using the Select Hours dialog box. You can assign more than one time. Each time is separated by a comma.
	
	The manually entered action times are not restricted to the hour and half hour only; they can be assigned any hour and minute combination. Use the 24:00 format.
	
	For example:
	
	`11:15 AM is 11:15`
	
	`11:15 PM is 23:15`
	
	Note: This box is only available when you want to schedule a task to run on a daily, weekly, or monthly basis.

Invocation Time	(Appears when you choose **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 choose **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).
Start at	(Does not appear when you select **Once**) Choose the date and time when you want the action to begin running by selecting the **Start at** check box and then clicking the down-arrow to the right of the box. **Note:** This step is optional. If you do not want to specify a beginning time, leave the **Start at** check box unselected.
Time Zone	Set the required time zone.

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 in the Navigation Menu or select **Managers > Administration > Scheduler**.
Relevant tasks	"How to Define Tasks That Are Activated on a Periodic Basis" on page 125

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.
✏️	**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 *HP Universal CMDB Modeling Guide*.
🔄	**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 *HP Universal CMDB Modeling Guide*.
<Right-click a column header>	For details, see Sort Column Content Dialog Box in the *HP Universal CMDB Modeling Guide*.

UI Element (A-Z)	Description
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 the "Scheduler Pane" on page 129.

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 125

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

UI Element (A-Z)	Description
<List of days from 1-31>	Choose the required days by selecting the required check boxes. You can select multiple days. The selected days appear in the **Days of month** box. For details, see Scheduler pane in the Job Definition dialog box.

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 125

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

UI Element (A-Z)	Description
<List of times by the hour and half hour>	Choose all the required times by selecting the required check box. You can select multiple times. The selected hours appear in the **Invocation hour** box. For details, see "Scheduler Pane" on page 129.

Chapter 10: Recipients Manager

This chapter includes:

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 *HP Universal CMDB Modeling Guide*.

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" below.

Recipients Manager User Interface

This section includes (in alphabetical order):

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	- 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" above
See also	"Recipients Manager Overview" above

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 in the Navigation Menu or select **Managers > Administration > Recipients Manager**.
Important information	The recipients that appear in 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 the previous page
See also	"Recipients Manager Overview" on the previous page

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

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 147.

Note:

- Touch parameters are defined in the **DataFlowProbe.properties** file. For details, see the Probe Manager Configurations section in DataFlowProbe.properties File in the *HP Universal CMDB Data Flow Management Guide*.

- 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 *HP Universal CMDB Modeling Guide*.) 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 Results Management Pane in the *HP Universal CMDB Data Flow Management Guide* and "Enable Aging" on page 142.

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 *HP Universal CMDB Modeling Guide*.

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:

- "Enable Aging" below

- "First Aging Run" on the next page

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 141.

   > **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**.

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:\hp\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:\hp\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 the 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:

   a. Back up the CMDB database schemas. This step is mandatory.

   b. Run the tool in a testing environment before running it in a production environment. This step is recommended.

c. Stop the UCMDB server.

d. Run the **dbtool.bat** file from the file system.

e. Restart the UCMDB server.

f. Return to the Aging Status tab and enable aging.

g. 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:

- "Generate CI Lifecycle Data" below

- "Filter the CI Lifecycle Results" below

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 145.

   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.

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 146.

CI Lifecycle User Interface

This section includes (in alphabetical order):

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 138

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. **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	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: • 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 "First Aging Run" on page 139. • 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 138
See also	"The Aging Mechanism Overview" on page 137

User interface elements are described below:

UI Element (A-Z)	Description
Enable Aging	• To enable aging, select the check box. 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 147. • To disable aging, clear the check box.
Run results	**Total CIs to delete**. The number of CIs or relationships that are delete candidates and that are being deleted by the aging mechanism. **Deleted**. The number of CIs or relationships that have been deleted. **Failed**. CIs or relationships that could not be deleted. If any failures exist, click the **Failed** link to view their details.
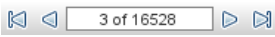
CI Lifecycle and Relationship Tabs

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 140

See also	• "CI Lifecycle – Overview" on page 138
	• "The Aging Mechanism Overview" on page 137
	• Working with CIs in the *HP Universal CMDB Modeling Guide*

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 page 141.
	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 146.
	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 in the *HP Universal CMDB Modeling Guide*.
30	Click the arrow to define the number of rows that should appear on each display page.
3 of 16528	Click to navigate through the results page by page or to jump to the first or last page.

UI Element (A-Z)	Description
Generate	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: • **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 "IT Universe Manager Shortcut Menu" in the *HP Universal CMDB Modeling Guide*.
<Right-click a column header>	For details, see Sort Column Content Dialog Box in the *HP Universal CMDB Modeling Guide*.

UI Element (A-Z)	Description
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. **End2**. The query node at the second end of the relationship (relevant only for relationships). **CI Type**. The type of the CI or relationship. **Last Access Time**. The last time that the CI or relationship was accessed, whether it was updated or discovered by the DFM process. **Updated by**. The administrator or process that updated the CI or relationship. **Actual Delete Time**. The date and time when the CI or relationship is deleted.
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	The CI Lifecyle page includes the following tabs:
	• **Aging Status**. Use this tab to enable the aging mechanism and to run aging. For details, see "Aging Status Tab" on page 141.
	• **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 142.
	• **Relationships**. Displays the same information as the CIs tab, with the addition of the **End1** and **End2** columns.
	The tab that is displayed by default depends on whether aging is enabled or disabled:
	• If aging is enabled, the CIs tab is displayed.
	• If aging is disabled, the Aging Status tab is displayed.
Relevant tasks	• "How to Enable and Run the Aging Mechanism" on page 138
	• "How to Generate CI Lifecycle Data and Filter the Results" on page 140
See also	• "CI Lifecycle – Overview" on page 138
	• "The Aging Mechanism Overview" on page 137
	• Working with CIs in the *HP Universal CMDB Modeling Guide*

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 140
See also	"CI Lifecycle – Overview" on page 138

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.

UI Element (A-Z)	Description
Value	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. 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. **Note:** You must select a condition before entering a value.

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.

Configuring Security

Chapter 12: User Permissions for UCMDB

This chapter includes:

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 156.

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 191.

User Permissions Workflow

> **Note:** When working in a multi-tenancy environment, refer to "Multi-Tenancy Workflow" on page 162.

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 197.

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 184.

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 171.

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 179.

User Permissions for the UCMDB Browser

To view and update data in the UCMDB Browser, 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. (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 Lightweight Modeling feature of the Browser.

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 HP Universal CMDB Configuration Manager. For details, see "Content Management Overview" in the *HP Universal CMDB Configuration Manager User Guide*.)

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 Lightweight Modeling feature of the UCMDB Browser (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" below

- "Resource Owner" on the next page

- "Default Tenants for Users and Groups" on the next page

- "User Ownership and Tenancy Rules" on the next page

- "Default Tenant Rules - Advanced Information" on page 155

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 164.

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 the previous page.

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.	• 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.	• 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	• 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.	• Can be multiple • Automatically defined based on the user logged in at the time of creation • Can be updated or deleted	• 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 149.

This section includes the following topics:

- "Required Permissions for Resources" below

- "User Permissions for General Actions" on page 159

- "Required Permissions for Tenant Assignments" on page 160

- "Multi-Tenancy in Package Manager" on page 160

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.
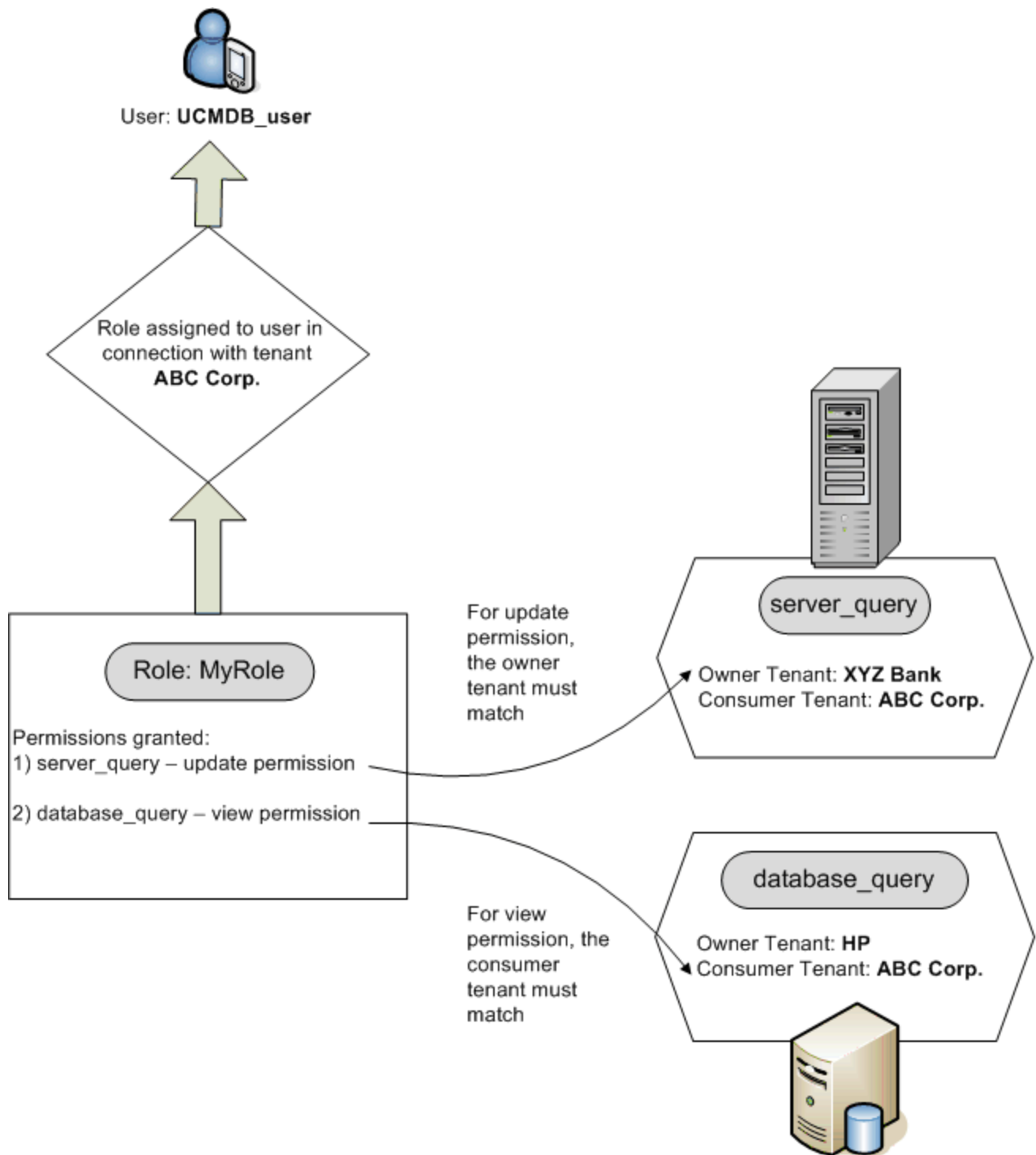
User: **UCMDB_user**

Role assigned to user in connection with tenant **ABC Corp.**

Role: MyRole

Permissions granted:
1) server_query – update permission

2) database_query – view permission

For update permission, the owner tenant must match

server_query

Owner Tenant: **XYZ Bank**
Consumer Tenant: **ABC Corp.**

For view permission, the consumer tenant must match

database_query

Owner Tenant: **HP**
Consumer Tenant: **ABC Corp.**

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 94.

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 *HP Universal CMDB Modeling Guide*.

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.

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.

  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 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 211.

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 197.

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 184.

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 153. 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 171.

   When assigning a role to a user, select the tenants associated with that assignment, as described in "Role Association Page" on page 177.

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 179.

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 153.

   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 Define a Tenant Association Rule.

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

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	In Modeling Studio, click the **Assign Tenants** button in the toolbar of the TQL Query Editor or right-click a resource in the Resources tab and select **Assign Tenants** from the shortcut menu. In the Reports module, click the **Assign Tenants** button in the Custom Reports toolbar or right-click a custom report and select **Assign Tenants** from the shortcut menu. In Impact Analysis Manager, click the **Assign Tenants** button in the toolbar or right-click an Impact rule and select **Assign Tenants** from the shortcut menu. In IT Universe Manager, right-click a CI and select **Assign Tenants** from the shortcut menu.
Important information	The Consumer Tenants section has different functionality depending on the number of resources selected: • 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. **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.
Relevant tasks	• "How to Change the Tenant Assignment for a Resource or a CI" on page 163 • "Multi-Tenancy Workflow" on page 162
See also	"Multi-Tenancy Overview" on page 153

User interface elements are described below:

UI Element (A-Z)	Description
<Arrow buttons>	The following arrow buttons are available: • **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. **Note:** These buttons are only available when a single resource is selected.
All tenants	Select **All tenants** to assign all tenants to the resource. **Note:** When you select All tenants, the Consumer Tenants section becomes disabled.

UI Element (A-Z)	Description
Assigned	The check boxes indicate the assignment status of each tenant as follows: ● 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. 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. 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. If a tenant is an inherited consumer tenant for at least one of the selected resources, the check box is disabled. **Note:** This item is only available when multiple resources are selected.
Available Tenants	Displays the available tenants. **Note:** This item is only available when a single resource is selected.
Description	Displays the descriptions of the available tenants. **Note:** This item is only available when multiple resources are selected.
Inherited Owner Tenants	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). **Note:** This feature only appears in the Assign Tenants dialog box for resources, not for CIs.

UI Element (A-Z)	Description
Name	Displays the names of the available tenants. **Note:** This item is only available when multiple resources are selected.
Owner Tenant	Select the owner tenant of the resource from the drop-down list. When multiple resources with different owner tenants are selected, **Multiple 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	In Modeling Studio, click the **Manage Security** 🖼 button in the toolbar of the TQL Query Editor or right-click a resource in the Resources tab and select **Manage Security** from the shortcut menu. In the Reports module, click the **Manage Security** 🖼 button in the Custom Reports toolbar or right-click a custom report and select **Manage Security** from the shortcut menu. In Impact Analysis Manager, click the **Manage Security** 🖼 button in the toolbar or right-click an Impact rule and select **Manage Security** from the shortcut menu.
Important information	You can also assign resources to roles and resource groups in the Security modules. For details, see "Roles Manager" on page 183 and "Resource Groups" on page 197. **Note:** You need permission for the **Administration** general action to assign resources to roles and resource groups.

See also	• "User Permissions in a Single Tenant Environment" on page 149
	• "User Permissions in a Multi-Tenancy Environment" on page 156
	• "Permissions Summary" on page 191

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	A green check mark indicates that at least one permission for the resource has been assigned to that role.
	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.
Description	Displays descriptions of the available roles.
Name	Displays the names of the available roles.
	Note: Read-only roles do not appear in the list, since they cannot be modified.

Resource Groups Pane

User interface elements are described below:

UI Element (A-Z)	Description
Assigned	Select the check box in the appropriate rows to assign the resource to the required resource groups.
	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.
Description	Displays descriptions of the available resource groups.
Name	Displays the names of the available resource groups.
	Note: The All Resources group does not appear in the list (it already includes all of the resources).

Chapter 13: Users and Groups

This chapter includes:

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 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.

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 177.

3. **Assign Roles to the User**

   Assign roles to the user on the Roles Association page. For details, see "Role Association Page" on page 177.

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.

Users and Groups User Interface

This section includes (in alphabetical order):

New Group Wizard

This wizard enables you to create a user group.

To access	Select **Users and Groups** from the **Security** module in 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	• "Users and Groups Overview" on page 170 • "User Permissions Workflow" on page 150 • "Multi-Tenancy Workflow" on page 162

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"

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 access	Select **Users and Groups** from the **Security** module in the Navigation Menu or select **Managers > Security > Users and Groups > Users tab**. Click the **New User** button.
Relevant tasks	"Users and Groups Workflow" on page 171
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	• "Users and Groups Overview" on page 170
	• "User Permissions Workflow" on page 150
	• "Multi-Tenancy Workflow" on page 162

User Name and Password Page

This wizard page enables you to assign a name and password for the user.

Important information	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.
	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. The new users must change the password on first login (you can also change the password in the wizard). The default user password is `welcome`.
	The default password policy requires the UCMDB password to include at least three types of characters from among the following types:
	• 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 setting **Password minimum length**.
Wizard map	The "New User Wizard" on the previous page contains:
	"User Name and Password Page" > "User Details Page" on the next page > "Group Association Page" on page 177 > "Role Association Page" on page 177 > "Default Tenant Page" on page 178

User interface elements are described below:

UI Element (A-Z)	Description
Confirm Password	• 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	• If the **Passwords must use default policy** setting in **Managers > Administration > Infrastructure Settings Manager** is set to **True**, 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"

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.

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 in the Navigation Menu or select **Managers > Security > Users and Groups**.
Relevant tasks	"Users and Groups Workflow" on page 171
See also	• "Users and Groups Overview" on page 170 • "User Permissions Workflow" on page 150 • "Multi-Tenancy Workflow" on page 162

Left Pane

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

UI Element (A-Z)	Description
✳	**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. **Note:** When LDAP is enabled, the users created with the **New User** button are integration users.
✏	**Edit User/Edit Group.** Enables you to edit the name of the selected user or group.
✖	**Delete.** Deletes the selected user or group.
🔒	**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. **Note:** This button is only relevant when the Users tab is selected.
👥	**Set Default Tenant.** Enables you to change the default tenant of the user or group. **Note:** This button is only available when multi-tenancy is enabled.

UI Element (A-Z)	Description
[Refresh icon]	**Refresh.** Refreshes the list of users or groups.
[Save icon]	**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	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. **Note:** This option is only available when two users are selected.
New User/New Group	Create a new user or group.
Refresh	Refresh the list of users or groups.
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. **Note:** This option is only available for users.
Save	Save the changes you have made.
Set Default Tenant	Enables you to change the default tenant of the user or group. **Note:** This option is only available when multi-tenancy is enabled.

Right Pane

User interface elements are described below:

UI Element (A-Z)	Description
Details tab	When the **Groups** tab is selected, displays details for the selected group.
	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.
	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.
	Under **Time Zone Preferences**, you can change the time zone for the selected user.
	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.
	Under **Server Administrator Privileges**, you can select the **Enabled** check box to grant the user permission to access the JMX console.
Permissions Overview	Displays a summary of the selected user or group's permissions.
	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.

UI Element (A-Z)	Description
Roles tab	The following areas are displayed: • **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 177. • **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 177. • **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

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 186.

> **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 the next page.

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 "Resources Tab" on page 188.

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 "Resource Groups Tab" on page 190.

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 "General Actions Tab" on page 190.

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

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 the previous page
See also	• "Roles Manager Overview" on page 183
• "Permissions Summary" on page 191

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 in the Navigation Menu or select **Managers > Security > Roles Manager**.
Important information	For each role, you can assign permissions for actions on resources using the following tabs: ● **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. ● **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). 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. The **Role Details** tab displays the name and description of the selected role. The **Permissions Overview** tab displays the selected role's permissions.
Relevant tasks	"How to Create a New Role and Define Permissions for the Role" on page 184
See also	● "Roles Manager Overview" on page 183 ● "Permissions Summary" on page 191

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.

UI Element (A-Z)	Description
✏️	**Edit Role.** Enables you to edit the name of the selected role.
✖️	**Delete.** Removes the selected role(s). **Note:** You can make multiple selections to delete multiple roles.
🔄	**Refresh.** Refreshes the list of roles.
💾	**Save.** Saves the changes you have made.
📝	**Save As.** Saves the role with a different name.
<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.

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	Displays the selected resources and their respective permissions for the current resource type. The available permissions differ for different resource types, as follows: ● **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). ● **UCMDB Browser Widgets** have view permission.

Browser CI Access Control Tab

Important information	The Browser CI Access Control tab enables you to define view and edit permissions for the UCMDB Browser. These permissions are not relevant in the UCMDB user interface.
	Select **Views** as the resource type to access Views mode and assign permissions according to the selected views and folders.
	Select **CI Types** as the resource type to access CI Types mode and assign permissions according to the selected CI types.
	Alternatively, select one or both of the check boxes to assign permissions for all CIs.
	For details on the possible permission combinations, see "User Permissions for the UCMDB Browser" on page 151.

User interface elements are described below:

UI Element (A-Z)	Description
<CI Types mode>	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
	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 ⬚.
<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	Displays the permitted actions selected for the resources in the selected resource group for the current role. **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.

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	Enter a description of the role. **Note:** This field is optional.
Name	Displays the role name.

Permissions Overview Tab

Important information	Displays a summary of the selected role's permissions. 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.

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 HP 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.
Manage in CM	Manage, unmanage, and edit the selected views in HP Universal CMDB Configuration Manager.
Authorize in CM	View and authorize changes to the selected views in HP 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
Gold Master Archive	Archive a Gold Master report.
Allow Search	Search for CIs in the Search tab of the CI Selector.
Get Related CIs	Access the Related CIs functionality.
Run Impact Analysis	Run Impact Analysis in the IT Universe Manager.
Run Query by Definition	Preview a view in the Modeling Studio.

Permission	Actions Permitted
View Recipients	View recipients in the Recipients Manager.
View UI Scheduler Jobs	View Scheduler jobs in the Scheduler.
Access to SDK	Run the Java API.
Access to UI	Access the UCMDB UI.
Access to UCMDB Browser	Access the UCMDB Browser UI.
Access to Authorized State	Access data in the authorized state.
Run Legacy API	Run the client APIs.
Settings Management	Update the infrastructure settings using the API.
Administration	Create users, groups, roles, resource groups and assign roles to users and groups.
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.
Reassign Tenant	Change 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.
Data Update	Create, update, and delete CIs and relationships.
View CIs	View CIs. **Note:** This permission is only available when multi-tenancy is enabled.
View History	View CI History.
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.

Permission	Actions Permitted
Class Model Modifier	Add, delete, and update CI types in the CI Type Manager.
Deploy Packages	Deploy packages in Package Manager.
Automation Setup	Configure Operations Orchestration flows in Configuration Manager (only relevant for HP Universal CMDB Configuration Manager).
Automation Execution	Execute any Operations Orchestration flow in Configuration Manager (only relevant for HP Universal CMDB Configuration Manager.
Automation Policies	Define automation policies in Configuration Manager (only relevant for HP Universal CMDB Configuration Manager.
Policies Admin	Create, edit, and delete baseline, topology, and similarity policies in HP Universal CMDB Configuration Manager.

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). Also includes all permissions associated with HP 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:

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 the next page.

> **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" on the next page.

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):

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 in 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 the previous page
See also	"Resource Groups Overview" on the previous page

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 | The tabs represent different resources. The following tabs are available:

 • Queries

 • Views

 • Impact Analysis

 • Custom Reports

 • UI Modules

 • UCMDB Browser Widgets

 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. |

User interface elements are described below:

UI Element (A-Z)	Description
All Resources	Select **All Resources** to move all available resources to the Selected Resources pane. **Note:** Selecting this option ensures that resources of the selected type that are created in the future are also included in the Selected Resources.
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:

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 153.

> **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

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 in 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.

UI Element (A-Z)	Description
	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:

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 HP Universal CMDB.

You can associate HP 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 183.

For details on synchronizing LDAP groups with HP Universal CMDB groups, see "Synchronize HP Universal CMDB User Groups with LDAP Groups" below.

For details on configuring LDAP authentication, see the section on enabling LDAP authentication in the *HP Universal CMDB and Configuration Manager Hardening Guide*.

> **Note:** You must configure LDAP mapping for both the actual and authorized states.

Synchronize HP Universal CMDB User Groups with LDAP Groups

This task describes how to synchronize LDAP user groups with HP Universal CMDB user groups:

1. **Configure infrastructure settings to set an LDAP synchronization strategy**

   To set up an LDAP authentication synchronization, you must first modify the settings in the Infrastructure Settings Manager.

   > **Note:** Any changes you make for **LDAP General** > **Enable LDAP Authentication** and **LDAP General** > **Enable User Permissions Synchronization** remain in effect for all future Web sessions.

a. Select **Managers > Administration > Infrastructure Settings**.

b. Select **LDAP General**, and then in the **LDAP server URL** setting, enter the URL of the LDAP server in the following format:

`ldap://<ldapHost>:<port>/<baseDN>??scope`

c. Select **LDAP Group Definition**, and then in the **Groups base DN** setting, enter the distinguished name of the general group.

d. Select **LDAP Group Definition**, and then in the **Root groups base DN** setting, enter the distinguished name of the root group.

e. Select **LDAP General**, and then in the **Enable User Permissions Synchronization** setting and verify that the value is set to **True.**

> **Caution:** In addition to the LDAP settings described in this step, it is highly recommended that you verify all LDAP settings. Some of the default values that come with the other LDAP settings may not be appropriate for your needs.

f. 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 91.

> **Note:** It is also possible to configure these settings using the JMX console. For details, see "Configure LDAP Settings Using the JMX Console" in the *HP Universal CMDB and Configuration Manager Hardening Guide*.

2. **Create HP Universal CMDB groups**

You can create HP Universal CMDB user groups and assign roles to them. For details on creating groups, see "Users and Groups" on page 170.

3. **Map LDAP groups to HP Universal CMDB groups**

You map user groups on the LDAP server to groups in HP Universal CMDB to synchronize the groups and enable management of your HP 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 HP Universal CMDB**

a. Select **LDAP General > Enable LDAP authentication** and set the value to **True.**

b. Log out of HP 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 Infrastructure Settings:

> **Note:** For all other parameters, you can use either the default values or, if required, LDAP-specific values.

LDAP Integration Settings	Comment
Distinguished Name of Search-Entitled User	CN=AD Connector CN=Users DC=consult DC=example DC=com
Enable User Permissions Synchronization	**true:** Enables permission synchronization for LDAP group mapping with HP Universal CMDB user groups (when **Enable LDAP Authentication** is set to **true**).
Group class object	group

LDAP Integration Settings	Comment
Groups base DN	CN=Users DC=consult DC=example DC=com
Groups member attribute	member
Groups search filter	(|(objectclass=groupOfNames) (objectclass=group) (objectclass=groupOfUniqueNames)(objectclass=groupOfUrls)(objectclass=access Group)(objectclass=accessRole))
LDAP server 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 groups base DN	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

LDAP Integration Settings	Comment
Root groups filter	(|(objectclass=groupOfNames) (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

LDAP Mapping User Interface

This section includes:

LDAP Groups to UCMDB Groups Mappings Dialog Box

This dialog box displays all the LDAP user groups that have been mapped to HP Universal CMDB user groups.

To access	Click the **Show LDAP Groups to UCMDB Groups Mapping** button in the toolbar.
See also	"LDAP Mapping Overview" on page 203

User interface elements are described below:

UI Element (A-Z)	Description
LDAP Group	The name of the LDAP user group.
UCMDB Groups	The HP Universal CMDB user roles that are mapped to the corresponding LDAP group.

LDAP Mapping Page

This page enables you to map groups configured in HP Universal CMDB to groups configured on the LDAP server.

To access	Select **LDAP Mapping** from the **Security** module in the Navigation Menu or select **Managers > Security > LDAP Mapping.**
Relevant tasks	• "How to Configure LDAP for Active Directory" on page 205 • "Synchronize HP Universal CMDB User Groups with LDAP Groups" on page 203
See also	"LDAP Mapping Overview" on page 203

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.

LDAP Repository Pane

UI Element (A-Z)	Description
<LDAP Groups Tree>	Displays a list of the LDAP groups that are configured on the LDAP server in tree format. **Note:** Begin typing the name of the required group to search for it in the tree.

UCMDB Groups For LDAP Group: <group name> Pane

This enables you to select the HP 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 in the toolbar.
See also	"LDAP Mapping Overview" on page 203

User interface elements are described below:

UI Element (A-Z)	Description
Login Name	Displays the login names of the user in the group.
User Name	Displays the user name of the users in the group.

Chapter 18: Tenants Management

This chapter includes:

> **Note:**
>
> - 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.

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 149.

> **Note:** The Tenants Management module is available only to those logged in with administration access rights.

Tenants Management User Interface

This section includes (in alphabetical order):

New Tenant/Edit Tenant Dialog Box

This dialog box enables administrators to create and edit tenants.

To access	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	- "Multi-Tenancy Overview" on page 153 - "Tenants Management Overview" above

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 in 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 162
See also	• "Multi-Tenancy Overview" on page 153 • "Tenants Management Overview" on the previous page

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.

We appreciate your feedback!

If you have comments about this document, you can contact the documentation team by email. If an email client is configured on this system, click the link above and an email window opens with the following information in the subject line:

Feedback on Administration Guide (Universal CMDB 10.10)

Just add your feedback to the email and click send.

If no email client is available, copy the information above to a new message in a web mail client, and send your feedback to SW-Doc@hp.com.