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RTSM Administration Guide

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Part I: Introduction

Chapter 1: Run-time Service Model (RTSM)

This chapter includes:

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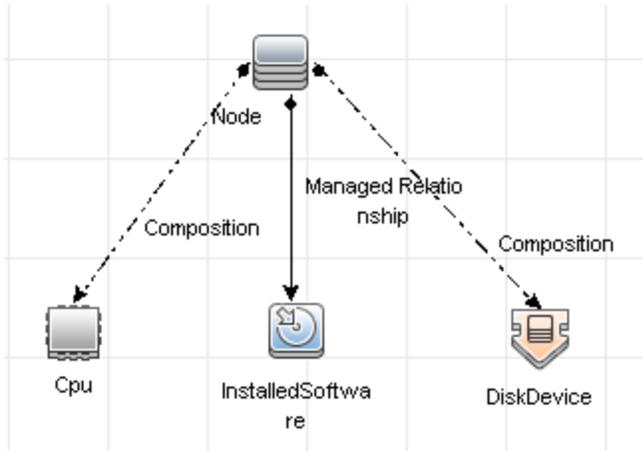
RTSM Overview

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

The RTSM contains all the configuration items (CIs) and relationships created in HPE Operations Manager i, whether created automatically from incoming data collector data or the DFM process, or created manually by using IT Universe Manager. The CIs and relationships together represent a model of all the components of the IT Universe in which your business functions. The RTSM stores and handles the infrastructure data collected and updated by the various processes. (For more information about the DFM process, see the *HPE Universal CMDB 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 RTSM. The views enable you to focus on specific IT areas and are available via the CI Selector in HPE Operations Manager i. An example of a view is shown in the following figure:



The RTSM also contains the TQL query definitions that are used to query and retrieve data from the RTSM 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 *RTSM Modeling Guide*.

Configuration Items (CIs)

A configuration item (CI) is a component of the RTSM 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 RTSM, where they are organized into a hierarchical format based on the interdependencies in your organization's IT environment. The interdependencies in HPE Operations Manager i are called relationships.

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

For further details on working with CIs in the RTSM, see "Working with CIs" in the *RTSM Modeling Guide*.

Query Nodes and Relationships

Query nodes are the components from which TQL queries are built in the Enrichment Manager, Impact Analysis Manager, and the Modeling Studio. For details, see the *RTSM Modeling Guide*.

Note: When working in views, query nodes are called **view nodes** in the RTSM Administration 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 *RTSM Modeling Guide*.

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](#)" below.

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 RTSM. 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 RTSM 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 HPE 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 HPE 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](#)" on [page 28](#).

Configure RTSM Log Levels

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

1. On the RTSM server, launch the Web browser and enter the following address:
https://localhost:21212/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**.

UCMDB Log Files

RTSM log files enable you to perform basic troubleshooting of RTSM runtime problems. Additionally, by tracking the RTSM behavior in the log files, you can examine the effects of changes made in the system. The RTSM is composed of subsystems and each subsystem records to several log files. RTSM Server logs have consistent format. The order is data and time: **(format "yyyy-MM-dd hh:mm:ss:SSS") logLevel [Thread Name]**. The wrapper log is an exception to this standard. These settings can be changed from log properties files located in the **UCMDBServer\conf\log** folder.

Log files are located in:

- **Windows: OMi_HOME/log/db**

Note: UCMDB log levels should be set to the OOTB values. They may be increased when investigating issues. However, after obtaining the required information the log levels should be reverted. Increased log levels for a longer period of time may have an impact over performance.

If you want to delete the logs, you should delete the content in the **log** folder only, and never delete the folder itself. Make sure that the **log** folder always exists. If the **log** folder is deleted accidentally, create the **log** folder manually before starting up the UCMDB Server.

This section includes the following topics:

- ["General Log Files" below](#)
- ["Class Model Log Files" on page 13](#)
- ["TQL Log Files" on page 13](#)
- ["Data-In Log Files" on page 14](#)
- ["History Log Files" on page 15](#)
- ["Enrichment Log Files" on page 17](#)
- ["Dal Log Files" on page 18](#)
- ["Authorization Log Files" on page 18](#)
- ["RTSM Administration UI Log Files" on page 19](#)
- ["Data Flow Management Log Files" on page 20](#)

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	RTSM 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.

RTSM 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: <ul style="list-style-type: none">• 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 <code>duplicate attributes</code> .
Error Level	Not available.
Debug Level	Every CI Type update includes the following: <ul style="list-style-type: none">• 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: <ul style="list-style-type: none">• A CIT in a package failed• An action in the CIT browser applet failed• An action in the CIT browser applet succeeded when it should have failed

TQL Log Files

RTSM 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 RTSM until the client's listener receives a message.

Log File	Description
	Most components receive configuration changes from the RTSM in push mode, by the notification mechanism, rather than in pull mode.
Information Level	<ul style="list-style-type: none"> Startup and shutdown of publishers Register and unregister remote and internal listeners
Error Level	<ul style="list-style-type: none"> Errors when messages are published Errors when messages are received
Debug Level	<ul style="list-style-type: none"> Unique message ID Number of changes that a message includes as well as more details according to the type of the message (for example, the TQL result version) JMS header properties
Basic Troubleshooting	<p>If an application does not receive a notification, check the following:</p> <ul style="list-style-type: none"> a listener is registered with the appropriate notification filter a message is published with data that matches this filter a message is received by the listener (use the unique message ID to verify)

Data-In Log Files

RTSM Model Audit Short Log

The log name is **cmdb.model.audit.short.log**.

Log File	Description
Purpose	<p>Information about a CI Type operation: type of operation, data received as input, and what happened to the data in each CIT.</p> <p>Also contains information about the caller application, execution time, and persistency time.</p>
Information Level	Operation details.
Error Level	Not available.
Debug Level	Not available.

Log File	Description
Basic Troubleshooting	<p>If there are no changes when there should be, check the following:</p> <ul style="list-style-type: none"> • Whether the operation exists. • Whether the input is correct. • What happened to the data. There may have been a false update. <p>This is especially useful when running DFM to trace the input.</p>

History Log Files

History Log

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

Log File	Description
Purpose	Records general history events
Information Level	<ul style="list-style-type: none"> • Auto completion events • Auto complete table lock or unlock messages • Tenants bitmask column size handling • Delete customer fuse notice
Debug Level	<ul style="list-style-type: none"> • Auto completion details • History Root table handling messages

History Audit Update Log

The log name is **history.update.audit.log**.

Log File	Description
Purpose	Tracks events saved in the History tables
Information Level	<ul style="list-style-type: none"> • Details all events stored in the history tables • Event statistics
Debug Level	Database statistics

History Partition Log

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

Log File	Description
Purpose	<ul style="list-style-type: none">Records history partition data.Records the Baseline process events.
Information Level	<ul style="list-style-type: none">Add or remove partition history tablesBaseline eventsBaseline statistics
Error Level	<ul style="list-style-type: none">Table partition failuresBaseline process failures

Query History Log

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

Log File	Description
Purpose	Records all the queries performed on the history tables.
Information Level	<ul style="list-style-type: none">Query conditionQuery results summary
Error Level	Fuse exceeded
Debug Level	<ul style="list-style-type: none">Query condition detailsQuery 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

RTSM Enrichment Log

The log name is **cmdb.enrichment.log**.

Log File	Description
Purpose	<ul style="list-style-type: none">• Enrichment definitions: adding, updating, removing, and calculating.• Calculation results such as how many CIs were added, how many relationships were removed, and so forth.• Supplies the reason for a calculation failure. Failure in a model update, however, is not included since it is an asynchronous execution.
Information Level	<ul style="list-style-type: none">• Add, update, and remove enrichment definitions.• Add, update, and remove CIs or relationships to or from a model.
Error Level	Calculation failure.
Debug Level	Traces the enrichment calculation process.
Basic Troubleshooting	<ul style="list-style-type: none">• If no calculation was carried out, check the definition of add enrichment.• If there are no results, check the finish calculate entry.

Dal Log Files

RTSM 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 RTSM.
Information Level	Not available.
Error Level	<ul style="list-style-type: none">• Connection pool errors• Database errors• Command execution errors
Debug Level	<ul style="list-style-type: none">• All DAL commands executed• All SQL commands executed
Basic Troubleshooting	<p>If you suspect that RTSM actions are taking too long, check the time spent on queries and updates in the DAL logs and operation logs.</p> <p>Exception details and ID are entered into the log. The exception ID appears in the exception itself.</p>

Authorization Log Files

RTSM Authorization Management Log

The log name is **security.authorization.management.log**.

Log File	Description
Purpose	Audit all modifications related to the authorization model.
Information Level	<ul style="list-style-type: none">• Creation and deletion of users, user groups, tenants, roles, and resource groups.

Log File	Description
	<ul style="list-style-type: none"> • 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.

RTSM 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	<p>To check a specific permission issue, turn on the debug level, perform the action in the UI, turn the debug level off, and check the log for the existing permissions of the user.</p> <p>It is not recommended to keep this log at debug level, because it generates a large amount of printed output.</p>

RTSM Administration 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 RTSM Administration UI to the Gateway 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 integrations), as well as related errors, that occur on the Server side.

mam.AutoDiscovery.log

Contains information about tasks running on the server. The server provides services to the user interface, such as: activating jobs, processing results from the Probe, or creating tasks for the Probe. In a distributed environment, the file resides on the Data Processing server.

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.

In a distributed environment, the file resides on the Gateway server.

Level	Description
Error	All errors in the servlet.
Information	Information about user requests and Probe task requests.
Debug	<ul style="list-style-type: none"> • User requests • Probe requests to read DFM tasks. • Probe access to the servlet.

Basic Troubleshooting

- User Interface – Server communication problems.
- Probe – Server communication problems.

Some processing problems may be written to this log instead of to **mamAutoDiscovery.log**.

mam.AutoDiscovery.Results.Stat.log

Contains the statistics of the results received from the Probe.

Autodiscovery Dal Log

The log name is **mam.autodiscovery.dal.log**.

Log File	Description
Purpose	Holds information on queries and other actions taken on the server's database tables as part of the discovery process.
Information Level	A summary of actions taken and their results on the database (such as retrieving information, deleting records, and so on).
Error Level	All critical errors that occurred during the attempt to access the database.

Log File	Description
Debug Level	Detailed information on query parameters and/or the results that are retrieved from them
Basic Troubleshooting	If there are any database errors or failures (such as connection failed, technical error in the query, and so on), the error log is included in this log file also.

workflow_sizing.log

Enabling this log file helps you to collect running statistics (for example, time spent on normalization and auto delete) of each modules on a probe.

How to Enable this log?

To enable this log,

1. On the probe, locate and open the **/conf/log/probeGWLog4j.properties** and **/conf/log/probeMgrLog4j.properties** files.
2. Manually add the following settings into each of the above files:

```
#####  
### cmdb.workflow.sizing          ##  
#####  
log4j.category.cmdb.workflow.sizing=INFO, cmdb_workflow_sizing  
log4j.appender.cmdb_workflow_  
sizing=com.mercury.topaz.cmdb.shared.base.log.BetterRollingFileAppender  
log4j.appender.cmdb_workflow_sizing.File=${logs.dir}/workflow_sizing.log  
log4j.appender.cmdb_workflow_sizing.Append=true  
log4j.appender.cmdb_workflow_sizing.MaxFileSize=512MB  
log4j.appender.cmdb_workflow_sizing.Threshold=INFO  
log4j.appender.cmdb_workflow_sizing.MaxBackupIndex=10  
log4j.appender.cmdb_workflow_sizing.layout=org.apache.log4j.PatternLayout  
log4j.appender.cmdb_workflow_sizing.layout.ConversionPattern=<%d> [%-5p]  
[%t] (%F:%L) - %m%n  
log4j.appender.cmdb_workflow_sizing.encoding=UTF-8
```

3. Save the files.
4. Restart the probe.

Sample log

```
<2015-11-11 13:56:51,459> [INFO ] [ProbeGW Task Results Sender]
(TaskResultsSenderThread.java:458) -
[TaskResultsSenderThread.handleSuccessTriggers.start][desc=update ID
mapping,size=1]

<2015-11-11 13:56:51,460> [INFO ] [ProbeGW Task Results Sender]
(TaskResultsSenderThread.java:481) -
[TaskResultsSenderThread.handleSuccessTriggers.stop][desc=update ID
mapping,size=1]
```

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 RTSM.

Thread dumps are created periodically: Once a minute, a thread dump snapshot is taken and is saved to a new file in the **%TOPAZ_HOME%\log\odb\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://<BSM Server Host Name or IP>:21212/jmx-console**.

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

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

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

HOME/log/odb/ThreadDumps. This is a thread dump that includes the threads of the Server framework only.

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

RTSM User Interface

This section includes:

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Annotation Tool

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

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

Annotation Options

The following elements enable you to annotate your snapshot.

User interface elements are described below:

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

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

Menu Bar

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

<p>Important information</p>	<p>The menu bar contains elements which enable you to:</p> <ul style="list-style-type: none"> ● Change the appearance of the snapshot. ● Customize the appearance of text annotated onto your snapshot. These elements are enabled only when the Text Tool  button is selected.
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User interface elements are described below (unlabeled elements are shown in angle brackets>):

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

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

Log Configuration Dialog Box

This dialog box enables you to view RTSM logs and change the log level.

To access	On the Status bar, click Log Level Configuration  or select Tools > Log Configuration... from the Modeling main menu.
See also	"Log Severity Levels" on page 9

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 RTSM logs. Select the required log from the list: the details of the log appear in the lower pane.
Logger's appender	A string defining the log category. For internal use only.
Log level	Select a log level from the drop-down list.

Status Bar

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

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

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. Note: Starting from version 10.21, if you use trial version of the product, in some cases you may read "Expiring in 22 days" instead of "Expiring in 21 days" when hovering your mouse over this icon. This is designed to provide users with 21 full days, regardless of the timezone where the license is generated/stored and where it is consumed.
<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 page 24 .
	Force refresh the user's authentication. Refreshes the authentication of the user logged in.

UI Element	Description
< Total heap size >	Indicates the amount of memory that the application is using.
	Run the Garbage Collector. Enables you to manually clean the memory (it runs automatically on a periodic basis).
	Help on Status Bar. Opens the HPE Operations Manager i Online Help for the Status Bar.

Part II: Administration

Chapter 2: Package Manager

This chapter includes:

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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 44](#).

Package Manager fulfills several functions:

- Enables the discovery of specific IT infrastructure assets. For example, HPE Operations Manager i 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 HPE Operations Manager i.

By default, factory packages are located in: **<HPE Operations Manager i root directory>\odb\conf\factory_packages** on the Data Processing server machine.

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 47.

Caution: If you create custom packages for the resources or tools you develop, do not place them in the **<HPE Operations Manager i root directory>\odb\conf\factory_packages** folder on the Data Processing server machine. 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 "[Export a Package](#)" on page 37.
- Deploy some or all of a package's resources to the RTSM from your local directory. For details, see "[Deploy a Package](#)" on page 36.

Package Locations

There are three predefined folders with out-of-the-box, automatically deployed packages under **<HPE OMi root directory>\odb\content**:

- basic_packages
Internal packages
- adapters
Adapter packages
- CPx.zip
Content Pack packages

There is an additional folder with packages relevant for OMi located at **<HPE OMi root directory>\odb\confactory_packages**.

Package Manager User Interface

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

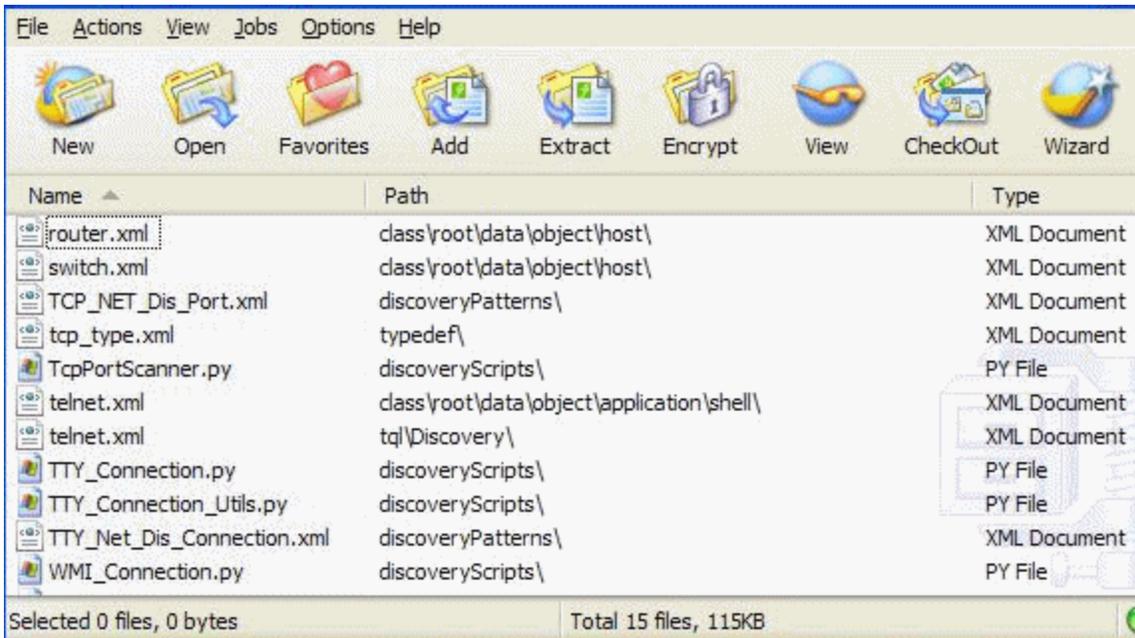
- An **Icon** identifying the package as factory, hidden or user
- A **Package Name** representing the name of the .zip file (optional)
- The **Category** as allocated in the descriptor.xml file (optional)
- A **Readme** file that corresponds to the package (optional)
- A **Description** that corresponds to the description located in the descriptor.xml file

Package Zip File Contents and Format

A package's resources are stored in the RTSM. To export a package from system to system, you use the Package Manager interface (for details, see "[Package Manager Page](#)" on page 53). 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 *RTSM Developer Reference Guide*.

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 47](#).

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

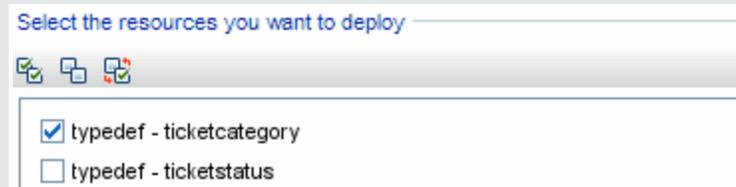
Deploy a Package

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:



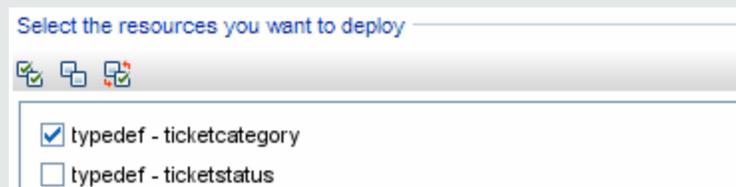
Note: Every time a package related to a change in the class model is deployed or undeployed, a zip file is generated in the `runtime\log\package_reports\customer_1\classModel` folder. The zip file contains the class model file before the change, the class model file after the change, and the package deployment report.

Export a Package

You can export some or all of a package's resources to your local directory. For details, see "[Package Manager Page](#)" on page 53.

Example of Exporting Only Specific Resources in a Package:

You want to export only some of the resources contained in a package called **ticket2.zip** to your local directory. Click the  button. In the Export Package dialog box, select the **Export Resources** option and select the resources you want to export. See the following illustration:



Use the JMX Console to Perform Package Manager Tasks

This section describes the Package Manager tasks you can perform by using the JMX console.

Note:

- It is recommended that you use the Package Manager to perform these tasks instead of the JMX console.
- View Package Deployment History cannot be performed by the Package Manager.

This section includes the following tasks:

- ["Deploy a Package" below](#)
- ["View Package Deployment History" on the next page](#)
- ["Undeploy a Package" on the next page](#)
- ["Display Currently Deployed Packages" on page 40](#)
- ["Export Packages" on page 40](#)
- ["Package Name Rules" on page 41](#)

Deploy a Package

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

1. Launch your Web browser and enter the following address: **https://<server_name>:21212/jmx-console**, where **<server_name>** is the name of the machine on which HPE Business Service Management 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 1.
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 41.
7. Select **True** to override job configurations changed in Universal Discovery. For details, see the *RTSM 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>:21212/jmx-console**, where **<server_name>** is the name of the machine on which HPE Business Service Management is installed.
2. Under **UCMDB**, click **UCMDB:service=Packaging Services** to open the JMX MBEAN View page.
3. Locate **displayResourcesDeploymentHistory**.
4. In the **Value** box for the parameter **customerId**, enter the <customer id>.
5. In the **Value** box for the parameter **reportNum**, enter the number of the report you want to view.
6. Click **Invoke** to view the deployment status report of the packages.

Undeploy a Package

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

1. Launch the Web browser and navigate to: **https://<server_name>:21212/jmx-console**, where **<server_name>** is the name of the machine on which HPE Business Service Management 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 the next page](#).
6. Click **Invoke** to undeploy the package.

Display Currently Deployed Packages

Follow these steps to display currently deployed packages using the JMX console.

1. Launch the Web browser and navigate to: **https://<server_name>:21212/jmx-console**, where **<server_name>** is the name of the machine on which HPE Business Service Management 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 RTSM to the server on which HPE Operations Manager i is installed using the JMX console.

1. Launch the Web browser and navigate to: **https://<server_name>:21212/jmx-console**, where **<server_name>** is the name of the machine on which HPE Business Service Management is installed.
2. Under **UCMDB**, click **UCMDB:service=Packaging Services** to open the JMX MBEAN View page.
3. Locate **exportPackages**.
4. In the **Value** box for the parameter **customerId**, enter the <customer id>.
5. In the **Value** box for the parameter **packageName**, enter the name of the package you want to export. For details, see ["Package Name Rules" on the next page](#).

6. In the **Value** box for the parameter **outputDir**, enter the name of the folder on the HPE Operations Manager i 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 44](#).

- **acl**. The definition of a role such as Administrator or Guest. For details, see "User Management" in Platform Administration.
- **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 *RTSM 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 59. For details on Impact Analysis, see "Impact Analysis Manager" in the *RTSM Modeling Guide*.
- **class.** CI type descriptions, such as host, file, switch, and so on. For details, see "CI Type Manager" in the *RTSM Modeling Guide*.
- **cmdbview.** Contains the hierarchy rules defined for the base TQL query of each view. For details, see "Modeling Studio" in the *RTSM Modeling Guide*.
- **correlation.** Impact rule definitions. For details, see "Impact Analysis Manager" in the *RTSM Modeling Guide*.
- **datamodel.** Used to import CI instances into the system. If the CI does not exist in the RTSM, an instance of the CI is created. If a CI already exists in the RTSM, the values of the CI from the package resource overwrites the values of the CI in the RTSM.
- **datamodelcreateonly.** Used to import CI instances into the system. If the CI does not exist in the RTSM, an instance of the CI is created. If a CI already exists in the RTSM, the values of the CI from the package resource does not overwrite the values of the CI in the RTSM.
- **datamodelgenerateids.** Used to import CI instances into the system for CITs that require the ID to be calculated dynamically upon deployment (such as CITs with no key attributes).
- **dataStore.** Contains the integration point definition.
- **discoveryConfigFiles.** Configuration files include properties and parameters that are needed to discover components on the system. For details, see "Adapter Configuration" in the *RTSM 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 *RTSM 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 *RTSM 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 adapter can be used as an integration adapter or a Discovery adapter. For details, see "Adapter Configuration" in the *RTSM 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 *RTSM Data Flow Management Guide*.

- **discoveryScripts**. DFM Jython scripts populates the RTSM 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 *RTSM Data Flow Management Guide*.
- **discoveryWizard**. Used to define the Discovery Activity dialog box contents. For details, see the section on discovery activities in the *HPE Universal CMDB Discovery and Integrations Content Guide*.
- **enrichment**. Enrichment rule definitions. For details, see "Enrichment Manager" in the *RTSM Modeling Guide*.
- **identification**. Contains the identification definition of a specific CI type.
- **integrationUsers**. Used to define a user of type integration.
- **modelnotification**. Contains filter definitions for RTSM model notifications. The data model notification system gives notification of changes that occurred in the RTSM. For example, items in the RTSM that have been removed, updated, or added.
- **report**. Report rule definitions, as described in "Topology Reports Overview" in the *RTSM Modeling Guide*.
- **schedulerJob**. Tasks that have been defined to run in the Scheduler. For details, see "[Scheduler](#)" on page 62.
- **singletqlref**. Contains TQL template and perspective instances. For details, see "Modeling Studio" in the *RTSM Modeling Guide*.
- **tql**. TQL query definitions. For details, see "Topology Query Language (TQL) Overview" in the *RTSM 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 *RTSM Modeling Guide*.
- **users**. The definition of a user and the user's role. For details, see "User Management" in Platform Administration.
- **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 41.

Model

- **Configuration Item Types.** The CITs defined in the CI Type Manager. For details, see "CI Types Overview" in the *RTSM Modeling Guide*.
- **Identifications.** The configuration files containing the identification rules for CIs. For details, see "Identification Service" in the *RTSM Data Flow Management Guide*.
- **Relationships.** The relationships defined in the CI Type Manager. For details, see "CI Type Relationships" in the *RTSM 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 *RTSM Modeling Guide*.

Query

- **Queries.** The TQL queries defined in the TQL Editor in the Modeling Studio. For details, see "Topology Query Language" in the *RTSM Modeling Guide*.
- **Views.** The views defined in the View Editor in the Modeling Studio. For details, see "View Formats" in the *RTSM Modeling Guide*.
- **Enrichments.** The Enrichment rules defined in the Enrichment Manager. For details, see "Enrichment Manager" in the *RTSM Modeling Guide*.
- **Impact Rules.** The Impact Analysis rules. For details, see "Impact Analysis Manager" in the *RTSM Modeling 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 *RTSM Modeling Guide*.
- **Job Scheduler.** Tasks that have been defined to run in the Scheduler. For details, see "[Scheduler](#)" on page 62.
- **State Categories.** The states defined in the State Manager. For details, see "[State Manager](#)" on page 59.

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 *RTSM 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 *RTSM 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 *RTSM 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 *RTSM 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 *RTSM 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 *RTSM 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 *HPE Universal CMDB 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 *HPE Universal CMDB 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 *HPE Universal CMDB 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 *HPE Universal CMDB Discovery and Integrations Content Guide*.

Package Manager User Interface

This section includes (in alphabetical order):

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Filter Dialog Box	51
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Package Manager Page	53
Undeploy Package Resource Wizard	56

Choose Resources to Export Dialog Box

This dialog box enables you to export an entire package or specific resources to your local directory.

To access	Click the Export resources button in the Export Package dialog box.
------------------	----------------------------------------------------------------------------

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

UI Element (A-Z)	Description
<List of resources >	Displays the list of resources contained in the package. Select the resources you want to export to your local directory.

Create Custom Package/Edit Package Wizard

This wizard enables you to create a package by using existing resources or edit an existing package.

To access	<p>Do one of the following:</p> <ul style="list-style-type: none"> Click the Create Custom Package  button on the Package Manager page to create a new package. Select a package and click the Edit package  button to edit an existing package.
Important information	When editing an existing package, this feature is not a wizard, but a dialog box. The dialog box contains two tabs: the Package Properties tab and the Resource Selection tab.
Relevant tasks	"Create a Custom Package" on page 35
Wizard map	<p>The "Create Custom Package/Edit Package Wizard" contains:</p> <p>"Package Properties Page" > "Resource Selection Page" > "Selection Summary Page"</p>
See also	<ul style="list-style-type: none"> "Package Administration Overview" on page 32 "Package Resources" on page 41 "Resource Types" on page 44

Package Properties Page

This wizard page enables you to define the properties of the package.

Wizard map	<p>The "Create Custom Package/Edit Package Wizard" contains:</p> <p>"Package Properties Page" > "Resource Selection Page" > "Selection Summary Page"</p>
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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 on the Package Manager page. Note: <ul style="list-style-type: none"> This check box is always disabled. To display the hidden packages, right-click anywhere on 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.
Package Description	A description of the package.
Package Name	The name of the package.

Resource Selection Page

This wizard page enables you to add the required resources to the package. Select the required resources from the various resource types.

Important information	You can make multiple selections from each resource type.
Wizard map	The " Create Custom Package/Edit Package Wizard " contains: "Package Properties Page" > " Resource Selection Page " > " Selection Summary Page "

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

UI Element (A-Z)	Description
Automatically	(Create Custom Package Wizard only) Select this check box allows you to

UI Element (A-Z)	Description
export dependencies of the checked resources	automatically export dependencies of the checked resources when creating a package.
✓	Appears in the left pane. Indicates that a resource has been added to the package.
-	Appears in the left pane. Indicates that no resource has been added to the package.
<Resource types in the left pane>	<p>Contains the resource types from which you can choose the required resources to add to the package.</p> <p>For details of a list of the available resource types and their descriptions, see "Resource Types" on page 44.</p> <p>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.</p>
<Resources in the right pane>	<p>Select the resources you want to add to the package. You can select multiple resources.</p> <p>Note:</p> <ul style="list-style-type: none"> • A green check appears to the right of a Configuration Item Types, Relationships, or Calculated Relationships when one or more of its children in the resource tree are included in the package. • A folder's check box has a <input type="checkbox"/> when only some of its resources are included in the package. (This does not apply to Configuration Item Types, Relationships, or Calculated Relationships.) • A folder's check box is selected when all its resources are included in the package. (This does not apply to Configuration Item Types, Relationships, or Calculated Relationships.) <p>Important information:</p> <p>To add a calculated relationship to the package, select either the required calculated relationship together with one or more of its triplets, or the required triplets without selecting the calculated relationship itself.</p> <ul style="list-style-type: none"> • If you select only specified triplets and not the calculated relationship, the triplets are added only if you already have an existing calculated relationship in the system. • If you select a calculated relationship together with one or more of its triplets, the property definitions of the calculated relationship are included in the package. If you already have a calculated relationship in the system, the property definitions of the existing calculated relationship are updated with the

UI Element (A-Z)	Description
	<p>properties of the calculated relationship you are adding to the package.</p> <p>For details on calculated relationships and triplets, see "Using Calculated Relationships" in the <i>RTSM Modeling Guide</i>.</p>

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

UI Element (A-Z)	Description
<Selected resources>	Displays the resources that were selected to be part of the package.

Export Package Dialog Box

This dialog box enables you to export the selected package's resources to your local directory.

To access	Click the Export Package to Local Directory  button on the Package Manager page.
Important information	You can choose to export some or all the resources in the package.
Relevant tasks	"Export a Package" on page 37
See also	"Package Administration Overview" on page 32

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.

UI Element (A-Z)	Description
Export to directory	Select the directory to which you want to export the resources.
Export whole package	Export all the resources in the package to your local directory.
File name	The name of the package. Note: The package name cannot be edited.

Filter Dialog Box

This dialog box enables you to display only specific packages on the Package Manager page.

To access	Click the Filter  button on the Package Manager page.
Important 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 . 
See also	"Package Administration Overview" on page 32

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

UI Element (A-Z)	Description
<Click a column header>	For details, see "Sort Column Content Dialog Box" in the <i>RTSM Modeling Guide</i> .
<Right-click a column header>	For details, see "Sort Column Content Dialog Box" in the <i>RTSM Modeling Guide</i> .
Condition	Click inside the box and select the required operator. For details, see "Attribute Operator Definitions" in the <i>RTSM Modeling Guide</i> .
Display Name	Filter the task list according to one of the following: <ul style="list-style-type: none"> • Package name • Category • Readme • Version

UI Element (A-Z)	Description
	<ul style="list-style-type: none"> • Build Number • Description <p>For details, see "Package Manager Page" on the next page.</p>
Value	<p>Click inside the box to open the Edit box. Enter the required value.</p> <p>Note:</p> <ul style="list-style-type: none"> • You must choose a value in the Condition column (other than Is null or Not null) to be able to specify a value for the filter. • When using the Like or Like ignore case operators, include the wildcard (%) in the search value.

Find Dialog Box

This dialog box enables you to find a package that contains a specified resource.

To access	Click the Find  button on the Package Manager page.
See also	"Resource Types" on page 44

User interface elements are described below:

UI Element (A-Z)	Description
Case sensitive	Distinguish between uppercase and lowercase characters. When you select Case sensitive , search results find only those instances in which the capitalization matches the text you typed in the Resource name box.
Resource name	Enter a word or phrase contained in the resource for which you are looking.
Search Results	The search results. Displays the names of up to 30 resources containing the text entered in the Resource name box.
Topic	The subsystem containing the resource you want the package to contain. For details, see "Resource Types" on page 44.

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 Administration > RTSM Administration > Administration > Package Manager .
Relevant tasks	<ul style="list-style-type: none"> • "Deploy a Package" on page 36 • "Export a Package" on page 37 • "Create a Custom Package" on page 35
See also	<ul style="list-style-type: none"> • "Package Administration Overview" on page 32 • "Package Resources" on page 41 • "Resource Types" on page 44

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 "Create a Custom Package" on page 35 .
	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.
	<p>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:</p> <ul style="list-style-type: none"> • CSV. The table data is formatted as a comma-separated values (CSV) text file that can be displayed in a spreadsheet. <p>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</p>

UI Element (A-Z)	Description
	<p>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.</p> <ul style="list-style-type: none"> • PDF. The table data is exported in PDF format. <p>Note: When exporting to PDF, select a reasonable number of columns to display to ensure that the report is legible.</p> <ul style="list-style-type: none"> • 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. <p>Tip: To extract HTML code from the report:</p> <ul style="list-style-type: none"> ◦ Save the file as HTML ◦ Open the file in an HTML editor ◦ Copy the relevant table into the target file
	<p>Deploy packages to server. Deploys a package's resources to the RTSM 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.</p> <p>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.</p>
	<p>Undeploy resources. Deletes the resources from the system and removes them from the selected package. Opens the Undeploy Package Resource Wizard.</p>
	<p>Export package. Exports some or all of the package's resources to your local directory. Opens the Export Package dialog box.</p>
	<p>Find. Enables you to search for a package that contains a specified resource. Opens the Find dialog box.</p>
	<p>Refresh. Refreshes the contents of the table.</p>
	<p>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..</p>

UI Element (A-Z)	Description
	<p>Note: This feature is only relevant when the latest content pack is available in the local file system of the Data Processing Server (DPS).</p>
	<p>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.</p> <p>Note: Editing the Content Pack file by using 7-Zip may result in the file being saved with an incorrect version.</p>
	<p>View UCMDB Class Model. Opens the UCMDB Class Model Reference, which contains information on all packages, CI types and relationships in the class model.</p>
	<p>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.</p>
	<p>Clear. Clears the filter definitions you created in the Filter dialog box. This is enabled only if filter definitions were created.</p>
	<p>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.</p> <p>For details on the Select Columns dialog box, see Select Columns Dialog Box in the <i>RTSM Modeling Guide</i>.</p>
	<p>Represents a factory package.</p>
	<p>Represents a hidden package.</p>
	<p>Represents a custom package.</p>
<p>Build Number</p>	<p>The build number of the package.</p>
<p>Category</p>	<p>The free text you want to associate with the package, as displayed on the Package Properties page of the Create Custom Package Wizard.</p>
<p>Description</p>	<p>The description of the package, as displayed on the Package Properties page of the Create Custom Package Wizard.</p>
<p>Package Name</p>	<p>The name of the package.</p>
<p>Readme</p>	<p>Click to read a description of the package, as well as other relevant information.</p>
<p>Version</p>	<p>The version of the package.</p>

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.
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	<ul style="list-style-type: none"> • "Package Administration Overview" on page 32 • "Use the JMX Console to Perform Package Manager Tasks" on page 38

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 – Package Manager

This section describes some of the troubleshooting issues that might arise when deploying and undeploying packages.

This section includes the following topics:

- ["Datamodel Resources Cannot Be Undeployed" below](#)
- ["Additional Information on Package Deployment Failure" below](#)
- ["Package Creation and Deployment in a Non-English Locale" below](#)

Datamodel Resources Cannot Be Undeployed

For a list of the package resources, see ["Package Resources" on page 41](#).

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 <HPE Operations Manager i **root directory**>\odb\conf 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 3: State Manager

This chapter includes:

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Define a State	59
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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 *RTSM 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 *RTSM 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 HPE Software Support.

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 *RTSM Modeling Guide*.
3. (Optional) You can create a new Enumeration definition by clicking the **New Enumeration** button.

For details, see ["State Manager Page" below](#).

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	60
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State Manager Page

This page enables you to create a state based on a severity list (Enumeration definition).

To access	Select Administration > RTSM Administration > Administration > State Manager .
Important information	<ul style="list-style-type: none"> The change and operation states are default states that cannot be edited. It is recommended to consult with HPE Software Support before defining a state.
Relevant tasks	"Define a State" on the previous page
See also	<ul style="list-style-type: none"> "State Manager Overview" on the previous page How to Create an Enumeration Definition – Workflow in the RTSM 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.

UI Element (A-Z)	Description
	Saves the changes you have made.
	<p>Creates an Enumeration definition. Opens the Create Enumeration Definition dialog box.</p> <p>For details, see Create/Update List/Enumeration Definition Dialog Box in the RTSM Modeling Guide.</p> <p>The Enumeration definition you have created appears in the System Type Manager dialog box, where you can edit it if required (for details, see System Type Manager Dialog Box in the RTSM Modeling Guide.</p>
Description	(Optional) Click in the box and enter a description of the state.
Name	Click in the box and enter a unique name for the state.
Type Definition	<p>Click in the box to display a list of the Enumeration definitions.</p> <p>Note: The Type Definition list only displays the Enumeration definitions whose list of key values begins with zero (0) (and not List definitions) that are defined in the System Type Manager.</p>

Chapter 4: Scheduler

This chapter includes:

Define Tasks That Are Activated on a Periodic Basis	62
How to Rebuild Indexes on Microsoft SQL Databases	64
Scheduler User Interface	65

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" on the next page](#)

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 67](#).

Example of a Job Definition

The illustration below shows that an Enrichment rule is set to run every week on Sunday at 7:30 AM.

Active	Name	Job Definition	Schedule	Last Run Time	Next Run Time
<input checked="" type="checkbox"/>	CUSTOM_ENRICHMENT_JOB	Run an Enrichment rule	Weekly ([Sunday][07:30])		Sun Apr 25 2010 07:30 ...

2. Choose an Action

Select the actions that you want the Scheduler to run. For details, see ["Action Definition Dialog Box" on page 65](#).

3. Schedule a Task

Set the schedule for activating a task in the Scheduler pane. For details, see "[Job Definition Dialog Box](#)" on page 67.

Note: When updating a schedule for a task, all jobs run, by default, immediately upon saving the change. If you do not want jobs to run immediately upon updating the schedule, but rather when they are due to run, do the following:

In the **Administration module > Infrastructure Settings Manager > Integration Settings**, set the value for **Enable Scheduled Jobs Auto Run** to **false** (ID: enable.scheduled.jobs.auto.run).

Example of a Scheduled Task

The illustration below shows that the Scheduler is set to run an Enrichment rule called **SAP_Old_Transports** every day at 1:00 AM and 6:00 AM.

Name	
Run an Enrichment rule	SAP_Old_Transports

Scheduler	
<input type="radio"/> Once <input type="radio"/> Interval <input checked="" type="radio"/> Daily <input type="radio"/> Weekly <input type="radio"/> Monthly <input type="radio"/> Cron	
Time zone:	<input type="text" value="US/Central"/> <input type="button" value="Reset server time zone"/>
Invocation hour	<input type="text" value="01:00, 06:00"/> <input type="button" value=" >>"/>

How to Rebuild Indexes on Microsoft SQL Databases

UCMDB is an online transaction processing (OLTP) application. It performs many insert, update, and delete operations each day, its indexes might become fragmented. The index fragmentation could be even higher if discovery jobs that run also modify the data.

To help rebuild fragmented indexes on Microsoft SQL database, the **RebuildIndexes** job is introduced. It uses a stored procedure to defragment the indexes. The **RebuildIndexes** job is deactivated by default. You can start the job manually when necessary.

How to manually start rebuilding fragmented indexes

You can start rebuilding fragmented indexes manually by using either of the following:

- Start the **RebuildIndexes** job from UCMDB UI
 - a. On UCMDB UI, go to **Administration > Scheduler > Job Scheduler**.
 - b. Select the **RebuildIndexes** job, and click **Edit** .
 - c. Modify the job scheduler information in the Schedule section of the Job Definition dialog.

It is recommended to run the job on a daily basis.

For more information about the scheduler options, see "[Job Definition Dialog Box](#)" in the *HPE Universal CMDB Administration Guide*.
 - d. Click **OK**.
- Invoke the **rebuildIndexes** JMX method from the JMX console
 - a. Launch the Web browser and navigate to: **https://<Server name>:8443/jmx-console**, where **<Server name>** is the name of the machine on which Universal CMDB is installed.
 - b. Under **UCMDB**, click **UCMDB:service=Dal Services** to open the JMX MBean View.
 - c. Invoke the **rebuildIndexes** JMX method with a **customerID** parameter value of **1**.

Note:

- During the rebuilding of the indexes, the UCMDB database log file size may increase. Make sure that the UCMDB database log file has enough disk space.
- Before you invoke the **rebuildIndexes** JMX method, make sure that the discovery, enrichment, or other jobs that modify the data are not running.

- The **RebuildIndexes** job is visible only for Customer 1 (default customer) in UI, even if the Server has multiple customers.
- The **rebuildIndexes** JMX method recreates the indexes for all customers even if the customerID is set to 1, in case the server has multiple customers or has the authorized state.

How to modify the RebuildIndexes job definition and scheduler information

If necessary, you can modify the definition of the **RebuildIndexes** job. To do so,

1. On UCMDB UI, go to **Administration > Scheduler > Job Scheduler**.
2. Select the **RebuildIndexes** job, and click **Edit** .
3. Modify the job definition and scheduler information as necessary to meet your needs.
4. Click **OK**.

Scheduler User Interface

This section includes (in alphabetical order):

Action Definition Dialog Box	65
Filter Dialog Box	66
Job Definition Dialog Box	67
Job Scheduler Page	70
Select Days Dialog Box	72
Select Hours Dialog Box	72

Action Definition Dialog Box

This dialog box enables you to select a required action in a list of actions that can be run by the Scheduler.

To access	Click the Add  button in the Actions pane in the Job Definition dialog box.
Important information	<p>After selecting the required action, click Next to display a list of actions. The list of action details depends on which action you choose.</p> <p>For example, if you select Run an Enrichment Rule, a list of the existing Enrichment Rules appears. Select the required Enrichment rules. You can select up</p>

	to 15 items.
Relevant tasks	"Define Tasks That Are Activated on a Periodic Basis" on page 62

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

UI Element (A-Z)	Description
<Click a column header>	For details, see Sort Column Content Dialog Box in the <i>RTSM Modeling Guide</i> .
<Right-click a column header>	For details, see Sort Column Content Dialog Box in the <i>RTSM Modeling Guide</i> .
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 *RTSM 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	"Define Tasks That Are Activated on a Periodic Basis" on page 62

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

UI Element (A-Z)	Description
<click a column header>	For details, see Sort Column Content Dialog Box in the <i>RTSM Modeling Guide</i> .

UI Element (A-Z)	Description
<right-click a column header>	For details, see Sort Column Content Dialog Box in the <i>RTSM Modeling Guide</i> .
Condition	Click inside the box and select the required operator. For details, see Attribute Operator Definitions in the <i>RTSM Modeling Guide</i> .
Display Name	Filters the task list according to one of the following: <ul style="list-style-type: none"> • 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	"Define Tasks That Are Activated on a Periodic Basis" on page 62

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	"Define Tasks That Are Activated on a Periodic Basis" on page 62
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User interface elements are described below:

UI Element (A-Z)	Description
	Add. Adds an action to the task. Opens the Action Definition dialog box.
	Edit. Enables you to edit an existing action.
	Delete. Deletes an action.
	Up. Moves a selected row up.
	Down. Moves a selected row down.
Action Definition	Displays the action details you selected in the Action Definition dialog box for the action added.
Name	Displays the name of the action that was added to the job.

Scheduler Pane

This area enables you to set the schedule for activating a task.

Important information	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	"Define Tasks That Are Activated on a Periodic Basis" on page 62
See also	Cron Expressions in the <i>RTSM Modeling Guide</i>

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

UI Element (A-Z)	Description
	Automatically set the time zone to the correct one for the server.
	(Appears when you select Cron). Click to validate the Cron expression you entered.

UI Element (A-Z)	Description
<Schedule options>	<p>Select the required option for scheduling the task. The available options are:</p> <ul style="list-style-type: none"> • Once. Activates the task only once. • Interval. Activates the action at a set time interval. • Daily. Runs a task on a daily basis. • Weekly. Runs a task on a weekly basis. • Monthly. Runs a task on a monthly basis. • Cron. Use a Cron expression to schedule a job. For a description of the fields used in Cron expressions and examples of how to use them, see Cron Expressions in the <i>RTSM Modeling Guide</i>.
Cron Expression	(Appears when you select Cron). Enter a Cron expression in the proper format. For a description of the fields used in Cron expressions and examples of how to use them, see Cron Expressions in the <i>RTSM Modeling Guide</i> .
Days of month	(Appears when you select Monthly). Click the  button to the right of the Days of month box to open the Select Days dialog box and choose the day of the month on which you want to run the action. For details, see the Select Days dialog box.
Days of the week (Sunday - Saturday)	(Appears when you select Weekly). Select the day or days on which you want the action to run.
End by	<p>(Does not appear when you select Once). Choose the date and time when you want the action to stop running by selecting the End by check box and then clicking the down-arrow to the right of the box.</p> <p>Note: This step is optional. If you do not want to specify an ending date, leave the End by check box unselected.</p>
Invocation Hour	<p>(Appears when you select Daily, Weekly, or Monthly.) Choose the time to activate the action. Click the  button to the right of the Invocation Hour box to open the Select Hours dialog box. For details, see the Select Hours dialog box.</p> <p>Note: You can also enter the time manually in the Invocation hour box. Separate times by a comma and enter AM or PM after the hour. The manually entered action times are not restricted to the hour and half hour only: you can assign any hour and minute combination. Use the following format: HH:MM AM, for example, 8:15 AM, 11:59 PM.</p>

UI Element (A-Z)	Description
Invocation Time	(Appears when you select Once). Choose the date and time you want the action to begin running by clicking the down-arrow to the right of the box.
Months of the year (January - December)	(Appears when you select Monthly). Select the month or months in which you want the action to run.
Repeat every	(Appears only when you select Interval). Type a value for the interval between successive runs and then choose the required unit of time measurement (Minutes, Hours, or Days). Note: After each change, the next time that the job runs is the current time plus the interval, that is, the job does not start immediately.
Start at	(Does not appear when you select Once). Choose the date and time when the action must begin running by selecting the Start at check box, opening the calendar, selecting the date and time, and clicking OK . Note: <ul style="list-style-type: none"> When selecting the start time, the time zone in the start time is set according to the client machine's location, although it may not match the value selected in Time Zone. This step is optional. If you do not want to specify a beginning time, leave the Start at check box unselected.
Time Zone	Select the time zone according to which the Probe must schedule jobs. The default is << Data Flow Probe Time Zone >>: the Probe uses its own system-defined time zone. This enables scheduling to take place at different times in different geographical locations. For all Probes to start working at the same time, select a specific time zone. (This assumes that the Probes' system date/time and time zone are correctly configured.)

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 Administration > RTSM Administration > Administration > Scheduler .
Relevant tasks	"Define Tasks That Are Activated on a Periodic Basis" on page 62

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 <i>RTSM Modeling Guide</i> .
	Refresh. Refreshes the display of the jobs in the Job Scheduler page.
<Click a column header>	For details, see Sort Column Content Dialog Box in the <i>RTSM Modeling Guide</i> .
<Right-click a column header>	For details, see Sort Column Content Dialog Box in the <i>RTSM Modeling Guide</i> .
Active	Select the check box to activate the scheduled job.
Job Definition	A description of the scheduled job as defined in the Job Definition field in the Job Definition dialog box.
Last Run Time	The last time the job was run.
Name	The name of the scheduled job.
Next Run Time	The next time the job is scheduled to run.
Schedule	How often the job is scheduled to run. For details, see " Scheduler Pane " on page 68.

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	"Define Tasks That Are Activated on a Periodic Basis" on page 62

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

UI Element (A-Z)	Description
Actions	<ul style="list-style-type: none">  Select All. Select all the days.  Clear Selection. Clear all the selected days.  Invert Selection. Switch the selection.
<List of days from 1-31>	<p>Choose the required days by selecting the required check boxes. You can select multiple days.</p> <p>The selected days appear in the Days of month box. For details, see "Scheduler Pane" on page 68.</p>

Select Hours Dialog Box

This dialog box enables you to choose the time at which to activate the action.

To access	In the Job Definition dialog box, click Daily, Weekly, or Monthly , and then click the  button to the right of the Invocation hour box.
Relevant tasks	"Define Tasks That Are Activated on a Periodic Basis" on page 62

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

UI Element (A-Z)	Description
Actions	<ul style="list-style-type: none">  Select All. Select all the times.

UI Element (A-Z)	Description
	<ul style="list-style-type: none"><li data-bbox="613 296 1203 331">•  Clear Selection. Clear all the selected times.<li data-bbox="613 352 1138 388">•  Invert Selection. Switch the selection.
<List of times by the hour and half hour>	<p data-bbox="605 428 1349 491">Choose all the required times by selecting the required check box. You can select multiple times.</p> <p data-bbox="605 516 1365 579">The selected hours appear in the Invocation hour box. For details, see "Scheduler Pane" on page 68.</p>

Chapter 5: CI Lifecycle and the Aging Mechanism

This chapter includes:

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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 RTSM 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 RTSM, 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 RTSM and database servers and can impact the overall RTSM 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 83](#).

Note:

- Touch parameters are defined in the **DataFlowProbe.properties** file. For details, see the Probe Manager Configurations section in DataFlowProbe.properties File in the *RTSM 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 *RTSM 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 Adapter Configuration Tab in the *RTSM Data Flow Management Guide* and ["Enable Aging" on page 78](#).

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 *RTSM Modeling Guide*.

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 (**Administration > RTSM Administration**

> **Administration > CI Lifecycle**). Select the **Enable Aging** check box. For details, see "[Aging Status Tab](#)" on page 78.

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 to be deleted. If the number of CIs to be deleted is greater than 10,000, a confirmation message is displayed. Perform the following method of deletion to keep the RTSM up to date.

- 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.

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](#)" on the next page

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, by using the drop-down calendars in the **From** and **To** fields, and click **Generate**. For details, see "[CI Lifecycle Page](#)" on page 81.

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 82](#).

CI Lifecycle User Interface

This section includes (in alphabetical order):

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Aging Status Tab	78
CI Lifecycle and Relationship Tabs	79
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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	"Enable and Run the Aging Mechanism" on page 75

User interface elements are described below:

UI Element (A-Z)	Description
Aging Runs	Run at. The start and finish time of the run.

UI Element (A-Z)	Description
	<p>Deleted. The number of CIs that have been deleted.</p> <p>Failed. The number of CIs that have not been deleted.</p>
Errors	<p>ID. The IDs of the failed CIs, that is, of the CIs that could not be deleted.</p> <p>Error message. A message describing the cause of failure.</p>

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 Administration > RTSM Administration > Administration > CI Lifecycle .
Important information	<p>This tab displays information about the number of CIs that are candidates for deletion, and functions as follows, if you select the Enable Aging check box:</p> <ul style="list-style-type: none"> • If the number of CIs for deletion is larger than 10,000, you can choose to use the aging mechanism to delete the CIs in chunks, or to use the database aging tool. For details on which procedure to use, see "First Aging Run" on page 76. • 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	"Enable and Run the Aging Mechanism" on page 75
See also	"The Aging Mechanism Overview" on page 74

User interface elements are described below:

UI Element (A-Z)	Description
Enable Aging	<ul style="list-style-type: none"> • To enable aging, select the check box. <p>The frequency and size of the chunks that are marked as candidates for deletion are determined in Infrastructure Settings. For details, see "Aging Parameters" on page 83.</p> <ul style="list-style-type: none"> • To disable aging, clear the check box.
Run results	<p>Total CIs to delete. The number of CIs or relationships that are delete candidates and that are being deleted by the aging mechanism.</p> <p>Deleted. The number of CIs or relationships that have been deleted.</p> <p>Failed. CIs or relationships that could not be deleted. If any failures exist, click the Failed link to view their details.</p>

CI Lifecycle and Relationship Tabs

This area enables you to display a list of CIs and relationships that are candidates for deletion, and to manage the list (for example, to delete or prevent or postpone deletion of specific CIs, to view statistics, and to filter the list).

To access	Select Administration > RTSM Administration > Administration > CI Lifecycle .
Relevant tasks	"Generate CI Lifecycle Data and Filter the Results" on page 76
See also	<ul style="list-style-type: none"> • "CI Lifecycle Overview" on page 75 • "The Aging Mechanism Overview" on page 74 • "Working with CIs" in the <i>RTSM Modeling Guide</i>

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

UI Element (A-Z)	Description
	Postpone Deletion. Enables you to delay the deletion of a CI by one aging period. It disappears from the list of candidates for deletion. (If the CI is not touched again for a full aging period, it again becomes a candidate for deletion.)
	Mark as Deletion Proof. Enables you to prevent a CI or relationship from being deleted. It disappears from the list of candidates for deletion.
	Delete. Deletes the selected CI or relationship.
	Statistics. Enables you to view statistics (such as the start and finish time of each run and the number of deleted CIs), for the previous five runs of the aging mechanism. For details, see "Aging Status Tab" on the previous page .
	Select/Clear All. Selects or clears all data on the current page.
	Refresh. Refreshes the displayed data.
	Filter. Opens the Filter dialog box, which enables you to customize the filter. For details, see "Filter Dialog Box" on page 82 .
	Clear. Clears the filter and display the full results.
	Customize Columns. Opens the Select Columns dialog box, which

UI Element (A-Z)	Description
	enables you to change the display order of the columns, hide a column, or display a hidden column. For details, see the <i>RTSM Modeling Guide</i> .
	Click the arrow to define the number of rows that should appear on each display page.
	Click to navigate through the results page by page or to jump to the first or last page.
	Generates data for a selected period. Tip: If no results are generated, try extending the time period further into the future (the To field).
	Export Data to File. Enables you to select the format for previewing and exporting the table data. The available options are: <ul style="list-style-type: none"> • CSV. The table data is formatted as a comma-separated values (CSV) text file that can be displayed in a spreadsheet. Note: For the CSV formatted table data to display correctly, the comma (,) must be defined as the list separator. In Windows, to verify or modify the list separator value, open Regional Options from the Control Panel, and on the Numbers tab ensure that the comma is defined as the List Separator value. • PDF. The table data is exported in PDF format. Note: When exporting to PDF, select a reasonable number of columns to display to ensure that the report is legible. • XLS. The table data is formatted as an .xls (Excel) file that can be displayed in a spreadsheet. • XML. The table data is formatted as an XML file that can be opened in a text or XML editor.
<Right-click a CI>	For details on the menu options, see in the <i>RTSM Modeling Guide</i> .
<Right-click a column header>	For details, see in the <i>RTSM Modeling Guide</i> .
CIs/Relationships tabs	Select to see a list of CIs or relationships that are candidates for deletion: Select. Select the check box to select a CI or relationship before performing an operation on it (such as Delete or Postpone Deletion). End1. The query node at one end of the relationship (relevant only for relationships). Display Label. The name of the CI or relationship as it appears in the Topology Map.

UI Element (A-Z)	Description
	<p>End2. The query node at the second end of the relationship (relevant only for relationships).</p> <p>CI Type. The type of the CI or relationship.</p> <p>Last Access Time. The last time that the CI or relationship was accessed, whether it was updated or discovered by the DFM process.</p> <p>Updated by. The administrator or process that updated the CI or relationship.</p> <p>Actual Delete Time. The date and time when the CI or relationship is deleted.</p>
From	Click the arrow and use the calendar to select the beginning date and time for the CI Lifecycle results.
Relationships tab	Select to see lifecycle results for relationships.
Rows per Page	Select the number of rows per page from the drop-down list.
To	Click the arrow and use the calendar to select the end date and time for the CI Lifecycle results.

CI Lifecycle Page

This page enables you to enable and run the aging mechanism. It also enables you to display a list of CIs and relationships that are candidates for deletion and to manage the list (for example, to delete, prevent, or postpone deletion of specific CIs, to view statistics, and to filter the list).

To access	Select Administration > RTSM Administration > Administration > CI Lifecycle .
Important information	<p>The CI Lifecycle page includes the following tabs:</p> <ul style="list-style-type: none"> • Aging Status. Use this tab to enable the aging mechanism and to run aging. For details, see "Aging Status Tab" on page 78. • 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 79. • Relationships. Displays the same information as the CIs tab, with the addition of the End1 and End2 columns. <p>The tab that is displayed by default depends on whether aging is enabled or disabled:</p> <ul style="list-style-type: none"> • If aging is enabled, the CIs tab is displayed.

	<ul style="list-style-type: none"> • If aging is disabled, the Aging Status tab is displayed.
Relevant tasks	<ul style="list-style-type: none"> • "Enable and Run the Aging Mechanism" on page 75 • "Generate CI Lifecycle Data and Filter the Results" on page 76
See also	<ul style="list-style-type: none"> • "CI Lifecycle Overview" on page 75 • "The Aging Mechanism Overview" on page 74 • Working with CIs in the <i>RTSM Modeling Guide</i>

Filter Dialog Box

This dialog box enables you to filter the list of CIs that are candidates for deletion.

To access	Click Filter on the CI Lifecycle page.
Relevant Tasks	"Generate CI Lifecycle Data and Filter the Results" on page 76
See also	"CI Lifecycle Overview" on page 75

User interface elements are described below:

UI Element (A-Z)	Description
Condition	Click in the Condition column and select an option.
Display Name	The columns displayed for the CIs or relationships on the CI Lifecycle page.
Value	<p>Click in the Value column to set a value for the selected condition. Depending on the condition selected, you can select a value from a drop-down list, select a date and time from the calendar, or click the ellipsis  button to open an editing dialog box where you can enter a value.</p> <p>When the conditions Like or Like ignore case are selected in the Condition column, you can use a wildcard (%) before and after the string for which you are searching.</p> <p>Note: You must select a condition before entering a value.</p>

Aging Parameters

Aging parameters are defined in Infrastructure Settings (**Administration > Platform > Setup and Maintenance > Infrastructure Settings > 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.

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