

HP Business Service Management

for the Windows® and Linux operating systems

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Using Operations Management

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Welcome to This Guide

This guide describes how to configure, administer, and use Operations Management to do the following:

- ▶ Monitor the events that occur in your organization's IT environment.
- ▶ Correlate the events and events across multiple domains.
- ▶ Compile and display a detailed overview of the health of your systems.

This chapter includes:

- ▶ How This Guide Is Organized on page 14
- ▶ Who Should Read This Guide on page 14
- ▶ How Do I Find the Information That I Need? on page 15
- ▶ Additional Online Resources on page 17
- ▶ Documentation Updates on page 18

How This Guide Is Organized

This part of the guide contains the following chapters:

Part I Working with Operations Management

Explains how to use Operations Management to monitor and manage the events that occur in your IT environment and resolve the underlying problems.

Part II Configuring Operations Management

Describes the concepts and tasks required to configure and maintain Operations Management. The information provided helps you configure Operations Management for users to monitor and manage the IT environment efficiently.

Part III Content Packs

Describes the content packs delivered with Operations Management. The information provided helps you configure Operations Management to manage specific areas such as infrastructure elements, databases, and applications.

Who Should Read This Guide

This guide is intended for the following users of HP Business Service Management:

- Operations Management software administrators.
- Domain (subject matter) experts, for example, database experts, and Exchange administrators.
- Operations Management operators and domain operators.

Users of this guide should be knowledgeable about navigating and using enterprise applications. Users should also be familiar with the concepts underlying enterprise monitoring and management.

How Do I Find the Information That I Need?

This guide is part of the HP Business Service Management Documentation Library. This Documentation Library provides a single-point of access for all Business Service Management documentation.

You can access the Documentation Library by doing the following:

- ▶ In Business Service Management, select **Help > Documentation Library**.
- ▶ From a Business Service Management Gateway Server system, select **Start > Programs > HP Business Service Management > Documentation**.

Topic Types

Within this guide, each subject area is organized into topics. A topic contains a distinct module of information for a subject. The topics are generally classified according to the type of information they contain.

This structure is designed to create easier access to specific information by dividing the documentation into the different types of information you may need at different times.

Three main topic types are in use: **Concepts**, **Tasks**, and **Reference**. The topic types are differentiated visually using icons.

Topic Type	Description	Usage
Concepts 	Background, descriptive, or conceptual information.	Learn general information about what a feature does.
Tasks 	<p>Instructional Tasks. Step-by-step guidance to help you work with the application and accomplish your goals. Some task steps include examples, using sample data. Task steps can be with or without numbering:</p> <ul style="list-style-type: none"> ▶ Numbered steps. Tasks that are performed by following each step in consecutive order. ▶ Non-numbered steps. A list of self-contained operations that you can perform in any order. 	<ul style="list-style-type: none"> ▶ Learn about the overall workflow of a task. ▶ Follow the steps listed in a numbered task to complete a task. ▶ Perform independent operations by completing steps in a non-numbered task.
	<p>Use-case Scenario Tasks. Examples of how to perform a task for a specific situation.</p>	Learn how a task could be performed in a realistic scenario.

Topic Type	Description	Usage
 Reference	General Reference. Detailed lists and explanations of reference-oriented material.	Look up a specific piece of reference information relevant to a particular context.
	User Interface Reference. Specialized reference topics that describe a particular user interface in detail. Selecting Help on this page from the Help menu in the product generally open the user interface topics.	Look up specific information about what to enter or how to use one or more specific user interface elements, such as a window, dialog box, or wizard.
 Troubleshooting and Limitations	Troubleshooting and Limitations. Specialized reference topics that describe commonly encountered problems and their solutions, and list limitations of a feature or product area.	Increase your awareness of important issues before working with a feature, or if you encounter usability problems in the software.

Additional Online Resources

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HP Software Support accesses the HP Software Support Web site. This site enables you to browse the Self-solve knowledge base. You can also post to and search user discussion forums, submit support requests, download patches and updated documentation, and more. Choose **Help > HP Software Support**. The URL for this Web site is www.hp.com/go/hpsupport.

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Part I

Working with Operations Management

1

Introduction and Overview

The information in this section helps Operations Management operators to monitor the events that occur in your organization's IT environment, correlate events, and, as a result, compile and display a detailed overview of the health of your CIs.

This chapter includes:

- How This Section Is Organized on page 21

How This Section Is Organized

Chapter 1 Introduction and Overview

This chapter introduces you to chapters describing the basic use of Operations Management.

Chapter 2 Event Management

This chapter introduces the concepts of managing events, and describes how to work with events to help solve the problems that they represent.

Chapter 3 Health Perspective

This chapter introduces the Health Perspective used to manage events from the point of view of the health of the CIs associated with event received from your monitored objects.

Chapter 4 Performance Graphs

This chapter describes the main concepts of performance graphing, which enables you to generate and view performance graphs and graphs for the objects and events that you are monitoring.

Chapter 5 Actions Pane

This chapter introduces the Actions pane used to manage running actions on events or their related CIs and nodes.

Chapter 6 User Tools

This chapter describes how to use tools configured in Operations Management to help manage solving the problems identified by events.

Chapter 7 Filtering Events

This chapter describes the main concepts of event filters and how you can use filters to focus on the information that you want to see and, as a result, locate and fix problems more quickly and easily.

Chapter 8 Views for Operations Management

This chapter describes the main concepts of views and how you can use views to reduce and refine the configuration items you see in the Model Explorer. The contents of the Event Browser are filtered by the selected configuration item.

2

Event Management

This chapter includes:

Concepts

- Operations Management Orientation on page 25
- Event Browser and the Event Perspective on page 26
- Health Perspective on page 40
- Performance Graphs on page 42
- Filters on page 42
- Event Priority on page 43
- Event Sources on page 44
- Relating Events and Automatically Creating Correlation Rules on page 45
- Event Correlation on page 45
- Tools on page 47
- Exporting Event Data on page 47
- Event Closing and Archiving Database Tools on page 47
- Operations Manager Actions on page 49
- Launching Operations Orchestration Run Books on page 50

Tasks

- How to Configure the Event Browser on page 51
- How to Export the Contents of the Event Browser on page 53
- How to Relate Events Manually on page 54
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- ▶ How to Set Priorities Manually on page 55
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- ▶ How to Display Events from EUM in the Event Browser on page 64
- ▶ How to View All Closed Events on page 65
- ▶ How to View the Closed Event History of a CI on page 66

Reference

- ▶ Event Perspective User Interface on page 68
- ▶ opr-archive-events Command-Line Interface on page 117
- ▶ opr-close-events Command-Line Interface on page 119

Troubleshooting and Limitations on page 121

Concepts

Operations Management Orientation

Managing events with Operations Management helps you to restore services and minimize service disruptions. Events are managed using the Operations Management application. The application is configured using the Operations Management Administration areas.

You can find the Operations Management Application pages using the following menu option:

Applications > Operations Management

The Operations Management Application area includes the following tabs:

► **Event Perspective**

Display, monitor, and manage the events that occur in your IT environment. For details, see "Event Browser and the Event Perspective" on page 26.

► **Health Perspective**

Display alternative perspectives of the events you are monitoring. For details, see "Health Perspective" on page 40.

► **Performance Perspective**

Configure, generate, and view graphs and tables that can help you understand and manage the performance of the systems in the environment you are managing with Operations Management. For details, see "Performance Graphs" on page 42.

Event Browser and the Event Perspective

This section includes the features and functionality of the Event Perspective. The information you find here covers the following main panes:

► **Model Explorer**

Displays the contents of the configuration item database and enables you to configure filters that determine how you view the contents of the database.

► **Event Browser**

Displays a detailed summary of all the events that occur in the operating environment you are monitoring.

► **Event Details**

Contains more detailed information about the selected event. Event details can be displayed as a pane below the Event Browser or as a popup window.

► **Actions Pane**

Display, and execute tools, HPOM actions, and Run Books that can be executed on the selected events in the Event Browser. For details, see "Tools" on page 47, "Operations Manager Actions" on page 49, and "Launching Operations Orchestration Run Books" on page 50.

The size of all Operations Management Application panes can be manually modified. You can also use the **Expand** and **Collapse** buttons to alter the display formats to predefined settings. The **Restore** button reverts the associated pane to the default size.

Model Explorer

The Model Explorer displays the CIs and relationships from the Run-time Service Model database (RTSM). It enables you to select views that filter the contents of the RTSM before presenting it in a CI tree in the Browse Views tab to simplify navigation.

When you select one or more configuration items in the CI Tree, a filter is automatically applied to the Event Browser so that only those events that are related to the selected configuration items are displayed.

The selected view also limits the events displayed to those related to CIs contained by the view. The Model Explorer selections can also be cleared using the **Clear All** button.

Note: The behavior of the Event Browser depends on the type of the CI selected: CI Group type, Node type, or Other types.

Event Browser

The Event Browser displays a summary of all the events that occurred in the environment you are monitoring. The details include:

- ▶ Date and time when the event occurred.
- ▶ Host system (node) where the event occurred.
- ▶ Application that caused the event.
- ▶ Severity of the event.
- ▶ The user responsible for solving the problem that caused the event, if assigned.

Note: The time zone that is configured for a user in BSM is not considered for displaying the time and date in the Event Browser. The time zone set on the client system displaying the Event Browser is used.

You can also use the Event Browser to display information about the status of a selected event. The event states are **Open**, **In Progress**, **Resolved** or **Closed**. The information displayed by default is a small selection of the total information available about an event.

Note: Tooltips are available and provide a brief explanation of the functionality of the associated button.

You can configure the contents of the Event Browser to show the information that is most important to you and play sound on receipt of an event using the Browser Options dialog box, accessed using the  button.

All changes you make to the Event Browser layout are automatically saved to your user account. The next time you logon, the Event Browser displays the latest events in accordance with the way you configured the Event Browser. For example, when you relogon, the last selected view and Event Browser tab are selected and reopened.

Selecting an event in the Event Browser displays the event's properties in the details pane, as long as the details pane is not hidden (toggle Details pane using the  button). The details pane contains tabs that enable you to view and modify some aspects of the selected event (for example, event properties, annotations, custom attributes, and priority).

Note: It is not possible to edit an event with the state **Closed**, except for adding annotations. To edit a closed event, you must first reopen it.

General Event Details

The General tab in the Event Details pane displays the most commonly required information associated with a selected event. General event information includes the following details:

- **Severity:** Indication of the level of the problem assigned to the selected event. Usually, this is the same as the severity status of the original event received from HPOM.
- **Lifecycle State:** Point in the event lifecycle that the selected event has reached (Open, In Progress, Resolved or Closed).
- **Priority:** Importance assigned to the selected event (for example, Low, Medium, or High).
- **Location** in the network where the original problem occurred (read-only).
- **User** who is responsible for solving the problem.
- **Message text** in the Title field. This type of text field also supports URLs and hyperlinks.

The available information displayed in the General tab summarizes the most important information contained in the original event. A blank field indicates that no information is available. If you know that a particular type of required information is not automatically available, you can use custom attributes to provide this information.

Additional Info

The Additional Info tab in the Event Details pane displays more detailed information associated with a selected event. Additional event information includes the following details:

- Application name
- Object
- Key
- Close events with key
- Suppress deduplication flag
- Received during Downtime flag

- Description of the event
- Solution information for the event

Actions

HP Operations Manager actions can be started manually from any events which have actions associated with them. The actions can be used to help solve the problem that caused the event or inform about the existence of a problem, for example, by a notification.

The Event Browser displays an icon in the A column to indicate that an automatic action is available for the selected event. An icon in the U column indicates that a user action is available for the selected event. For more information about the icons used in the Event Browser, see "Event Browser Overview" on page 69.

Annotations

An annotation is a free-text attachment to the description of an event used to provide information that may be useful to solve the cause of this event. You can use the Annotations tab in the Event Details pane to add, view, and manage the annotations associated with an event. The annotations text field also supports URLs and hyperlinks.

The Event Browser displays icons in the annotations column N to indicate that annotations exist for a selected event. For more information about the icons used in the Event Browser, see "Event Browser Overview" on page 69.

Assignment of Events to Users

The Event Browser shows you to which user and group an event is assigned for investigation and resolution. If the event is not yet assigned, you can assign it from the General tab in the Event Details pane.

You can also configure rules to automatically assign incoming events to available user groups. Automatic assigning of events to user groups responsible for solving these events significantly improves the efficiency of event management. Each event is assigned to an appropriate user group as soon as it is received. All operators in a user group are permitted to work on those events assigned to that user group. For detailed information, see "Event Assignment" on page 621. See also "Event Categories" on page 32.

Note: To display the contents of the Event Browser according to the user assigned to the event, select the User or Group column header. To define users and user groups, choose the following menu option:

Admin > Platform > Users and Permissions > User Management

Closed Events

You can view the history of closed events over a specified time period. This information can help you to derive a better understanding of long-standing problems. From the Closed Events Browser, you can change the lifecycle state of any displayed events, for example, to Open.

The Closed Events Browser shows only a snapshot of closed events available at the time of opening the Closed Events Browser. Reopened events are automatically removed from the Closed Events Browser window. However, events that are closed after the opening of the Closed Events Browser are not automatically added to the current Closed Events Browser window. A refresh is required. The timestamp when the snapshot was taken is displayed in the Closed Events Browser window.

You can create filters to help you identify specific events, for example, to select a particular CI.

For details about using the Closed Events Browser, see "How to View All Closed Events" on page 65.

Closed events are not automatically removed from the database. Use the **opr-archive-events** tool to delete closed events from the database and add them to an archive file. For details, see "opr-archive-events Command-Line Interface" on page 117.

Custom Actions

Custom actions are script-based actions that can be executed on the selected event. You configure custom actions from the Custom Actions manager, where you set up scripts to run custom actions on events. For example, you can add a text string to certain events to make them easier to identify in the Event Browser. Available custom actions for an event are executed from the context menu.

For more information about creating and managing custom actions, see "Custom Actions" on page 565.

Custom Attributes

Custom attributes are additional information included in the original event forwarded by a monitoring application such as HP Operations Manager. For example, you can define custom attributes to attach the location of the problem element or contact details for the team assigned to troubleshoot the problem.

You can use the Custom Attributes tab in the Event Details pane to view and manage the custom attributes available for an event.

You can also add custom attributes as columns to the Event Browser.

Event Categories

Event categories are logical groups of events with some similarities (for example, belonging to the same problem area). Event categories help simplify the process of deciding to which user or user group an event type should be assigned for investigation.

The Event Browser displays the category to which a selected event belongs (for example, Storage, Database (DB), System, or WebApp (Web Application)).

Note: To display the contents of the Event Browser according to event category, include Category as an Event Browser column option and then select the Category column header to sort alphabetically.

You can restrict user access to events on the basis of event categories. For example, some users can be restricted to view and work on events belonging to the category Database only. Other users are given access to events that belong to the category System only.

For more information about event assignment, see "Assignment of Events to Users" on page 30.

Event History

Event history is a log of information about who or which component has changed values of an Operations Management event. This feature enables an operator to see how event attribute values changed during the life of an event, for example, the sequence of severity changes. Event history information is available in a separate tab in the Event Details pane and can be viewed by any user with access to that event.

History Tab

The information available in the History tab if an event is manually modified in the event console, or automatically modified by closed related events (closing all existing related events to a new incoming event) or duplicate event suppression (retain and update the original event and close newer duplicates) includes the following:

- ▶ The server's timestamp of the modification.
- ▶ The old and the new value of the modified attributes.
- ▶ Information is also available about the modifier of the event. One of the following types of information is available:
 - ▶ User name, if an Operations Management user has modified the event or if an external user has made the modification.

- ▶ Title line which summarizes an change resulting from automatic closing of related events or an automatic suppression of duplicate events.
- ▶ Integration user name of the HPOM synchronization, if the event is modified by a data synchronization from HPOM.
- ▶ For annotations and custom attributes, the executed action, such as delete, or modify, is displayed in the history line entry.

Event History Creation

An event history entry is created for the following cases:

- ▶ User changes an attribute of an event using the Event Browser.
- ▶ An external user or application changes event attributes using the Northbound Interface.
- ▶ HPOM or another Operations Management instance synchronizes an attribute change to Operations Management.
- ▶ Duplicate suppression changes an existing event.
- ▶ Automatic closing of related events.
- ▶ Control is transferred, cancelled, or returned.
- ▶ Server is added to the event forwarding list.

An event history entry is not created in the following cases:

- ▶ A pipeline step (for example, CI resolution, or ETI resolution) changes an event which is not marked as received because it is still being processed by the pipeline.
- ▶ Events which are modified by the opr-close-events.bat tool.

Event History Characteristics

The following list summarizes the main technical characteristics of event history information:

- ▶ User cannot modify existing history information.

- Closing, deleting, and archiving events using the opr-archive-events tool deletes history, but history is included as part of the XML output produced by the opr-archive-events tool.
- There is no limit to the number of history entries per event.

History is created if one or more of the following properties of an event are modified:

- Cause (cause/symptom relationship)
- Duplicate Count
- Correlation Rule
- Description
- Severity
- HPOM user
- AssignedGroup
- Custom Attributes
- Time Received
- Title
- Lifecycle state
- Priority
- Assigned User

In addition, changes to event annotations are also tracked as changes in the event history.

Filters

The Event Browser enables you to display events according to filters that you define. For example, you can filter the events displayed according to severity, assigned user, event category, or lifecycle state. For details, see "Filtering Events" on page 211.

Note: When you select a configuration item in the CI Tree, Operations Management automatically applies a filter to the Event Browser so that only those events are displayed that are related to the selected configuration item.

Instructions

Operators working with the HPOM message browser can see additional instructions, when available, for this message. It is equally helpful for Operations Management operators to be able to access this information when using HPOM servers to forward events to Operations Management. This information is displayed in the Instructions tab of the Event Browser.

HPOM instructions are not contained within the event but are dynamically retrieved from the HP Operations Manager either from the corresponding policy or an external instruction provider when you select the Instructions tab.

Note: In MOM environments where events can come from multiple servers, you must connect to a server with the policy installed as only these have the instructions available. Originating servers must be configured as a Connected server. For details, see "Connecting Servers" on page 407.

Lifecycle Management

The Event Browser enables you to display and track the position of an event in a defined lifecycle. A lifecycle is a complete series of predefined states that summarizes the event's life. The lifecycle states are as follows:

- ▶ **Open:** Event is identified for investigation of the problems that caused the event. It is either not assigned to a user or assigned but not yet being worked on.
- ▶ **In Progress:** Assigned user has started working on the investigation of the event's underlying problems. The name of the assigned user appears in the User column.
- ▶ **Resolved:** Investigation into the selected event's underlying problem is found and fixed.
- ▶ **Closed:** Event is removed from the list of active events displayed in the Event Browser.

Note: Lifecycle states are linked to authorizations granted to users. For example, the user to whom an event is assigned can change the assigned event's state from **Open** to **In Progress** and **Resolved** but not to **Closed**. Only users with higher authority can assign events to other users or change the event lifecycle state from **Resolved** to **Closed**.

Although the lifecycle states occur in a consecutive manner, you can set an event's lifecycle state at any time. For example, you can assign an event to an alternative user, or reopen an investigation by changing the event state from **Closed** to **In Progress**.

Note: You can change the lifecycle state of an event by selecting the event and selecting the appropriate button (for example, the **Open**  or **Work On**  button). For more information about event lifecycle buttons and the actions they perform, see "Event Browser Overview" on page 69.

Notifications

Notifications are Emails, SMSs and Pager messages that can be sent on receipt of preconfigured types of events. You configure notifications from the Notifications manager, where you set up rules to notify people when events with predefined characteristics are received.

For example, if critical events for the most important business-relevant services are received by Operations Management during any weekend period, the engineer responsible for these services is immediately informed by an email, SMS or pager message, or any combination of these. Recipients configured in BSM are available to the Notifications manager. You use templates to define how events are translated into emails, SMS messages, or pager messages.

For more information about creating and managing notifications, see "Notifications" on page 533.

Related Events

To reduce the problem of duplication and overload when managing information from multiple sources, you can set up topology-based rules. These rules correlate events by distinguishing between symptom and cause events and present a clearer picture of the state of the operational environment that you are monitoring.

Topology-based event correlation uses a combination of specified symptoms and a probable causes to determine the cause of an event, which it then flags in the Event Browser. An icon in the C column of the Event Browser indicates that the selected event is correlated. For details about correlated events, see "Related Events Tab" on page 96. For more information about event correlation in general, see "Event Correlation" on page 45.

Resolver Hints

The Resolver Hints tab in the Event Details pane displays information associated relating to the identification of the node, source CI, related CI and the ETI of the received event.

Severities Assigned to Events

Each event can be assigned a severity to show the importance of the underlying problem. The values are: critical, major, minor, warning, normal, and unknown. The Event Browser indicates an event's severity with an icon.

Note: The Items bar at the bottom of the Event Browser indicates the number of active events by severity. An active event is one that is open and being worked on.

Source Info

The Source Info tab in the Event Details pane displays information associated relating to the identification of the source CI of the received event.

Synchronization of Events

Event synchronization enables bidirectional communication between managers, for example, Operations Management and HPOM. Updates and modifications to events can be exchanged. For example, changes of ownership or modifications to the severity status of an event are synchronized between management servers.

Note: All messages forwarded from HPOM systems are treated as allowing read and write. Any changes made to these events result in a back synchronization to the originating HPOM server.

Note: HPOM events are not updated when using the `opr-close-events` tool and the `opr-archive-events` tool to close, delete, and archive events. The events in HPOM remain unaffected.

The opposite is also true when using the `omwmsgutil` (HPOM for Windows) tool and `opckack` and `opchistdown` (HPOM for UNIX) tools to close, delete, and archive events. The events in Operations Management remain unaffected.

All these tool operates directly on their respective databases and the changes do not go through the workflow process, resulting in the loss of synchronization between Operations Management and HPOM.

If you use these tools to close, delete, and archive events from one system (for example, Operations Management), you must make the equivalent changes with the appropriate tools on the other system (for example, HPOM).

Health Perspective

This section describes how to display more information about events by changing the way you view them. It includes the following sections:

- "Health Perspective Basics" on page 40
- "Health Top View" on page 41
- "Health Indicators Pane" on page 41

Health Perspective Basics

The health perspective page displays topological information and health indicators related to the selected event. This display enables you to simultaneously see events from different perspectives and helps you to better understand complex relationships and dependencies.

For example, you can view the following:

- List of active events.
- Topological view of the CI related to the selected event.
- Health indicators assigned to the objects, their state and value.

Health Top View

The Health Top View displays the business availability of your system components. The CI bar icons in the Health Top View provide a visual indication of the health of the related CI of the selected event, based on the hierarchy tree structure defined for each view. The connecting lines between the bars define the relationships between the CIs.

For more information about KPIs, see "HI-Based KPI Calculations" on page 129. For more information about Health Top Views, see "Health Top Views" on page 125.

Health Indicators Pane

The Health Indicators pane of an event shows a list of the health indicators used to calculate the health of the configuration item to which the selected event belongs. The information displayed includes the name and value of the health indicator, its current status, the last time it was updated, and whether the trend is up, down, or stable.

The Health Indicators pane displays a list of all the health indicators assigned to the KPIs that are attached to the selected configuration item. The list is divided according to health indicators contributing to KPIs.

For more information about health indicators, see "Health Indicators" on page 128.

Performance Graphs

You can generate graphs and tables to illustrate graphically how the monitored objects in the environment are performing. The graphs you generate show an overview of important performance metrics (for example, CPU and swap space utilization over time, memory page use, and availability).

You can choose from a variety of graph types and configure the details that you want to include in the graph, the time period to be used, and the display format (for example, graph, chart, or table). You can also display the same data in different forms using multiple tabs.

For details about the performance graphs, see "Graphing Overview" on page 142. For more information about how to refine the way in which the data is presented in graphs, see "Types of Graphs" on page 144.

Filters

You can limit the set of events displayed in the Event Browser using filters that you define to display a subset of the available events. For example, you can filter the events displayed according to severity, the assigned user, the event category, or the lifecycle state. You can also display the filtered events in different pages. The Event Browser is dynamically updated. Events that no longer match a relative time filter are removed from the Event Browser and new events that match are added.

Note: Filters are visible and available only to the user who created them.

For more information about filters in general, see "Event Filters" on page 215.

Event Priority

Event priorities can be automatically calculated from the Business Model and the Event's severity. Event Priority is assigned one of the following values Lowest, Low, Medium, High, or Highest.

The Event Priority calculation is executed in the event pipeline on new events. It also can be started manually on multiple events from the console context menu.

Input parameters for the calculation are:

- Severity of the event
- Business criticality of the related CI (if available)

Note: If no CI is related to the selected event, the priority is None.

The business impact is provided by the Business Impact Service (BIS) and the severity is an attribute of the event.

The calculation of priority is based on the relationship in the following table.

	Event Severity					
Impact	Unknown	Normal	Warning	Minor	Major	Critical
NoImpact	Lowest	Lowest	Low	Low	Medium	Medium
Low	Lowest	Lowest	Low	Low	Medium	Medium
MediumLow	Low	Low	Low	Medium	Medium	High
Medium	Medium	Low	Medium	Medium	High	High
MediumHigh	High	Medium	Medium	High	High	Highest
High	Highest	Medium	High	High	Highest	Highest

In event forwarding, the calculated priority is forwarded to the receiving application. If the CI related to the event is configured in the receiving application, the event priority is recalculated by each receiving application. If the CI related to the event is not configured in the receiving application, the event priority contained within the forwarded event is used.

Note: You can manually change the automatically-assigned priority of an event. You can also select two or more events and recalculate their priorities, for example to reflect a change in Business Criticality.

Event Sources

Events originating from many different sources can be processed, for example:

- ▶ HP BSM components:
 - ▶ HP Operations Manager for UNIX (HPOM for UNIX)
 - ▶ HP Operations Manager for Windows (HPOM for Windows)
 - ▶ HP Network Node Manager i (NNMi)
 - ▶ HP End User Management (EUM):
 - ▶ Business Process Monitor (BPM)
 - ▶ Real User Monitor (RUM)
 - ▶ HP SiteScope
 - ▶ HP Systems Insight Manager
- ▶ Third-party management software, normally used to monitor specific environments or special needs not monitored by other solution components:
 - ▶ Microsoft Systems Center Operations Manager, Active Directory, Exchange
 - ▶ BlackBerry Enterprise Server
 - ▶ SAP

Alerts, for example, from CI Status Alerts, SLA Alerts, and Event Based Alerts, can also generate events in Operations Management. For example, Operations Management operators can collect, view, correlate, and manage events generated from Event Based Alerts from EUM components. EUM components include BPM, or RUM.

Relating Events and Automatically Creating Correlation Rules

You can manually relate events, assigning one event as a cause event and the other logically-related events as symptom events. For further information, see "How to Relate Events Manually" on page 54.

Manually-related events can also be used as the basis for creating new or enhancing existing correlation rules. For further information, see "How to Create Correlation Rules from Manually-Related Events" on page 56.

Event Correlation

Topology-Based Event Correlation (TBEC) in Operations Management is used to automatically identify and display the real cause of problems. Events that are only symptoms of the cause event can be filtered out using the Top Level Items filter, resulting in a clearer overview of the actual problems that need to be solved. Event correlation relies on defining relationships between correlation rules, ETIs and ETI-values associated to events, and CIs and relations between these CIs.

Note: To use event correlation, the Event Management Foundation and Correlation licenses are required. For detailed information on licensing, see *the HP Business Service Management Deployment Guide PDF*.

The topology-based event correlation process works as follows:

- ▶ Checks whether a relationship exists between the events being correlated.
- ▶ Monitors the CIs and ETI values assigned to events being correlated.
- ▶ Determines relationship between two events by checking if there is a relationship in the topology database between the CIs to which the events are related.

The correlation result is displayed in the Event Browser with an icon in the C column to indicate that it is the result of a correlation process.

-  — Event is the *cause* of another event
-  — Event is the *cause* of one event and a *symptom* of another event
-  — Event is a *symptom* of another event

Note: You might not be authorized to open the Correlation Rules manager. For more information about user authorization, see "User Management" on page 629.

Events related as a result of correlation with the selected Event are displayed in the Related Events tab. The selected event can also be a symptom event and you can also see its cause in the Related Events tab.

For more information about the icons used in the Event Browser, see "Event Browser Overview" on page 69. For details about correlated events, see "Related Events Tab" on page 96. For more information about setting up correlation rules, see "Topology-Based Event Correlation" on page 370.

Tools

You can specify tools, for example, to ping a system. These tools are launched from events or from the Actions panel and run on the associated CI. Tools are designed to help users solve common problems quickly and efficiently.

All available tools are displayed in the Select Tool window launched in the context of a configuration item. The selection of tools a particular user sees in context menus depends on the tools that are available for the configuration item affected by a particular event.

For information about running configured tools, see "Run Tools User Interface" on page 207.

Exporting Event Data

You can export the contents of the Event Browser to an external file. The supported formats include Microsoft Excel and comma-separated value (.csv) lists. It is possible to export the information selected for display in the Event Browser (default), a subset of this information or any combination of available attributes.

For information about exporting event data, see "How to Export the Contents of the Event Browser" on page 53.

Event Closing and Archiving Database Tools

You can use the following two database maintenance command-line tools to close and archive events:

- ▶ **opr-close-events Command-Line Interface**
- ▶ **opr-archive-events Command-Line Interface**

Both command-line tools are available only on Data Processing servers and are protected from unauthorized execution.

Note: HPOM events are not updated when using the `opr-close-events` tool and the `opr-archive-events` tool to close, delete, and archive events. The events in HPOM remain unaffected.

The opposite is also true when using the `omwmsgutil` (HPOM for Windows) tool and `opcachk` and `opchistdown` (HPOM for UNIX) tools to close, delete, and archive events. The events in Operations Management remain unaffected.

All these tool operates directly on their respective databases and the changes do not go through the workflow process, resulting in the loss of synchronization between Operations Management and HPOM.

If you use these tools to close, delete, and archive events from one system (for example, Operations Management), you must make the equivalent changes with the appropriate tools on the other system (for example, HPOM).

opr-close-events Command-Line Interface

It is possible that a certain problem in the IT environment results in the generation of a very large number of similar events (event storm) which are received by Operations Management. Browsing through and filtering a large number of events can be time-consuming and can lead to time-out errors.

Time-outs may be experienced as a result of delays in processing a large number of events in the web application, for example, when you select all events in the browser and attempt to close them. The user interface server may take a long time to start up or may experience a memory bottleneck.

You can use the **opr-close-events** command-line interface tool to close a large number of events, including related events, as experienced during an event storm, even when the Operations Management user interface is not responding.

For a description of the **opr-close-events** command options, see "opr-close-events Command-Line Interface" on page 119.

opr-archive-events Command-Line Interface

Closed events are not automatically removed from the database. The database maintenance command-line tool **opr-archive-events** enables you to archive closed events. The specified closed events are exported to an XML-format file. These events are deleted from the database on archiving.

Note: Importing closed events is not supported.

For a description of the **opr-archive-events** command options, see "opr-archive-events Command-Line Interface" on page 117.

Operations Manager Actions

You can run actions configured in HP Operations Manager from Operations Management. Events from HPOM received by Operations Management can contain event-related actions. If event-related actions exist, the following icons are displayed in the Event Browser in the A column and the U column:

 — Automatic action is available

 — User action is available

Operator-initiated actions and automatic actions are also displayed in the Actions tab of the Event Details pane.

Further icons indicate the status of the actions, including, starting, running, succeeded, and failed. For a complete overview of the icons and actions available, see "Event Browser Overview" on page 69.

You can execute these actions from either the Actions tab or the context menu of the event. The result of the action execution creates an entry in the History that is added to the event, if configured in the policy. It is also possible to stop an event-related action before execution completes.

Event-related actions for assigned and unassigned events require authorization to run. If you are not authorized to execute event actions, you still see the configured commands but you are not permitted to execute them.

Note: Actions that contain the `$OPC_GUI_CLIENT` and `$OPC_GUI_CLIENT_WEB` variables are not supported and are filtered out.

For information about running actions, see "How to Run an HPOM Action" on page 62.

Launching Operations Orchestration Run Books

If you are using HP Operations Orchestration (OO) to automate operator tasks for analyzing or fixing problems, these OO Run Books can be mapped to CI Types within BSM.

Run Books can be started from events (shortcut menu). The CIs related to the event define which of the available flows are suitable. When you launch a Run Book from an event, appropriate flow parameters are automatically acquired from the CI or event itself.

Note: When integrating Run Books from OO, you must specify for which CI types each Run Book is valid (configured in the Platform) and define which event attributes can be used as Run Book input parameters.

If a Run Book input parameter is mapped to a CI attribute and an event attribute, the event attribute takes precedence (if launched from events).

For information about running actions, see "How to Launch an HP Operations Orchestration Run Book" on page 63.

Tasks

How to Configure the Event Browser

This task describes how to configure the Event Browser to display only the details that you are interested in. For example, you can add and remove columns, customize additional tabs, and configure filters to change and improve the way in which data displays.

All changes you make to the Event Browser layout are automatically saved to your user account. The next time you log on, the Event Browser displays the latest events in accordance with the way you configured the Event Browser. For example, the last selected view is selected and reopened.

To configure the Event Browser:

- 1 Open the Event Browser to display the list of known events:

Applications > Operations Management > <select a perspective>

- 2 In the Event Browser, click the **Browser Options**  button.
- 3 From the **Columns** tab, select the columns to display in the Event Browser and click the add () button to include them in the Display these fields box.
- 4 Select from the **Display these columns** box any columns that you do not want to display and click the remove () button.
- 5 Select column names and rearrange their display positions by use of the  and  buttons.

The first column item in the list is displayed as the first column in the Event Browser. Subsequent column items are placed progressively to the right in the order of their appearance in the Display these columns list.

Alternatively, to select the default columns for display in the Event Browser, click **Reset**.

- 6 Select **OK**.

Note: You can add custom attributes as columns by defining them under the corresponding infrastructure settings:

Admin > Platform > Setup and Maintenance > Infrastructure Settings > Operations Management > Custom Attributes Settings

Custom attributes defined there can then be selected as a column in the Event Browser.

How to Export the Contents of the Event Browser

This task describes how to export the contents of the Event Browser to an external file. The supported formats include Microsoft Excel and comma-separated value (.csv) lists. It is possible to export the information selected for display in the Event Browser (default), a subset of this information or any combination of available attributes.

To export the contents of the Event Browser:

- 1 Open the Events Perspective tab or the Health Perspective tab to display the list of known events:

Applications > Operations Management > <select a perspective>

- 2 *Optional:* Filter the event browser to display only the events that you want to export.

- 3 In the Event Browser, select the **Export Events List**  icon.

The Export Event List dialog box opens.

- 4 From the **Available Columns** tab, select the attribute columns to export and click the add () button to include them in the Export these columns box.

Use the add all () button to include all columns in the Export these columns box.

- 5 Select from the **Export these columns** box any columns that you do not want to export and click the remove () button.

Use the remove all () button to remove all columns from the Export these columns box.

- 6 Select column names and rearrange their export order by use of the up  and down  buttons.

The first column item in the list is displayed as the first column in the exported file. Subsequent column items are placed progressively to the right in the order of their appearance in the Export these columns list.

Alternatively, to select the default columns for export, click **Reset**.

- 7 From the **File format** list, select the format of the export file to be created:
 - ▶ Comma-separated values (.csv)
 - ▶ Microsoft Excel 2007 Workbook (.xlsx)
 - ▶ Microsoft Excel 97-2003 Workbook (.xls)
- 8 Select **OK**.
- 9 Enter a name and select a location for the export file and click **Save**.

Note: If you export the contents of the Event Browser with non-ascii characters using the comma separated values (.csv) format and open it directly in Microsoft Excel, the characters may be unreadable.

As the file is UTF-8 encoded, it can be read by Microsoft Excel by using one of the following methods:

- ▶ Import the file into Excel with UTF-8 character set:
Data > Import External Data > Import Data
Text Files, 65001 encoding (UTF-8)
 - ▶ Open the csv-format file with Notepad and save it with UTF-8 encoding.
-

How to Relate Events Manually

This task describes how to manually relate selected events in the Event Browser by assigning one event as a cause event. All other related events become symptom events.

To manually relate an event:

- 1 Open the Event Browser to display the list of known events:
Applications > Operations Management > <select a perspective>
- 2 In the Event Browser, select the events that you want to relate.
- 3 Right-click one of these events and select **Relate Events** from the context menu. The Relate Events dialog box opens.

- 4 Select one of the events as the cause event.

All other events are symptoms of the selected cause event.

- 5 *Optional:* Manually related events can also be used as the basis for automatically generating a correlation rule. If you also want to create a correlation rule based on the current relationship, select the check box **Open correlation rule wizard**. For details about creating a correlation rule using the Correlation Rule Generator, see "How to Create Correlation Rules from Manually-Related Events" on page 56.

- 6 Select **OK**.

How to Recalculate Event Priorities

This task describes how to manually recalculate the priorities for selected events in the Event Browser. This may be necessary when Business Criticality values changed in the underlying business model, and you want these changes reflected in your active events.

To manually recalculate the priority of an event:

- 1 Open the Event Browser to display the list of known events:
Applications > Operations Management > <select a perspective>
- 2 In the Event Browser, select the events for which you want to recalculate the priority.
- 3 Right-click one of these events and select **Recalculate Priority** from the context menu.

The priority value for the selected events is updated.

How to Set Priorities Manually

This task describes how to manually change the automatically-assigned priority of an event.

To manually change the priority of an event:

- 1 Open the Event Browser to display the list of known events:

Applications > Operations Management > <select a perspective>

- 2** In the Event Browser, select the event for which you want to change the priority value.
- 3** Open the Event Details pane.
- 4** Select the required priority from the Priority list.
- 5** Select **Save**.

How to Create Correlation Rules from Manually-Related Events

This task describes how to create or enhance a correlation rule based on selected events. From the Event Browser, you need to identify related events, select a cause event, relate them manually, and choose to create a correlation rule to reflect this relationship.

The Correlation Rule Generator wizard requires that the events being used to generate a new rule include a Related CI.

Note: If related ETIs and their values are not available, you can define indicator mapping rules to set indicator states (see "How to Create and Edit Indicator Mapping Rules" on page 330), and create a correlation rule for this case. You must also modify and redeploy the event forwarding policy that created the event in HPOM to provide a suitable ETI and value for this type of event. Next time such an event is received, an ETI is included, and the associated correlation rule is triggered.

To create or edit a correlation rule from manually-related events:

- 1** Open the Event Browser to display the list of known events:
Applications > Operations Management > <select a perspective>
- 2** In the Event Browser, select the events that you want to relate.

Note: Generation of a correlation rule from selected events is limited to a maximum of 10 events.

- 3** Right-click one of these events and select **Relate Events** from the context menu.

The Relate Events dialog box opens.

- 4** Select one of the events as the cause event.

All other events are symptoms of the selected cause event.

- 5** Select **Open correlation rule wizard**.

- 6** Select **OK**.

The Correlation Rule Generator dialog box opens.

- 7** Select the cause event (**Use as Cause**  button).

All rules with the selected cause are displayed.

- 8** From the Select Events for Creating or Enhancing a Correlation Rule section, select additional events that are to be included in the correlation rule.

Note: The list of possible rules that can be enhanced is dependent on the CI Type of the cause event selected.

- 9** Select **Create** to create a correlation rule based on the specified cause and symptom events, or select an existing correlation rule and click **Enhance**.

The Rule Properties page opens.

- 10** Specify the properties for a new correlation rule or make the appropriate changes to the existing correlation rule.

- 11** *Optional:* If you want the correlation rule to be enabled immediately, select **Active**.
- 12** *Optional:* Select an alternative time window for this correlation rule. This defines time period used to correlate events with an existing event. An event received after the time period is past is not be correlated with the original event. An alternative time window overrides the global default set in the Infrastructure Settings Manager page for Operations Management. For details, see "Topology-Based Event Correlation Settings" on page 717.
- 13** Select **Next**.
The Rule Details page opens.
- 14** *Optional:* You can select nodes from a graph and can add additional ETIs to the rule.
- 15** Select **Finish** to create the new correlation rule or modify the existing one.
For more information about correlation rules, see "Correlation Rules" on page 367.

How to Transfer Control to an External Manager

This task describes how to transfer control of events in the Event Browser to an external manager.

Note: The external manager server must be specified as a target in the Connected Servers manager.

For example, if your organization uses HP Service Manager as a central service desk, you can transfer control of events from the Event Browser to HP Service Manager. This is often the case when the Operations Management operator is not able to solve the problem and needs to assign the problem to an expert. HP Service Manager creates an incident returns the Incident ID to Operations Management. This is displayed in the External Info tab with additional information about the event available from the external manager.

Note: If you transfer control of an event:

- ▶ it is not possible to transfer control again and the option is not displayed.
- ▶ a message is sent to the target server to notify that control was transferred if the event was forwarded with the Synchronize option.

To manually transfer control of an event to an external manager:

- 1** Open the Event Browser to display the list of known events:
Applications > Operations Management > <select a perspective>
- 2** In the Event Browser, select the events that you want to transfer control to an external manager.
- 3** Right-click one of these events and from the context menu select:
Transfer Control to > <select a manager>

Note: If there is a problem connecting to the system to which you want to transfer control, the event forward request or event update synchronization request is held in a queue. If the request cannot be delivered to the target server within the specified time, it is automatically deleted from this queue.

To set the Event Forwarding Expiration time period, see "Event Forwarding Settings" on page 702. The default value is 2 hours and the minimum value is 1 hour.

How to Add Annotations to an Event

This task describes how to add an annotation to an event. Annotations help the user understand the background of an event.

To add an annotation to an event:

1 Open the Event Browser to display the list of known events:

Applications > Operations Management > <select a perspective>

2 In the Event Browser, select an event.

3 From the Event Details pane, select the **Annotations** tab.

Click the **Add Annotation** * button from the Annotations toolbar to open the Add Annotation dialog box.

4 Enter the information text.

Note: Annotations exceeding 100 000 characters are truncated and it is not possible to save annotation longer than 100 000 characters.

5 Select **OK**.

How to Add Custom Attributes to an Event

This task describes how to add custom attributes to an event. Custom attributes provide extra information that can help the user understand the background to an event and, as a result, speed up the resolution of the event's underlying problem.

Note: To add or modify custom attributes, you must be logged on as a user with permissions to modify the event.

To add a custom attribute to an event:

- 1** Open the Event Browser to display the list of known events:
Applications > Operations Management > <select a perspective>
- 2** In the Event Browser, select an event.
- 3** From the Event Details pane, select the **Custom Attributes** tab.
- 4** Click the **Add Custom Attribute** * button to open the Add Custom Attribute dialog box.
- 5** Enter the custom attribute name and value.
- 6** Select **OK**.

How to Assign an Event to a User or User Group

This task describes how to assign an event from the Event Browser to a user or user group.

To assign an event to a user or user group:

- 1** Open the Event Browser to display the list of known events:
Applications > Operations Management > <select a perspective>
- 2** From the Event Browser pane, select the event that you want to assign to a user.
- 3** Open the Event Assignment dialog box in one of the following ways:
 - In the Event Browser pane, click the **Assign To**  button.
 - Right-click the event and select **Operations > Assign To** from the context menu.
- 4** In the Assigned Group box, use the menu to select the user group to which you want to assign the selected event (for example, **Database Experts** or **Application Server Operators**).
- 5** In the Assigned User box, use the menu to select the user to whom you want to assign the selected event.

The users displayed in the menu are filtered according to the user group selected in the previous step.

Note: Alternatively, in the **General** tab of the Event Details pane, select the user and group from the Assigned Group and the Assigned User boxes and click the **Save**  button.

- 6 Select **OK**.

How to Run an HPOM Action

In this task, learn how to run HPOM actions for an event containing event-related actions.

To run an action from an event with related actions:

- 1 Open the Event Browser to display the list of known events:

Applications > Operations Management > <select a perspective>

- 2 Select an event that includes event-related actions.

Actions are identified by the following icons displayed in the Event Browser in the **A** column and the **U** column:

 — Automatic action is available

 — User action is available

Further icons indicate the status of the actions, including, starting, running, succeeded, and failed. For a complete overview of the icons and actions available, see "Run Tools User Interface" on page 207.

- 3 Select the **Actions** tab.

The action specification, target node, and the status of the available actions are displayed. A maximum of one automatic action and one user action is available for an event.

- 4 For the action that you want to run, select **Start**.

Alternatively, from the context menu for the event, select the appropriate action:

Right-click > Actions > Start

The action starts, the status changes to **Running** and the associated action icon in the Event Browser changes to reflect this status.

After the action execution has completed successfully, the status changes to **Succeeded**. If the action did not execute successfully, the status is changed to **Failed**.

- 5 Select the **Annotations** tab for a summary of the executed action.

How to Launch a Custom Action

In this task, learn how to launch a custom action for an event.

To run a custom action from an event:

- 1 Open the Event Browser to display the list of known events:
Applications > Operations Management > <select a perspective>
- 2 Select the Custom Action that you want to run on an event:
Right-click > Launch > Custom Actions > <select a custom action>

The selected custom action is launched in the context of the selected event.

How to Launch an HP Operations Orchestration Run Book

In this task, learn how to launch an HP Operations Orchestration Run Book for an event.

To run a Run Book from an event:

- 1 Open the Event Browser to display the list of known events:
Applications > Operations Management > Event Perspective
- 2 Select the Run Book that you want to run on an event:
Right-click > Launch > Run Books > <select a Run Book>

The selected Run Book is launched in the context of the event or the CI associated with the selected event.

Note: The context menu item is only visible if the logged-on user has permissions to execute Run Books. Users can be configured in the Permissions tab under the Operations Orchestration Integration context. This available from:

Admin > Platform > User and Permissions

Tip: Run Books can also be run from the Actions pane.

How to Display Events from EUM in the Event Browser

You can configure the automatic forwarding of events from End User Management (EUM) to the Operations Management Event Browser using the Event Channel to proactively alert the operator about a problem in the system. EUM alerts are mapped to events using the Event Template.

The possible configuration methods are:

- ▶ Configure HI status changes
- ▶ Configure EUM alerts
- ▶ Configure specific CI Status alerts

For task details, see the *Solutions and Integrations* guide.

If configured, EUM events are displayed in the Event Browser. In addition to the regular Event Browser operations, you can drill down to EUM reports to complete your analysis. The drill down is available only for events which are generated by the EUM alerts.

How to View All Closed Events

In this task, you display a Closed Events Browser window containing all closed events over a selected time period.

The Closed Events Browser shows only a snapshot of closed events available at the time of opening the Closed Events Browser. Events that are reopened are automatically removed from the Closed Events Browser. Events that are closed after the opening of the Closed Events Browser are not automatically added to the current Closed Events Browser window. A refresh is required. The timestamp when the snapshot was taken is displayed in the Closed Events Browser window.

The maximum number of events that can be displayed in the Closed Events Browser can be configured in the Settings Manager. For details, see "Closed Events Browser Settings" on page 693.

To show closed events history related to a current event:

- 1** Open the Event Browser to display the list of known events:
Applications > Operations Management > <select a perspective>
- 2** Click the **Show Closed Events**  button.
- 3** In the **Closed Events Browser Configuration** window, specify the time period for which you want to display history.
 Select a predefined period, and the number of available related closed events is displayed in the Number of events field.
 If you select **Select a custom range**, specify a custom time range, and select **Apply**. The number of available related closed events is displayed in the Number of events field.
- 4** Select **OK** to display the Closed Events Browser window containing the available events.

Actions can be executed on the selected event using the available buttons and context menus. For details, see "Closed Events Browser Configuration Dialog Box" on page 106.

How to View the Closed Event History of a CI

In this task, you display a Closed Events Browser window containing all closed events related to the related CI of a current event over a selected time period.

The Closed Events Browser shows only a snapshot of closed events available at the time of opening the Closed Events Browser. Events that are closed after the opening of the Closed Events Browser are not added to the current Closed Events Browser window. The timestamp when the snapshot was taken is displayed in the Closed Events Browser window.

The maximum number of events that can be displayed in the Closed Events Browser can be configured in the Settings Manager. For details, see "Closed Events Browser Settings" on page 693.

To show closed events history related to a current event:

- 1** Open the Event Browser to display the list of known events:

Applications > Operations Management > <select a perspective>

- 2** Right-click the event for which you want to see the event history and select **Show > Closed Events (Related CI)** from the context menu.
- 3** In the **Closed Events Browser Configuration** window, specify the time period for which you want to display history.

Select a predefined period, and the number of available related closed events is displayed in the Number of events field.

If you select **Select a custom range**, specify a custom time range, and select **Apply**. The number of available related closed events is displayed in the Number of events field.

- 4** Select **OK** to display the Closed Events Browser window containing the available events.

Actions can be executed on the selected event using the available buttons and context menus. For details, see "Closed Events Browser Configuration Dialog Box" on page 106.

Reference

Event Perspective User Interface

This section aims to help you become familiar with the Event Perspective and understand how you can use it to better manage the events that occur in your IT environment. The Event Perspective page displays event-related information in separate panes, the contents of which are described in greater detail in the following topics:

- ▶ Model Explorer on page 69
- ▶ Event Browser Overview on page 69
- ▶ General Tab on page 84
- ▶ Additional Info Tab on page 88
- ▶ Source Info Tab on page 89
- ▶ Actions Tab on page 91
- ▶ Annotations Tab on page 92
- ▶ Custom Attributes Tab on page 93
- ▶ Related Events Tab on page 96
- ▶ History Tab on page 98
- ▶ Resolver Hints Tab on page 99
- ▶ Instructions Tab on page 102
- ▶ External Info Tab on page 103
- ▶ Browser Options Dialog Box on page 104
- ▶ Relate Events Dialog Box on page 108
- ▶ Correlation Rule Generator Dialog Box on page 110
- ▶ Export Event List Dialog Box on page 115
- ▶ Closed Events Browser Configuration Dialog Box on page 106

- Correlation Rule Generator Dialog Box on page 110
- opr-archive-events Command-Line Interface on page 117
- opr-close-events Command-Line Interface on page 119

Model Explorer

The Model Explorer displays configuration items from the Run-time Service Model database (RTSM). The displayed selection can be filtered by applying a view. Views configure the Model Explorer to display only the configuration items specified in the view.

The contents of the Event Browser pane are filtered according to the selected view or configuration item type. The active filter is indicated in the Filter applied list.

To access	Select Applications > Operations Management > Event Perspective
Important Information	Using the Modeling Studio (Admin > RTSM Administration > Modeling > Modeling Studio), you can configure new views or modify existing views to change, increase, or decrease the information displayed.

Event Browser Overview

The Event Browser pane, available in the Event and Health Perspectives, displays an overview of the active events that exist in the IT environment you are monitoring. Events report important occurrences in the managed environment, and are generated by source managers. These are forwarded to Operations Management and are assigned to operators for resolution.

Filtering the Event Browser content helps you to focus on the most useful information. You can configure new filters or modify existing filters to change, increase, or decrease the information displayed.

To access	Select Applications > Operations Management > Event Perspective
Important information	The contents of the Event Browser pane in the Event Perspective and Health Perspective are filtered according to the selected view or configuration item. The active view or configuration item filter is indicated in the filter list enabled using the (View/CI) filter  button. The Active Event Filter is displayed in the filter selection field.
Relevant tasks	For more information about configuring the Event Browser, see "How to Configure the Event Browser" on page 51.
See also	For more information about the Event Browser, see "Event Browser and the Event Perspective" on page 26.

Closed Events Browser

You can view closed events history over a specified time period, either for all closed events or for a selected CI. From the Closed Events Browser, you can change the lifecycle state of any displayed events. For details, see "Closed Events" on page 31. All Event Browser actions relevant to closed events can be accessed from the Closed Events Browser.

To access	Select Applications > Operations Management > Event Perspective > click the Show Closed Events  button.
Important information	The maximum number of events that can be displayed in the Closed Events Browser can be configured in the Settings Manager. For details, see "Closed Events Browser Settings" on page 693.
Relevant tasks	For more information about viewing closed events, see "How to View All Closed Events" on page 65.

Note: Reopened events are automatically removed from the Closed Events Browser window. However, events that are closed after the opening of the Closed Events Browser are not automatically added to the current Closed Events Browser window. A refresh is required. The timestamp when the snapshot was taken is displayed in the Closed Events Browser window. Only one Closed Events Browser can be opened at a time by each user.

Event Browser Icons, Buttons, and Context Menus

To access	Select Applications > Operations Management > Event Perspective > right-click an event.
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Important information	Some options and tools displayed in context menus require you to be logged on as a user with the authorization to start the selected tool.
Relevant tasks	For more information about the actions that are available in context menus and tooltips displayed in the Event Browser page, see the Event Browser graphical user interface descriptions in "Event Browser Icons, Buttons, and Context Menus" on page 71.

The following table lists the buttons that enable you to perform actions in the Event Browser pane. For a short explanation of the action performed by a button in the Event Browser, check the tooltip.

UI Element (A-Z)	Description
	Reopen: Sets the lifecycle status for the selected events to Open. The events can now be assigned to users for investigation and resolution.
	Work On: Sets the lifecycle status for the selected events to In Progress, indicating that the underlying problems of the events are under investigation.
	Resolve: Sets the lifecycle status for the selected events to Resolved.
	Close: Sets the lifecycle status for the selected events to Closed.
	Assign To: Opens the Event Assignment dialog box, enabling you to assign the selected events to a specific user or user group.
	Relate Events: Opens the Relate Events dialog box, enabling you to manually relate the selected events by assigning one event as a cause event. All other events become symptom events. Manually related events can also be used as the basis for automatically generating a correlation rule. For details, see "Relating Events and Automatically Creating Correlation Rules" on page 45.

UI Element (A-Z)	Description
	<p>Enables and disables CI filtering. Visible from the Event Perspective and the Health Perspectives.</p> <p> — Disable CI Filter: Display all events selected by the active filter for all CIs.</p> <p> — Enable CI Filter: Display all events selected by the active filter for the selected CI.</p> <p> — Enable CI Filter (include events for child CIs): Display all events selected by the active filter for the selected CI and all its child CIs.</p> <p>Tip: Can be combined with the Search Events feature.</p>
	<p>Event Filters: Opens the Select an Event Filter dialog box, enabling you to select the event filter that you want to apply.</p> <p>From the Select an Event Filter dialog box, you can also open the Filter Configuration dialog box to create an event filter, test, edit or delete an existing event filter.</p> <p>For more information about the event filters, see "Event Filters" on page 215.</p>
	<p>Browser Options: Opens the Browser Options dialog box for the current Event Browser tab. You can modify and set display options (for example, to hide or display columns, or change the order in which the data appears, play sound on receipt of an event).</p>
	<p>Opens the Export Event List dialog box for the current Event Browser where you can specify which event attributes you want to export to the external file.</p>
	<p>Show/Hide Event Details Pane: Toggles between the Event browser view with and without the Event details pane. You can also open the event details for an event in a pop-up window using the Show > Event Details context menu item or double-click the event.</p>

UI Element (A-Z)	Description
	<p>Refresh: Synchronizes the event data displayed in the user interface with the latest information available in the database on the server and forces a complete refresh.</p> <p>For information on setting the automatic update interval, see "User Interface Settings" on page 720.</p>
	<p>Show/Hide Closed Events: Displays the Closed Events Browser Configuration window used to specify the time period for the closed events to be displayed in the Closed Events Browser. Select OK and the Events Browser displays the closed events related to the related CI of a current event over a selected time period opens.</p> <p>Click the Hide Closed Events  button to return to the Event Browser.</p>
<Search Events>	<p>Entered text string is used to search the text displayed in the Event Browser and display only the events containing the specified string. Clearing the field displays all events again.</p> <p>If you are also filtering by CIs, selecting a different CI clears the search field.</p>
Close and Reset Health Indicator	<p>Sets the lifecycle status for the selected events to Closed and resets the associated HI values to the default values.</p>
Configure > Event Type Indicators	<p>Opens the Indicators manager. You need the appropriate authorization to access the Indicators manager and other Administration features.</p>
Configure > Integration Policies	<p>Opens the Policy Management UI in a new window.</p>
Configure > Performance Graphs	<p>Opens a new window and displays the graph Design Wizard. This wizard enables you to design a graph and specify its attributes and save it as a template for later use.</p>
Configure > Tools	<p>Opens the Tools manager. You need the appropriate authorization to access the Indicators manager and other Administration features.</p>

UI Element (A-Z)	Description
Configure > View Mappings	Opens the View Mappings manager. You need the appropriate authorization to access Administration features.

UI Element (A-Z)	Description
<p>Items</p>	<p>Indicates the number of events by severity and assignment to individual users or user groups. The valid severities are critical, major, minor, warning, normal, and unknown.</p> <p>The number of events displayed as a total of the number of available events before filtering is also displayed along with the number of selected events in brackets. For example, 25 of 40 (3) means that there are 40 possible events available for the current user of which 25 are displayed in the Event Browser (15 have been removed by filtering). 3 events are selected in the Event Browser.</p> <p>The following icons indicate event severity status:</p> <ul style="list-style-type: none">  — Critical  — Major  — Minor  — Warning  — Normal  — Unknown <p>Usually, this is the same as the severity status of the original event received from HPOM.</p> <p>Selecting a severity icon results in filtering out all other events and displays only the events with the selected severity. The filter is cleared by clicking the icon again.</p> <p>The following icons indicate the event assignment status:</p> <ul style="list-style-type: none">  — Event assigned to logged-on user  — Event assigned to one of the groups that the logged-on user is a member of.  — Events assigned to other users  — Event assignment not known <p>Depending on the settings selected in the active filter, some items are displayed with a value of 0, for example, because they are excluded by a filter.</p>

UI Element (A-Z)	Description
Launch > Custom Actions	Opens the Custom Actions menu from which you can select a custom action from a list of those configured for the CI type associated with the selected event.
Launch > Run Books	Opens the Run Books menu from which you can select a Run Book from a list of those configured for the CI type associated with the selected event.
Launch > Tool	Opens the Tool menu from which you can select a tool from a list of those configured for the CI type associated with the selected event.
Recalculate Priority	<p>Manually recalculates the priorities for selected events in the Event Browser.</p> <p>If the Business Criticality was changed for one or more CIs related to events in the Event Browser, a recalculation assigns new priority values for these events.</p>
Show > Application Summary Report	If available, the Application Summary report is displayed for the selected event created by BPM.
Show > BPM Performance Analysis Report	If available, the BPM Performance Analysis report is displayed for the selected event created by BPM.
Show > BPM Triage Report	If available, the BPM Triage report is displayed for the selected event created by BPM.
Show > Business Service Impact for Related CI	Opens a new window and displays the Business Service Impact for CI associated with the selected event.
Show > Changes for Related CI	<p>Displays information about the most recent changes to the CI related to the selected event.</p> <p>Data can also be displayed for the child CIs which have an Impact relationship with the selected CI. If you clear the Show data for child CIs check box, data is only shown for the selected CI.</p> <p>By default, actual changes and incidents are shown for the past week. The requests for change area shows the changes planned during the previous week, and those that are planned for the coming week.</p>

UI Element (A-Z)	Description
Show > Closed Events (related CI)	<p>Displays the Closed Events Browser with closed events that are associated with the CI related to the selected event.</p> <p>Click the Hide Closed Events  button to return to the Event Browser.</p>
Show > Event Details	<p>Opens the event details for an event in a pop-up window and displays all available information about the event.</p>
Show > Event in Source Manager	<p>Opens the event in the source manager user interface connected using the Integration Adapter.</p>
Show > External Details	<p>Opens the event in the external application that is responsible for managing the event.</p>
Show > Filtered Browser (Node)	<p>Displays only events that concern the Node CI to which the selected event is related.</p>
Show > Filtered Browser (Related CI)	<p>Displays events that concern the selected configuration item only.</p>
Show > Performance Graphs (CI)	<p>Opens a new window and displays the performance graphs that are available for the selected CI.</p>
Show > Performance Graphs (Neighborhood)	<p>Opens a new window and displays the performance graphs that are available for the selected node or event.</p>
Show > RUM Event Summary Report	<p>If available, the RUM Event Summary report is displayed for the selected event created by RUM.</p>
Show > RUM Performance Analysis Report	<p>If available, the RUM Performance Analysis report is displayed for the selected event created by RUM.</p>
Show > RUM Triage Report	<p>If available, the RUM Triage report is displayed for the selected event created by RUM.</p>
Show > Source Manager Policies	<p>Opens the event in the Policy Management Integration Adapter user interface.</p>

UI Element (A-Z)	Description
Show > Related Events	Opens the Related Events tab of the Event Details dialog box which indicates the relationship of the selected event to other events. The information displayed is the same as that available in the event details pane.
Transfer Control to	Forwards the selected event to a configured external manager application. Used when the operator is not able to solve the problem and needs to escalate the issue, for example, create a Service Manager incident. The external manager can be configured to return an incident ID to Operations Management as external information.

Event Browser Context Menus

Most actions are also available from context menus, which provide quick and direct access to information about selected elements and actions that you can perform on them.

You open a context menu by right-clicking a user interface element. The information available and the actions that are possible from a context menu depend on the element and the context in which it exists.

To access	Select Applications > Operations Management > Event Perspective > right-click an event.
Important information	Some options and tools displayed in context menus require you to be logged on as a user with the authorization to start the selected tool.
Relevant tasks	For more information about the actions that are available in context menus and tooltips displayed in the Event Browser page, see the Event Browser graphical user interface descriptions in "Event Browser Icons, Buttons, and Context Menus" on page 71.

Event Browser Labels

The following table lists the elements that are included in the Event Browser pane. For a short explanation of the action performed by a button in the Event Browser, check the tooltip.

UI Element (A-Z)	Description
A-Automatic Action	<p>Indicates if an automatic action is attached to the event and describes its status using the following icons:</p> <ul style="list-style-type: none">  — Not run automatic action available for event  — Automatic action is running  — Automatic action executed successfully  — Automatic action failed to execute successfully
C-Correlation	<p>Indicates if the event has any related events that are hidden as a result of a correlation. The following icons indicate the event's position in a chain of events:</p> <ul style="list-style-type: none">  — Event is a <i>cause</i> in a correlation  — Event is a <i>cause</i> in one correlation and a <i>symptom</i> in another  — Event is a <i>symptom</i> in a correlation <p>For details about correlated events, see "Related Events Tab" on page 96.</p>
D-Duplicate Count	<p>Indicates how many duplicate events exist (for example, 2 or 3).</p>
I-Instructions	<p>Indicates if the event contains any Instructions. Operators working with the HPOM message browser can see additional instructions, when available, for this message. It is equally helpful for Operations Management operators to be able to access this information when using HPOM servers to forward events to Operations Management. This information is displayed in the Instructions tab of the Event Browser.</p>

UI Element (A-Z)	Description
N-Annotations	<p>Indicates if the event contains any annotations. Annotations are comments or observations relating to the associated (or a similar) event. The following icons indicate the presence of annotations:</p> <p> — Event has annotations</p> <p>For more information about annotations, see "Annotations Tab" on page 92.</p>
T-Control Transferred	<p>Indicates if the responsibility for the associated event was transferred to an external manager.</p>
U-User Action	<p>Indicates if a user action is attached to the event and describes its status using the following icons:</p> <p> — Not run user action available for event</p> <p> — User action is running</p> <p> — User action executed successfully</p> <p> — User action failed to execute successfully</p>
Application	<p>Application that caused the event to occur.</p>
(Assigned) Group	<p>Name of the group to which the selected event is assigned.</p>
(Assigned) User	<p>Name of the network user who is responsible for solving the event's underlying problem. For example, if the event is owned by an Operations Management user, the user name is displayed. If the event is owned by an HPOM user, the user name is displayed with the prefix OM:, for example, OM:Database Operator.</p>
Category	<p>Name of the logical group to which the event belongs (for example, Database, Security, or Network). An event category is similar in concept to a message group in HPOM.</p>
CI Hint	<p>Information that helps to resolve the related CI, for example, Service name in HPOM event.</p>
CI Type	<p>Configuration item type associated with the event.</p>
Core ID	<p>Host system where the event occurred.</p>

UI Element (A-Z)	Description
Description	Optional information about the event in addition to the event's original title and the text captured from the event source.
Event Type Indicator (ETI)	<p>Display name of the event type indicator (ETI) reported by the selected event and the current value, (for example, Web application state: Slow).</p> <p>WebAppState is the name of the event type indicator. The corresponding label is Web application state, which is shown in the General tab. The level of the current ETI value is Slow.</p> <p>If event type indicators are assigned (see the Source Info tab) but are not being resolved (event type indicator field in General tab is empty), the configuration must be corrected.</p>
External ID	ID of the event assigned by the external manager.
ID	ID of the event. Same as the ID of the message in HPOM if it is forwarded to Operations Management.
(Lifecycle) State	<p>Point in the event lifecycle that the selected event has reached:</p> <ul style="list-style-type: none">  — Open  — In Progress  — Resolved  — Closed <p>To change an event's lifecycle status, select the event, and select one of the status buttons above the event list or use the context menu options. User authorizations control the permissions to change lifecycle states.</p>
Node Hint	<p>Information used to identify node CI. For example, the hostname in HPOM used to find host in the RTSM:</p> <ul style="list-style-type: none"> ➤ DNS name of the originating server. ➤ Node ID of the originating server.
Object	Device such as a computer, printer, or modem.

UI Element (A-Z)	Description
Originating Server	Management server that initially forwarded the original event along the chain of servers configured in a flexible management environment.
Owned in HP OM	Indicates whether the event is owned by a user in HPOM (Y). If the event is owned by an HPOM user, the user name is displayed with the prefix OM:, for example, OM:Database Operator in the User field (Event Browser and General tab).
Priority	Priority assigned to the selected event (for example, Low, Medium, or High).
Received during Downtime	Event received from a CI during a time period when the CI was in downtime (scheduled to not be available).
Related CI	Name of the impaired configuration item where the event occurred. If the Related CI includes a subcomponent, it is displayed as follows: Related CI: Subcomponent. For example, Server1: CPU1.
Sending Server	Last server in the HPOM flexible management chain that forwarded the event to Operations Management.
Severity (Sev)	Severity assigned to the selected event. Usually, this is the same as the severity status of the original event received from HPOM. The following icons indicate event severity status:  — Critical  — Major  — Minor  — Warning  — Normal  — Unknown
Solution	Text field used to document solutions to help operators solve the problem indicated by the event.
Source CI	Node where the monitoring agent or probe is running that generated the selected event.

UI Element (A-Z)	Description
Source CI Hint	Information used to identify the source CI.
Subcategory	Name of the logical subgroup (category) to which the event belongs (for example, Oracle (database), Accounts (security), or Routers (network)).
Time Created	Date and time when the event was created.
Time Lifecycle State Changed	Date and time when the last lifecycle state change took place.
Time Received	Date and time when the event was received.
Title	Brief summary of the event.
Type	Type of message in HPOM. String used to organize different types of events within an event category or subcategory.

General Tab

The General tab in the Event Details pane displays detailed information about the selected event including its origin, the time at which it was created, and who is responsible for resolving the problem to which it relates. The values for Severity, Lifecycle State, Priority, Assigned Group, and Assigned User can be changed using the associated lists.

Note: If a field is empty, no information exists for the selected item.

To access	Select Applications > Operations Management > Event Perspective and select the General tab.
See also	For more information about the Event Browser, see "Event Browser and the Event Perspective" on page 26.

The following table lists the elements that are included in the General tab of the Event Browser.

UI Element (A-Z)	Description
	Save: Saves the changed values.
	Undo changes: Discards the changed values.
Assigned Group	Name of the group to which the selected event's assigned user belongs.
Assigned User	Name of the user who is responsible for solving the event's underlying problem. For example, if the event is owned by an Operations Management user, the user name is displayed. If the event is owned by an HPOM user, the user name is displayed with the prefix OM:, for example, OM:Database Operator.
Category	Name of the logical group to which the event belongs, (for example, Database, Security, or Network). The event category is similar in concept to the HPOM message group.
Control Transferred	Indicates if the responsibility for the associated event is escalated to a higher-level manager.
Duplicate Count	Number of duplicate events associated with the selected event.
Event Type Indicator	<p>Display name of the event type indicator (ETI) used to calculate the status reported by the selected event and the current value, (for example, Web application state:Slow).</p> <p>WebAppState is the name of the event type indicator. The corresponding label is Web application state, which is shown in the General tab. The level of the current ETI value is Slow.</p> <p>If event type indicators are assigned (see the Source Info tab) but are not being resolved (event type indicator field in General tab is empty), the configuration must be corrected.</p>

UI Element (A-Z)	Description
ID	ID of the selected event. The event reports an event that occurred in the operational environment.
Lifecycle State	<p>Point in the event lifecycle that the selected event has reached:</p> <ul style="list-style-type: none">  — Open  — In Progress  — Resolved  — Closed <p>To change an event’s lifecycle status, select a lifecycle state from the list and click Save. User authorizations control the permissions to change lifecycle states.</p> <p>The following list shows correlation between the state used in the incoming message and the state used in Operations Management:</p> <ul style="list-style-type: none"> ▶ Message = acknowledged; Lifecycle state = Resolved ▶ Message = owned; Lifecycle state = In Progress ▶ Message = neither acknowledged nor owned; Lifecycle state = Open
Node	<p>Host system where the event occurred. The link opens the CI properties in a pop up window.</p> <p>The link opens the CI Properties dialog box of the CI.</p>
Priority	<p>The priority assigned to the selected event (for example, for example, Low, Medium, or High).</p> <p>To change an event’s priority, select a priority from the list and click Save.</p>
Related CI	<p>Name of the impaired configuration item where the event occurred. The link opens the CI properties in a pop up window.</p> <p>If the Related CI includes a subcomponent, it is displayed as follows: Related CI[additional info]: Subcomponent. For example, Server1[Windows]: CPU1.</p> <p>The link opens the CI Properties dialog box of the CI.</p>

UI Element (A-Z)	Description
Severity	Severity assigned to the selected event. Usually, this is the same as the severity status of the original event received from Operations Management. The following icons indicate event severity status: <ul style="list-style-type: none">  — Critical  — Major  — Minor  — Warning  — Normal  — Unknown (Cannot change severity to Unknown).
Source CI	Host system where the monitoring agent or probe is running that generated the selected event. The link opens the CI Properties dialog box of the CI.
Subcategory	Name of the logical subgroup (category) to which the event belongs (for example, Oracle (database), Accounts (security), or Routers (network)).
Time Created	Date and time when the selected event was created.
Time State Changed	Date and time when the last lifecycle state change took place.
Time Received	Date and time when the selected event was received.
Title	Brief description of the nature of the selected event.
Type	String used to organize different types of events within an event category or subcategory (for example, users or applications, accounts, and security).

Additional Info Tab

The Additional Info tab in the Event Details pane displays more detailed information about the attributes of the selected event.

To access	Select Applications > Operations Management > Event Perspective and select the Additional Info tab.
See also	For more information about the Event Browser, see "Event Browser and the Event Perspective" on page 26.

The following table lists the elements that are included in the Additional Info tab.

UI Element (A-Z)	Description
	Save: Saves the changed values.
	Undo changes: Discards the changed values.
Application	Application that caused the event to occur. Unlike the Related CI attribute in Operations Management, which is a direct relationship to a CI in the RTSM, the application attribute is a simple string-type attributes from HPOM. Examples of Application attributes are Oracle, and OS.
Close Events with Key	String used to automatically acknowledge duplicate events.
Description	Optional information about the original event in addition to the event's original title and the text captured from the event source.
Key	Key associated with the original HPOM event. It is an identifier used to identify the message policy. Used for duplicates and for Close Events with Key.

UI Element (A-Z)	Description
Object	Device such as a computer, printer, or modem. Unlike the Related CI attribute in Operations Management, which is a direct relationship to a CI in the RTSM, the object attribute is a simple string-type attribute from HPOM. Examples of Object attributes include orainst, C:, /dev/spool.
Received during Downtime	Indicates whether an event was received from a CI during a time period when the CI was in downtime (scheduled to not be available).
Solution	Text field used to document solutions to help operators solve the problem indicated by the event.
Suppress Deduplication	Indicates whether deduplication is inactive. Stops automatic discarding of new events that are duplicates of the selected event. Attributes can be set to suppress deduplication of events. For details, see "Duplicate Events Suppression Settings" on page 695.

Source Info Tab

The Source Info tab of the Event Details pane displays an overview of the information available about the source of the selected event.

To access	Select Applications > Operations Management > Event Perspective and select the Source Info tab.
See also	For more information about the Event Browser, see "Event Browser and the Event Perspective" on page 26.

The following table lists the elements that are included in the Source Info tab.

UI Element (A-Z)	Description
Match Information	Displays details of the policy that the event matched: <ul style="list-style-type: none"> ➤ Policy Name ➤ Policy Type ➤ Condition
Original Event	Displays details of the original event: <ul style="list-style-type: none"> ➤ Original ID — Unique ID assigned to the original HPOM message by the message policy that generated the message. ➤ Original Data — Original event text as captured from HPOM agents before being formatted into an HPOM message. Contains information about the original input before being normalized by HPOM agent policies into a message. Typically, the information available includes node name, message group, application, object, severity, and message text.
Originating Server	Management server that forwarded the original HPOM event along the chain of servers configured in a flexible management environment: <ul style="list-style-type: none"> ➤ DNS Name of the forwarding management server ➤ IP Address of the forwarding management server
Sending Server	Last server in the HPOM flexible management chain that forwarded the event to Operations Management: <ul style="list-style-type: none"> ➤ DNS Name of the last HPOM management server ➤ IP Address of the HPOM management server

Actions Tab

Events from HPOM received by Operations Management may contain event-related actions. The Actions tab in the Event Details pane displays these actions available for an event. There are two types of possible actions: user actions and automatic action.

Click the Start button to run an action. The Stop button stops a running action from completing.

To access	Select Applications > Operations Management > Event Perspective and select the Actions tab.
Relevant tasks	To run actions, see "How to Run an HPOM Action" on page 62 and "How to Launch a Custom Action" on page 63.
See also	For more information about the Event Browser, see "Event Browser and the Event Perspective" on page 26.

The following table lists the elements that are included in the Actions tab.

UI Element (A-Z)	Description
Action	Action specification summary.
Node	Target system where the action can be run.
Start	Starts the action on the CI associated with the selected event.
State	Describes the status of the available action. The following states are used:  — Available  — Running  — Succeeded  — Failed
Stop	Stops the current action.

Annotations Tab

The Annotations tab in the Event Details pane displays a list of the annotations attached to the selected event. Annotations are comments and observations relating to the event that help the event owner understand what the underlying problems are and how to fix them. Click the Add button to add an annotation to the selected event.

Note: Annotations exceeding 100 000 characters are truncated and it is not possible to save annotation longer than 100 000 characters.

To access	Select Applications > Operations Management > Event Perspective and select the Annotations tab.
Relevant tasks	To add annotations, see "How to Add Annotations to an Event" on page 60.
See also	For more information about the Event Browser, see "Event Browser and the Event Perspective" on page 26.

The following table lists the elements that are included in the Annotations tab of the Event details pane.

UI Element (A-Z)	Description
	Opens the Add Annotation dialog box. You can add annotation text in the Text field. Click OK to save the annotation.
	Opens the Modify Annotation dialog box. You can edit the annotation text in the Text field. Click OK to save the annotation.
	Opens the Delete Annotation dialog box. Click Yes to delete the annotation.
Text	Content text of the annotation.

UI Element (A-Z)	Description
Time Created	Date and time when the selected annotation was added to the event.
User	Name of the user who added the selected annotation to the event.

Custom Attributes Tab

The Custom Attribute tab in the Event Details pane displays a list of the attributes that either an administrator or the responsible user manually configured and added to the selected event. Click the Add button to configure a custom attribute and add it to the selected event.

Note: To add or modify custom attributes, you must be logged on as a user with permissions to add, update, and delete custom attributes.

Note: Policies configured in HP Operations Manager can set trouble ticket and notification flags. If these flags are set, the following custom attributes in Operations Management are generated:

- ForwardToTroubleTicket (value= true)
- NotifyUser (value= true)

Using appropriately configured event filters, events including these custom attributes with value of true can be automatically forwarded to an external manager using Forwarding Rules or notifications sent using Notification Rules.

To access	Select Applications > Operations Management > Event Perspective and select the Custom Attributes tab.
Relevant tasks	To add custom attributes, see "How to Add Custom Attributes to an Event" on page 60.
See also	For more information about the Event Browser, see "Event Browser and the Event Perspective" on page 26.

The following table lists the elements that are included in the Custom Attributes of the Event Details tab.

UI Element (A-Z)	Description
	Opens the Add Custom Attribute dialog box. You can add a name and value for the custom attribute. Click OK to save the custom attribute.
	Opens the Modify Custom Attribute dialog box. You can edit the custom attribute. Click OK to save the custom attribute.
	Opens the Delete Custom Attribute dialog box. Click Yes to delete the custom attribute.

UI Element (A-Z)	Description
Name	Name of the selected custom attribute defined for the selected event.
Value	Value assigned to the selected custom attribute.

Related Events Tab

The Related Events tab in the Event Details pane displays an overview of all the events that are related to the event selected in the Event Browser. The way the events are displayed indicates if the event is considered as a symptom or a cause in the correlation process. The event displayed in bold type in the Related Events tab is the event that is selected in the Event Browser pane.

To access	Select Applications > Operations Management > Event Perspective and select the Related Events tab.
Important information	A plus sign (+) icon in the event text column indicates the presence of correlated events, which the related events tab does not by default display. Use the plus sign (+) or minus sign (-) icons to display or hide correlated events.
Relevant tasks	To to relate events manually, see "How to Relate Events Manually" on page 54.
See also	For more information about the Event Browser, see "Event Browser and the Event Perspective" on page 26. For information about correlating events, see "Correlation Rules" on page 367.

The following table lists the elements that are included in the Related Events tab of the Event Details pane. Unlabeled elements are shown in angle brackets (<>).

UI Element (A-Z)	Description
	Removes the relationship between events. Useful if you think that Operations Management correlated the selected event by mistake. The Unrelate action has no effect on the correlation rule that initially established the event relation. If you want to avoid relating the events in future, modify the associated correlation rule.
<Severity>	Severity assigned to the related event. Usually, this is the same as the severity status of the original event received from HPOM. Tip: For a short explanation of the icons used to indicate event severity, check the tooltip.
Assigned User	Name of the user who is responsible for solving the related event's underlying problem.
Correlation Rule	Link to the correlation rule used to create the relationship.
Related CI	Name of the impaired configuration item where the event occurred.
State	Point in the event lifecycle that the related event has reached (for example, Open, In Progress, or Resolved).
Time Received	Date and time when the original message associated with the related event was received from Operations Management.
Title	Text of the message sent from Operations Management. Click the plus sign (+) or minus sign (-) icons to expand or collapse any correlated messages. Bold text indicates the message that is selected in the Event Browser.

History Tab

Event history is a log of information about who or which component has changed values of an Operations Management event. This feature enables an operator to see how event attribute values changed during the life of an event, for example, the sequence of severity changes. Event history information is available in a separate tab in the Event Details pane and can be viewed by any user with access to that event.

To access	Select Applications > Operations Management > Event Perspective and select the History tab.
See also	For more information about the Event Browser, see "Event Browser and the Event Perspective" on page 26.

The following table lists the elements that are included in the History tab of the Event Details pane.

UI Element (A-Z)	Description
<Search field>	Text field used to search for strings within event history. The  button clears the search string and displays all history information.
Actions	Descriptions of the changes made to the event.
Modification Time	Date and time when the associated change was made to the event.
Modified By	User who made the associated change to the event.

Resolver Hints Tab

The Resolver Hints tab displays the information used to identify the node and CI associated with an event.

To access	Select Applications > Operations Management > Event Perspective and select the Resolver Hints tab.
Important information	A plus sign (+) icon in the event text column indicates the presence of correlated events, which the related events tab does not by default display. Use the plus sign (+) or minus sign (-) icons to display or hide correlated events.
Relevant tasks	To configure CI Resolution, see: <ul style="list-style-type: none"> ➤ "How to Configure CI Resolution Cache Usage" on page 599 ➤ "How to Limit the Number of CIs Used by CI Resolution" on page 602 ➤ "How to Modify TQLs Used by CI Resolution" on page 603
See also	For more information about the Event Browser, see "Event Browser and the Event Perspective" on page 26. For information about CI Resolution, see "CI Resolution" on page 579.

The following table lists the elements that are included in the Resolver Hints tab of the Event Details pane.

UI Element (A-Z)	Description
ETI Resolution	<p>ETI Resolution Hint: Original string provided by the external manager, for example, in a custom message attribute from HPOM. Can be used to associate the event with an ETI.</p> <p>You must set an attribute in the event which can be mapped to this indicator. To do this, set a custom message attribute called <code>EventTypeIndicator</code> in the HPOM policy. Specify a namespace for the CMA that matches the Name of the indicator, for example, <code>CPULoad</code>. Specify an instance that matches an indicator state, for example, <code>High</code>. When an event with an <code>EventTypeIndicator</code> CMA value of <code>CPULoad:High</code> is received, and ETI and values exist, the event attribute <code>Event Type Indicator</code> is set.</p>
Node	<p>Information used to identify the host system in the RTSM associated with the selected event:</p> <ul style="list-style-type: none"> ➤ Node Hint: Hostname used to find a node in the RTSM ➤ DNS Name: DNS name of the originating system ➤ IP Address: IP address of the originating system ➤ Core ID: ID of the originating system
Related CI	<p>Name of the impaired configuration item where the event occurred.</p> <ul style="list-style-type: none"> ➤ Related CI Hint: Event information used to identify the CI related to the event ➤ HPOM Service ID: Service ID used to identify the service related to the event

UI Element (A-Z)	Description
Related CI Resolution Info	<p>Information associated with the selected event:</p> <ul style="list-style-type: none"> ▶ Matched Hints Count: Number of identified hints that matched the selected CI in the RTSM database. This value is presented as a proportion of the number of available identifiers extracted from the event. The available identifiers are displayed in the following sections of the Resolver Hints tab: <ul style="list-style-type: none"> ▶ Related CI Hint — includes colon-separated list of CI hints and must include the host identifier. ▶ HPOM Service ID — Service ID, in conjunction with object and application, used to identify the service related to the event. ▶ ETI Hint — Used to identify the ETI for each CI. If ETI Resolution is successful, the ETI is assumed to be assigned to the CI, and this CI is given a higher match rating. ▶ Status: Provides information about the matches used for related CI resolution. <p>Displays information about the match:</p> <ul style="list-style-type: none"> ▶ Success — Confirms a successful match and displays the hint used. ▶ Unsuccessful CI resolution — Displays the hint that could not be resolved or indicates that no hint was available to assess. confirms that a match was not possible and indicates the action taken, for example, <i>Fallback to host</i>.
Source CI	<p>Information used to identify the CI in the RTSM that is the source of the event associated with the selected event:</p> <p>Source CI Hint: Description of an Operations Management event attribute used to find the CI in the RTSM</p>

Instructions Tab

The Instructions tab in the Event Details pane displays instruction information from HPOM designed to help operators handle the associated event.

Operators working with the HPOM message browser can see additional instructions for this message. It is equally helpful for Operations Management operators to be able to access this information when using HPOM servers to forward events to Operations Management. This information is displayed in the Instructions tab of the Event Browser.

HPOM instructions are not contained within the event but are dynamically retrieved either from the corresponding policy or an external instruction provider when you select the Instructions tab.

To access	Select Applications > Operations Management > Event Perspective and select the Instructions tab.
Important information	The originating server must be specified as a connected server. For details, see "Connecting Servers" on page 407.
See also	For more information about the Event Browser, see "Event Browser and the Event Perspective" on page 26.

The following table lists the elements that are included in the Instructions Text tab of the Event Details pane.

UI Element	Description
Instructions	Instruction text available from the original event from HPOM.

External Info Tab

The External Info tab is available for events for which ownership was transferred to an external manager, for example, HP Service Manager. The information displayed in this tab is dynamically loaded from the external manager when the tab is opened. To load the latest information available from the external manager, click the  button in the External Info tab.

To access	Select Applications > Operations Management > Event Perspective and select the External Info tab.
See also	For more information about the Event Browser, see "Event Browser and the Event Perspective" on page 26.

The following table lists the elements that are included in the External Info tab of the Event Details pane.

UI Element (A-Z)	Description
	Refreshes the contents of the External Info tab.
	Opens the event in the external application that is responsible for managing the event.
	Deletes the transfer of control request for a pending transfer of control request. If the transfer request is complete, a cancel is no longer possible and the Cancel Transfer of Control is disabled.
Assigned Group	Group assigned to the event by the external manager.
Assigned User	User assigned to the event by the external manager.
External ID	ID assigned to the event by the external manager.
External Server	Node on which the external manager is hosted.
Lifecycle State	Lifecycle state assigned to the event by the external manager.
Priority	Priority assigned to the event by the external manager.

UI Element (A-Z)	Description
Severity	Severity assigned to the event by the external manager.
Transfer Status	Status of the Transfer Control request. The possible states are: <ul style="list-style-type: none"> ▶ Cancel Requested — For a transfer control request that is still in the queue for processing, a request was made to cancel the transfer of control. ▶ Forwarded — Control of the selected event was transferred to the selected external server. ▶ Queued — Request to transfer control of the selected event is in the queue for processing.

Browser Options Dialog Box

The Browser Options dialog box is used to configure the Event Browser to display only the details that you are interested in and to set other browser behavior. For example, you can add and remove columns, customize additional tabs, configure filters to change and improve the way in which data displays, and play a sound on receipt of an event.

All changes you make to the Event Browser layout are automatically saved to your user account. The next time you log on, the Event Browser displays the latest events in accordance with the way you configured the Event Browser. For example, the last selected view is selected and reopened.

Alternatively, to select the default columns for display in the Event Browser, select **Reset**.

To access	Select Applications > Operations Management > Event Perspective and click the Browser Options  button.
Relevant tasks	To configure the Event Browser, see "How to Configure the Event Browser" on page 51.
See also	For more information about the Event Browser, see "Event Browser and the Event Perspective" on page 26.

The following table lists the elements that are included in the Browser Options dialog box.

UI Element (A-Z)	Description
Columns	
	Adds columns to the Display these columns list.
	Removes columns from the Display these columns list.
	Used to move the selected column items down in the list of columns to be displayed. Items at the top of the list appear on the left side of the Event Browser.
	Used to move the selected column items up in the list of columns to be displayed. Items at the bottom of the list appear on the right side of the Event Browser.
Available columns	Information columns available but not selected for display in the Event Browser.
Display these columns	Information columns selected for display in the Event Browser.
Other	
Play sound notification for new events	Enables sound notification for new events. Overrides the global Sound Notification for New Events setting in the Operations Management Settings Manager.
Reset to defaults	Selects the default columns for display in the Event Browser.

Closed Events Browser Configuration Dialog Box

The Closed Events Browser Configuration dialog box contains the time periods that you can apply to view the history of closed events.

To access	Select Applications > Operations Management > Event Perspective > Right-click the event for which you want to see the event history and select Show > Closed Events (Related CI) from the context menu.
Relevant tasks	To view closed events, see "How to View the Closed Event History of a CI" on page 66.

The Closed Events Browser Configuration dialog box displays the UI elements listed in the following table.

UI Element (A-Z)	Description
<Date Range>	Sets the filter to display events within the selected predefined time period. The available choices are: <ul style="list-style-type: none"> ▶ Last hour ▶ Last 24 hours ▶ Last 3 days ▶ Last 7 days ▶ Last 14 days
Apply	Applies the custom time range.
Cancel	Closes the Closed Events Browser Configuration dialog box without opening the Closed Events Browser.
End Time	Sets a specific date and time to which point closed events should be selected.
Number of events in the selected range	Indicates the number of closed events to be displayed for the specified time range. If no closed events can be found, it is not possible to display the Closed Events browser. If too many events are available, reduce the time period in an attempt to focus in more closely on the problem area.

UI Element (A-Z)	Description
OK	Opens the Closed Events Browser using the time range specified in the Closed Events Browser Configuration dialog box.
Select a custom range	Enables the custom time range fields.
Start Time	Sets a specific date and time from which point closed events should be selected.

Relate Events Dialog Box

The Relate Events dialog box displays the selected events to be related.

To access	Select Applications > Operations Management > Event Perspective . In the Event Browser, select the events that you want to relate and right-click one of these events and select Relate Events from the context menu.
Relevant tasks	If you want to create a correlation rule to relate similar future events, select Open correlation rule wizard and specify the cause event. For details, see "How to Create Correlation Rules from Manually-Related Events" on page 56.
See also	For more information about correlating event, see "Correlation Rules" on page 367.

The Relate Events dialog box displays the UI elements listed in the following table.

UI Element (A-Z)	Description
C-Correlation	<p>Indicates if the event has any related events that are hidden as a result of a correlation rule. The following icons indicate the event's position in a chain of events:</p> <ul style="list-style-type: none">  — Event is a <i>cause</i> in a correlation rule   — Event is a <i>cause</i> in one correlation rule and a <i>symptom</i> in another   — Event is a <i>symptom</i> in a correlation rule <p>For details about correlated events, see "Related Events Tab" on page 96.</p>
Event Type Indicator (ETI)	<p>Display name of the event type indicator (ETI) used to calculate the status reported by the selected event and the current value, (for example, Web application state: Slow).</p> <p>WebAppState is the name of the event type indicator. The corresponding label is Web application state, which is shown in the General tab. The level of the current ETI value is Slow.</p> <p>If event type indicators are assigned (see the Source Info tab) but are not being resolved (event type indicator field in General tab is empty), the configuration must be corrected.</p>
Related CI	Name of the impaired configuration item where the event occurred.

UI Element (A-Z)	Description
Severity	Severity assigned to the selected event. Usually, this is the same as the severity status of the original event received from Operations Management. The following icons indicate event severity status:  — Critical  — Major  — Minor  — Warning  — Normal  — Unknown
Time Received	Date and time when the event was received.
Title	Brief summary of the event.

Correlation Rule Generator Dialog Box

The Correlation Rule Generator dialog box contains the Select Events/Select Rules, Rule Properties and the Rule Details pages that you use to create a correlation rule or enhance an existing correlation rule.

To access	Select Applications > Operations Management > Event Perspective . In the Event Browser, select the events that you want to relate and right-click one of these events and select Relate Events from the context menu. Select one of the events as the cause event and then select Open correlation rule wizard .
Relevant tasks	If you want to create a correlation rule to relate similar future events, select Open correlation rule wizard and specify the cause event. For details, see "How to Create Correlation Rules from Manually-Related Events" on page 56.
See also	For more information about correlating event, see "Correlation Rules" on page 367.

Selected Events / Select Rules Page

The Correlation Rule Generator dialog box displays the UI elements listed in the following table.

UI Element (A-Z)	Description
	Use as Cause: Selects the event to be used as the cause event.
	Open Event Details: Opens the event details for the selected event in a pop-up window.
	Select All Events: Selects all events in the Select Events pane.
	Unselect All Event: Clears all events in the Select Events pane.
Create	Enables the creation of a new correlation rule based on the selected events.
CI Type	Configuration item type associated with the event.
Description	Brief description of the correlation rule.
Enhance	If valid, enables the selection of an existing correlation rule to be modified.
Event Title	Title of the selected event.
Include	Enables you to select or clear events from the available list.
Indicator	Indicator associated with the event.
Indicator State	State of the indicator associated with the event.
Name	Internal name of the selected correlation rule. Automatically generated from the Display Name value. The first character must be a letter (A-Z, a-z) or an underscore (_). All other characters can be a letter (A-Z, a-z), a number (0-9), or an underscore (_). Can be manually overwritten. Note: May be disabled for certain locales (for example ja_JP, zh_CN, ko_KR).

UI Element (A-Z)	Description
Selected Events for Creating or Enhancing	Events that you selected to be the symptoms of the cause event on which the correlation rule is based.
Use as Cause	Event that you selected to be the cause event on which the correlation rule is to be based.

Rule Properties Page

The Rule Properties page displays the UI elements listed in the following table.

UI Element (A-Z)	Description
Active	Used to enable or disable the rule during runtime. By default it is disabled.
Description	Brief description of the correlation rule.
Display Name	Display name of the selected correlation rule used in the graphical user interface.
Name	<p>Internal name of the selected correlation rule.</p> <p>Automatically generated from the Display Name value. The first character must be a letter (A-Z, a-z) or an underscore (_). All other characters can be a letter (A-Z, a-z), a number (0-9), or an underscore (_). Can be manually overwritten.</p> <p>Note: May be disabled for certain locales (for example ja_JP, zh_CN, ko_KR).</p>
Time Window	<p>Specifies a specific time period for the selected correlation rule. By default it is not enabled and the global value is used. 0 seconds also mean it is not enabled and the global setting is used.</p> <p>The range is from 0 to 9999 seconds.</p>

Rule Details Page

The Rule Details page displays the UI elements listed in the following table.

UI Element (A-Z)	Description
	Binds one or more symptoms to the cause by taking the shortest path. All other bindings are removed.
	Displays details of the selected CI type, including indicators and values.
Rule Topology Pane	
<Dark Blue background>	Symptom CI type.
<Light Blue background>	Not cause or symptom CI type, but CI type is part of rule topology.
<Orange background>	Cause CI type.
<Pink frame>	Selected CI type.
<No background color>	CI type is not part of the rule.
	Indicates that the configuration item type has an indicator state that is configured as a symptom in the selected correlation rule.
	Indicates that the configuration item type has an indicator state that is configured as a cause in the selected correlation rule.
	Adds the highlighted link (constraint) to the correlation rule. Adding a link enables the path between the linked objects in the context of the correlation rule, which is a requirement for topology-based event correlation. It does not change the RTSM view model in any way.

UI Element (A-Z)	Description
	Removes the highlighted link (constraint) from the correlation rule you are editing. The link between the two objects is no longer recognized in the context of the correlation rule, and any rule that relies on this link no longer works. Removing a link from a correlation rule does not change the RTSM view model in any way.
Layout	Selects alternative ways of viewing the Rule Topology diagram. There are three options to chose from: Hierarchical, Circular, and Concentric Radial.
Levels	Selects the depth of topology levels displayed in the Rule Topology diagram.
Zoom	Controls the size of the displayed Rule Topology diagram.
Symptoms and Causes Pane	
	Delete Item: Deletes the selected indicator from the list of indicators included in the correlation rule as either a symptom or a cause.
CI Type	Name of the configuration item type to which the listed indicator is assigned.
Indicator	Name of the indicator referenced in the selected correlation rule.
Indicator State	Name of the indicator state referenced in the selected correlation rule.
Type	Indicates if the indicator is defined as a symptom or a cause in the selected correlation rule.
Indicators Pane	
	Refreshes the contents of the Indicators list. Use if new indicators becomes available while you are working.
	Group Indicator by Type: Toggles between a list containing all indicators and a list divided into health indicators and event type indicators.

UI Element (A-Z)	Description
	Add as a Cause: Sets the selected indicator state as a cause for the configuration item type selected in the Rule Topology pane.
	Add as a Symptom: Adds the selected indicator state as a symptom for the configuration item type selected in the Rule Topology pane.

Export Event List Dialog Box

The Export Events List dialog box is used to configure the event attributes that you want to export to an external file. For example, you can add and remove columns, and specify the format of the export file.

Alternatively, to select the default columns for display in the Event Browser, select **Reset**.

To access	Select Applications > Operations Management > Event Perspective . In the Event Browser, select the Export Events List  icon.
Relevant tasks	For more information about exporting event data, see "How to Export the Contents of the Event Browser" on page 53.

The following table lists the elements that are included in the Export Events List dialog box.

UI Element (A-Z)	Description
	Adds columns to the Export these columns list.
	Adds all columns to the Export these columns list.
	Removes columns from the Export these columns list.

UI Element (A-Z)	Description
	Removes all columns from the Display these columns list.
	Used to move the selected column items down in the list of columns to be exported. Items at the top of the list appear on the left side of the exported list.
	Used to move the selected column items up in the list of columns to be exported. Items at the bottom of the list appear on the right side of the exported list.
Available columns	Information columns available but not selected for export.
Export these columns	Information columns selected for export.
File format	List for selecting the format of the export file. The supported formats are: <ul style="list-style-type: none"> ➤ Comma-separated values (.csv) ➤ Microsoft Excel 2007 Workbook (.xlsx) ➤ Microsoft Excel 97-2003 Workbook (.xls)
Reset to defaults	Selects the default columns for export.

opr-archive-events Command-Line Interface

This section describes the options and parameters available in the **opr-archive-events** command-line interface. Closed events are not automatically removed from the database. Use the **opr-archive-events** tool to delete closed events from the database and add them to an archive file.

Note: HPOM events are not updated when using the **opr-close-events** tool and the **opr-archive-events** tool to close, delete, and archive events. The events in HPOM remain unaffected.

The opposite is also true when using the **omwmsgutil** (HPOM for Windows) tool and **opcack** and **opchistdown** (HPOM for UNIX) tools to close, delete, and archive events. The events in Operations Management remain unaffected.

All these tool operates directly on their respective databases and the changes do not go through the workflow process, resulting in the loss of synchronization between Operations Management and HPOM.

If you use these tools to close, delete, and archive events from one system (for example, Operations Management), you must make the equivalent changes with the appropriate tools on the other system (for example, HPOM).

The **opr-archive-events** command-line interface is located in:

<HPBSM_Root_Directory>/bin

Default:

Windows: C:\HPBSM\bin

Linux: /opt/HP/BSM/bin

The **opr-archive-events** command accepts the following options:

opr-archive-events

-o *<output path and file name>* **-u** *<date>* [-a][**-force**]
-u *<date>* **-d** [**-force**]
-h

Note: You can combine the options that are given between square brackets. Otherwise, use the rest of the options separately.

For more information about the options recognized by the **opr-archive-events** command, see the following list:

-a,--archiveOnly *<archive file>*

Only archives events without deleting them from the database.

-d,--deleteOnly

Deletes only the events from the database without archiving.

-force

Archive events without asking user for confirmation.

-h,--help

Displays a summary of the command options and exits.

-o,--output *<archive_file>*

Path and name of XML file used to store archived events.

-u,--until *<date>*

Archives the events that were received before the specified time. The time must be specified in one of the following formats:

yyyy.mm.dd-hh:mm:ss
yyyy.mm.dd-hh:mm
yyyy.mm.dd-hh
yyyy.mm.dd

opr-close-events Command-Line Interface

This section describes the options and parameters available in the **opr-close-events** command-line interface.

Note: HPOM events are not updated when using the **opr-close-events** tool and the **opr-archive-events** tool to close, delete, and archive events. The events in HPOM remain unaffected.

The opposite is also true when using the **omwmsgutil** (HPOM for Windows) tool and **opcack** and **opchistdown** (HPOM for UNIX) tools to close, delete, and archive events. The events in Operations Management remain unaffected.

All these tool operates directly on their respective databases and the changes do not go through the workflow process, resulting in the loss of synchronization between Operations Management and HPOM.

If you use these tools to close, delete, and archive events from one system (for example, Operations Management), you must make the equivalent changes with the appropriate tools on the other system (for example, HPOM).

The **opr-close-events** command-line interface is located in:

<HPBSM_Root_Directory>/bin

Default:

Windows: C:\HPBSM\bin

Linux: /opt/HP/BSM/bin

The **opr-close-events** command accepts the following options:

opr-close-events

[-u <date>] [-f <date>] [-s <severity>][-force] [-r]

-all [-force] [-r]

-h

Note: You can combine the options that are given between square brackets. Otherwise, use the rest of the options separately.

For more information about the options recognized by the **opr-archive-events** command, see the following list:

-all

Closes all events.

-f,--from <date>

Closes events (including related events) received after the specified time. This option can be combined with severity and until time. The time must be specified in one of the following formats:

yyyy.mm.dd-hh:mm:ss
yyyy.mm.dd-hh:mm
yyyy.mm.dd-hh
yyyy.mm.dd

-force

Closes events without asking user for confirmation.

-h,--help

Displays a summary of the command options and exits.

-r,--resetHIs

Resets health indicators after closing of events.

-s,--severity <severity>

Closes events of the specified severity. This option can be combined with from time and until time. The severity can be one of the following: NORMAL, WARNING, MINOR, MAJOR, CRITICAL.

-u,--until <*date*>

Closes events received before the specified time. This option can be combined with severity and from time. The time must be specified in one of the following formats:

```
yyyy.mm.dd-hh:mm:ss
yyyy.mm.dd-hh:mm
yyyy.mm.dd-hh
yyyy.mm.dd
```

Troubleshooting and Limitations

This section provides help in troubleshooting problems relating to event management.

- ▶ HPOM for Windows User Names are Truncated When Messages are Forwarded on page 121
- ▶ Correlations are Skipped in High Load Situations on page 121
- ▶ Data Collection Tool opr-checker.bat on page 122

HPOM for Windows User Names are Truncated When Messages are Forwarded

By default HPOM for Windows has the OM for UNIX compatibility mode enabled (true) in the Server-based Flexible Management configuration. This leads to the truncating of the user names.

Change the **OM for UNIX compatibility mode** setting to false in the Server-based Flexible Management namespace in the Generic Server Configuration tab.

Correlations are Skipped in High Load Situations

If a high number of events with ETIs is forwarded to Operations Management over a long period of time (30 minutes or longer), the correlation engine only considers up to the specified number of most recent events. If this limit is exceeded, the oldest events are removed from the queue and no longer considered for correlation.

This limit is set using the Max Waiting Queue Size attribute and is located in:

Infrastructure Settings Manager > Operations Management > Topology-Based Event Correlation Settings

The default value is 5000. The valid range is 100 to 20000.

If you are experiencing this problem, lower the incoming event rate or increase the Max Waiting Queue size limit. If the limit is increased, you should also monitor the memory consumption and, if necessary, increase the memory setting (parameter -Xmx) for the opr-backend process.

Data Collection Tool opr-checker.bat

If you are having problems with your Operations Management installation and need to contact HP Software Support, use the **opr-checker.bat** tool to generate a summary of your installation.

- 1 Run the **opr-checker.bat** tool from the following location and specify a target location for the output file:

```
<HPBSM_Root_Directory>/opr/support/opr-checker.bat -a -xml >  
<TempDir>/opr-checker.xml
```

- 2 Send the resulting XML file to HP Software Support for analysis.

3

Health Perspective

This chapter includes:

Concepts

- ▶ Health Status on page 124
- ▶ Health Top Views on page 125
- ▶ Event Type Indicators on page 127
- ▶ Health Indicators on page 128
- ▶ HI-Based KPI Calculations on page 129

Tasks

- ▶ How to View Event Type Indicators on page 132
- ▶ How to Reset Health Indicators on page 132
- ▶ How to View HI-based Key Performance Indicator Details on page 133
- ▶ How to View HI Details on page 133
- ▶ How to View KPI Business Rule Settings on page 134

Reference

- ▶ Health Perspective User Interface on page 135

Troubleshooting and Limitations on page 140

Concepts

Health Status

The Health Perspective tab is used to display the health of related CIs in the context of events. The event selected in the Event browser determines what is displayed in the Health Top View and the selected CI in the Health Top View determines what is displayed in the Health Indicators pane.

In the Health Perspective tab, the following panes help you understand the health status of an object, show you which business rules and KPIs are being used, and how the health status of the selected object affects the health of related objects:

► **Model Explorer**

Displays a list of all the objects in your monitored environment. For more information, see "Model Explorer" on page 26.

► **Event Browser**

Displays a list of the active events in your environment. For more information, see "Event Browser" on page 27.

► **Health Top View**

Displays a hierarchical overview of the relationships between the different objects that make up the monitored environment and indicates the current health of the displayed objects. For more information, see "Health Top Views" on page 125.

► **Health Indicators**

Displays a list of the KPIs and health indicators for the selected CI, used to calculate health-related information such as availability and performance of the selected configuration item. For more information, see "Health Indicators" on page 128.

► Actions Pane

Display, and execute the tools, HPOM actions and Run Books that can be executed on the selected events in the Event Browser. For details, see "Tools" on page 47, "Operations Manager Actions" on page 49, and "Launching Operations Orchestration Run Books" on page 50.

Health indicators (HI) and key performance indicators (KPI) are used to determine the health of an object. Operations Management calculates how severe the problems directly associated with the selected object are and combines this information with any additional information available about dependent objects. The combined data is passed to calculation rules that evaluate and set the KPIs that indicate the overall health of an object.

The color of an object displayed in the Health Top View is used to indicate its health, and the most critical status of any contributing objects. For example, green can be set to represent normal and red to represent critical. The color used depends on the view settings. Whatever you specify in the view settings contributes to the color of the CI.

Note: The Health Perspective panes display data related to the configuration item associated with the selected event. The Health Top View is designed to help investigate problems that require root cause analysis.

For more information about HIs and KPIs, see "Health Indicators" on page 128 and "HI-Based KPI Calculations" on page 129.

Health Top Views

The Health Top View in the Health Perspective tab shows the related CI from the event in the CI neighborhood of the configured view. The view shows the relationships between the configuration items that represent the monitored objects and indicates their current health status. The Health Top View is designed to help investigate problems that require root cause analysis.

It shows the related CI from the event in the CI neighborhood of the configured view. So there could be sibling CIs, children, and so on.

Note: You can refine the contents of the Health Top View pane by applying an alternative view. If no event is selected in the Event Browser pane, the Health Top View pane remains empty.

You can use the View Mappings manager to map views to individual configuration item types. A list of mapped views appears in the Selected Views list in the Health Top View pane. The contents of the Selected Views list are determined by the configuration item type associated with the event selected in the Event Browser. For more information about view mapping, see "View Mapping" on page 257.

The Health Indicators pane shows you the HIs used to calculate and set the current severity status of the highlighted configuration item in the Health Top View.

For more information about HIs and KPIs, see "Health Indicators" on page 128 and "HI-Based KPI Calculations" on page 129.

Health Top View Displays Guidance Messages

The following guidance information is available in the Health Top View pane:

- ▶ If no event is selected, a message is displayed prompting you to select an event.
- ▶ If an event without any related CI is selected, a message is displayed informing you that there is no CI information.
- ▶ If an event with a related CI but without an associated view mapping is selected, a message is displayed informing you that there is no view mapping. A link to the View Mappings manager where you can configure a suitable view mapping is also provided.

- ▶ If an event with a related CI and with a view mapping is selected, the list of mapped views is shown in the drop-down box and the selected view is shown.

Event Type Indicators

Event type indicators (ETIs) are attributes of Operations Management events used to categorize events according to the type of occurrence in the managed IT environment. An Operations Management event is created as a result of receiving a message from a manager, such as HPOM or Network Node Manager. In HPOM, you can configure events to include the custom attribute `EventTypeIndicator`, which is used to set event type attributes. If the custom attribute is not configured, event type attributes can be set by the applicable mapping rules. If adequate information is not available, no ETI is set.

Any occurrence on the monitored system of a given type causing an Operations Management event must be assigned the same ETI. After defining appropriate correlation rules, events are correlated based on the ETIs. The correlation rules relate types of events that can occur on the CI.

ETIs are characterized by the following:

- ▶ Categorize type of event to abstract multiple event sources.
- ▶ At least one value is required. This value is used to describe the event occurrence in the environment, for example, an ETI could read: `System restart:Occurred`. Usually, you do not need to set any values for such ETIs because, as a convenience, one value is created that is called `Occurred`.
- ▶ Events contain an ETI attribute. ETIs do not exist as instances in their own right.
- ▶ ETIs without a corresponding HI are not shown within the Health Indicators pane.
- ▶ No manual reset necessary. An ETI is just an event attribute.

A configuration item inherits ETI assignments, including HIs, from its parent configuration item type. For example, ETIs assigned to the configuration item type **Database** also apply to the configuration item type **Oracle** and are applied to any Oracle Database configuration items.

Health Indicators

Health indicators (HI) determine and display the health of specified aspects of a monitored CI. An HI is an event-specific monitor that uses one value to represent the normal state of the CI, for example, **System:Running**. One or more additional values are used to represent any abnormal states, such as **System:Stopped**. In this way, health indicators are used to show if a hardware resource is available and responding.

Health indicators can also display the state of a software application. For example, the possible states of a database server could be specified as: **Available**, **Starting** or **Stopping**. Health indicators can also be used to show the usage of a software application, for example, whether the load is **Normal**, **High**, or **Max. Exceeded**.

Only events that provide CI state information can set an HI. Health indicators are assigned to a specific configuration item type through the associated ETI.

Note: Operations Management sets indicators automatically using event attributes or mapping rules.

Mapping rules can be used to match attributes of incoming events to defined health indicator values, such as **Low** or **High**, for a given configuration type. For example, you can define an HI to monitor events related to the CPU load on Unix systems (CI type: **Infrastructure Element > Node > Computer > Unix**). When an event reporting **Low** or **High** CPU load is received, the appropriate health indicator value is set.

HIs provide the data that a KPI needs to calculate the availability and performance of monitored resources. The KPIs use calculation rules to collate the values from multiple health indicators and set a severity level, such as: Critical, Major, Minor, or Normal. For example, a KPI for a database can include multiple health indicators concerning the run state (Up, Down), the cache-hit ratio (0, 50, 00%), the length of query queues (Empty, Full), and response times (#ms) to determine overall health.

For more information about KPIs, see "HI-Based KPI Calculations" on page 129.

HI-Based KPI Calculations

Key performance indicators (KPI) apply calculation rules to the data provided by health indicators to determine the availability and performance of the objects to which the health indicators are assigned. The value that results from the calculation is used to set a severity level, for example, normal, warning, minor, major, or critical.

KPIs related to the selected event are displayed in the Health Indicators pane of the Health Perspective tab. Their color reflects the assigned severity. In the Health Top View, KPIs appear under the monitored object to which they belong.

The color of each KPI reflects the KPI's current severity status. The severity status is determined by a business rule, which specifies how and when severity status propagates up a relationship chain. One resource with a critical problem does not mean that all dependent resources are, by definition, also critical. KPIs can use data from multiple sources to determine the overall affects up and down dependency chains and determine the severity status accordingly.

Note: The type of source determines the importance of the information provided. For example, live data from a monitor running directly on a node is considered more important than data resulting from business rules, which base calculations on KPI relationships and dependencies. This means that KPI states propagated by a business rule may be overridden by live data directly from the CI.

KPIs exist for Operations Management in two high-level areas covering health-based and event-based data. The following KPIs use health-based data:

► **System and Application Performance KPI**

Performance-related data from health indicators can include values for the hit ratio in the database cache, server connection speeds, queue lengths, or database query processing times. This example describes health indicators that are specific to the database configuration item type. Other configuration item types have different health indicators.

► **System and Application Availability KPI**

Availability-related data can include server run states (up, down, starting, stopping) or process activity (refusing, accepting connections, not responding).

There are two additional KPI types that use event data for Unassigned or Unresolved events and are attached by default to every configuration item. Unassigned KPIs concern events with an underlying problem that has not yet been allocated to any user for investigation. Unresolved KPIs concern events with underlying problems that are not yet fixed.

Note: Unassigned, event-based KPIs are, by definition, also unresolved.

If an unassigned or unresolved KPI references data from more than one event, the color of the KPI reflects the severity status set by a business rule. The business rule associated by default with unassigned and unresolved KPIs is the Operations Event Lifecycle Group Rule, which sets the status of the KPI to the highest severity of any events associated with the related configuration item. For example, if a KPI for an unassigned event refers to one critical and four normal events, the KPI appears red to reflect the critical event.

Note: There is no propagation from child CIs.

Tasks

How to View Event Type Indicators

In this task, you learn how to list and view event type indicators (ETI).

To view HIs:

- 1 Open the Indicators manager:

Admin > Operations Management > Design Operations Content > Indicators

or

Select an event in the Event Browser, open the context menu and select:

Configure > Event Type Indicators

- 2 In the CI Types pane, select a CI type.
- 3 In the Indicators pane, select an indicator.

Details of the selected indicator are displayed in the Details pane.

How to Reset Health Indicators

In this task, you learn how to reset an HI. Resetting an HI is a way of returning an object's severity status to a defined default value such as Normal.

Note: Resetting an HI is not usually necessary and should be performed in exceptional circumstances only, for example, when Operations Management does not reset it automatically.

To reset an HI:

- 1 Open the Event Browser from Operations Management:

Applications > Operations Management > <select a perspective>

- 2** In the Event Browser pane, right-click the event you want to close and for which you want to reset the health indicator.
- 3** In the context menu that displays, select **Close and Reset Health Indicator**.

How to View HI-based Key Performance Indicator Details

In this task, you learn how to list and view the details of a KPI. KPIs use the data provided by one or more health indicators to set a severity level (normal, warning, or critical) for the monitored object.

To view details of KPIs:

- 1** Open the Health Perspective tab from Operations Management:
Applications > Operations Management > Health Perspective
- 2** In the Event Browser pane, select the event for which you want to view KPI details.
- 3** In the Health Indicators pane, point to the status icon of the KPI for which you want to display details. Details of the KPI, such as Status, Business Rule name, Held Status Since date, are displayed in a pop up dialog box.

How to View HI Details

In this task, you learn how to list and view health indicator details.

To view the health indicator details:

- 1** Open the Health Perspective tab from Operations Management:
Applications > Operations Management > Health Perspective
- 2** In the Event Browser pane, select the event for which you want to view Health Indicator State details.
- 3** In the Health Indicators pane, point to the state icon, for example , for the health indicator for which you want to display details.

Details of the selected KPI are displayed in a pop-up window. The background color reflects the status of the KPI.

The details include:

- Status of the KPI
- Business Rule applied to the KPI
- Severity of the health indicator
- Message
- Value

How to View KPI Business Rule Settings

In this task, you learn how to find out which business rule Operations Management applies to set the severity of a KPI. KPIs use the data provided by one or more health indicators to set a specific severity level for a monitored object. A KPI business rule specifies how the status of dependent KPIs is combined and the result used in the calculation of a parent KPI's severity.

To view the applied KPI business rule:

- 1** Open the Health Perspective tab from Operations Management:

Applications > Operations Management > Health Perspective

- 2** In the Event Browser pane, select an event.

The CI related to the event and its direct neighborhood CIs are displayed in the Health Top View.

- 3** In the Health Top View pane, point to the object for which you want to view the KPI business rule.

In the pop-up window that opens, check the value of the entry Business Rule to see which business rule was used to set the severity status, for example, Worst Child Rule.

Reference

Health Perspective User Interface

This section describes the health related information displayed in the Health Perspective tab. The information in this sections aims to help you understand how you can use health perspectives to better understand the overall health of your IT environment. In this section, you can find information about the following topics:

- "Health Top View" on page 135
- "Health Indicators Pane" on page 138

For information about the other panes, see "Model Explorer" on page 69 and "Event Browser Overview" on page 69.

Health Top View

The Health Top View pane in the Health Perspective tab displays a topological view of the configuration items affected by the event selected in the Event Browser pane. The view shows the relationships between the configuration items that represent the monitored objects and indicates their current health status. You can also use the Health Top View to see what affects the health of individual objects has on the health of other objects.

To access	Select Applications > Operations Management > Health Perspective
Relevant tasks	For more information about configuring the Health Browser, see "How to View Event Type Indicators" on page 132 and "How to View Event Type Indicators" on page 132.
See also	For more information about the Health Browser, see "Health Status" on page 124 and "Health Top Views" on page 125.

The information displayed in the Health Top View includes the following details:

UI Element (A-Z)	Description
<Selected View>	<p>List of the views mapped to the configuration item type (and any parents) referenced by the event selected in the Event Browser, which contain the CI, and, if configured, filtered by event category.</p> <p>Select the view you want to apply to the contents of the Health Top View pane. A view enables you to refine the type and amount of configuration items displayed. The selected view can also affect the severity status of configuration items, since views can exclude or include additional (related) items which have an affect on the displayed topology.</p> <p>You can map views to configuration item types. For more information about mapping views, see "View Mapping" on page 257.</p>
Last Updated	Date when the Health Top View information was last refreshed.

When you hover the cursor over any configuration item displayed in the Health Top View pane *except* the root configuration item in the tree or any item that is colored grey, Operations Management displays details of the factors that contribute to the status of a configuration item, as described in the following table.

Note: If you set up other monitors, for example, from BPM or Sitescope, you also see other KPIs listed.

UI Element (A-Z)	Description
Business Rule	Business rule used to determine the availability and performance of the selected configuration item.
Class Type	The CI type of the selected CI.
CI Name	Name of the selected configuration item, for example, DB_Server.example.com.
Held status since	Date and time since when the current status was applied to the selected configuration item.
Hidden Child CIs	Indicates that the selected CI has child CIs that are not displayed in the Health Top View.
KPI Name	Display name of the key performance indicator to which the displayed health indicator is assigned, for example, System Availability KPI.
Status	Severity assigned to the selected CI.
Unassigned Events	KPI associated with events that are either not assigned to any user or remain unresolved. The information includes, in addition to the details shown for performance and availability KPIs, the number of duplicate or related (and unassigned) events associated with the selected object. The background color indicates the highest severity of the KPIs associated with the selected object.
Unresolved Events	

For descriptions of the context menu items available in the Health Top View pane, see "Event Browser Icons, Buttons, and Context Menus" on page 71.

Health Indicators Pane

The Health Indicators pane lists the KPIs and health indicators for the configuration item associated with the event you select in the Event Browser. For details, see the *Service Health* online help.

To access	Select Applications > Operations Management > Health Perspective
Relevant tasks	For more information about configuring the Health Indicators, see "How to Reset Health Indicators" on page 132.
See also	For more information about the Health Browser, see "Health Status" on page 124 and "Health Top Views" on page 125.

The Health Indicators pane displays the UI elements listed in the following table. In the table, unlabeled UI elements are shown in angle brackets (<>).

UI Element (A-Z)	Description
<Selected View>	<p>List of the views mapped to the configuration item type (and any parents) referenced by the event selected in the Event Browser, which contain the CI, and, if configured, filtered by event category.</p> <p>Select the view you want to apply to the contents of the Health Top View pane. A view enables you to refine the type and amount of configuration items displayed. The selected view can also affect the severity status of configuration items, since views can exclude or include additional (related) items which have an affect on the displayed topology.</p> <p>You can map views to configuration item types. For more information about mapping views, see "View Mapping" on page 257.</p>
<CI Name>	Name of the selected configuration item, for example, DB_Server.example.com.

UI Element (A-Z)	Description
<CI Type>	Name of the configuration item type to which the configuration item displayed in the Selected CI field belongs.
Health Indicator	Display name of the health indicator used to set the severity of the selected event.
Health Indicators Contributing to KPIs	Lists any health indicators that are associated with the selected CI and are assigned to a KPI.
Health Indicators Not Contributing to KPIs	Lists any health indicators that are associated with the selected CI but are not assigned to any KPI.
KPI	Display name of the key performance indicator to which the displayed health indicator is assigned, for example, Operations Availability KPI.
Last Status Change	Time stamp indicating the last time the current status was updated.
Last Updated	Date when the Health Top View information was last refreshed.
Selected CI	Name of the configuration item to which the displayed health indicator is assigned.
State	<p>Current value set for the health indicator specified in the Name field, for example, Success or Failed. The value is also associated with a severity.</p> <p>An icon reflecting the severity assigned to the selected health indicator value is displayed, for example:</p> <ul style="list-style-type: none">  — Critical  — Warning  — Normal
Trend	<p>Arrows pointing up, down, or up and down to indicate the overall trend of the selected KPI since the last update:</p> <ul style="list-style-type: none">  — Positive  — Negative
Value	Value of the health indicator used to set the severity of the selected event.

Troubleshooting and Limitations

This section provides help in troubleshooting problems relating to health indicators, including listing, viewing, and enabling.

- "Event Browser is Empty" on page 140
- "Health Top View is Empty" on page 140
- "Health Indicators Display Incorrectly" on page 140

Event Browser is Empty

- No events are available
- Incorrect filter is applied
- No connection is available to the Operations Management application

Health Top View is Empty

- No event is selected in the Event Browser
- No view is mapped to the related CI of the selected event
- No CI is related to the selected event
- Java applet did not start or is not running correctly

Health Indicators Display Incorrectly

Health indicators are used to assign a severity to a state, for example, **Critical** severity to the state **Unavailable**. The state and the assignment are indicated in the Health Indicators pane. However, calculation rules for a KPI may use several health indicators to set a new severity level for the object in the Health Top View.

- No event is selected in the Event Browser
- The configuration item highlighted in the Health Top View pane does not have any assigned health indicators
- You selected an event in the Event Browser pane and a different configuration item in the Health Top View pane

4

Performance Graphs

This chapter includes:

Concepts

- ▶ Graphing Overview on page 142
- ▶ Types of Graphs on page 144
- ▶ Overview of Graph Templates on page 146
- ▶ Data Sources on page 147
- ▶ Metrics on page 148

Tasks

- ▶ How to Manage Graphs - Workflow on page 149
- ▶ How to Draw Graphs in MyBSM Workspace on page 150
- ▶ How to Draw Graphs from Operations Management on page 150
- ▶ How to Draw Graphs from the Performance Perspective on page 152
- ▶ How to Design Graphs on page 154
- ▶ How to Edit Graphs on page 154
- ▶ How to Delete Graphs on page 156

Reference

- ▶ Performance Graphs User Interface on page 156

Troubleshooting and Limitations on page 192

Graphing Overview

Graphing enables you to draw graphs and design custom graphs for configuration item types that you are monitoring. You can also compare multiple instances of a resource or an application on one or more configuration items (CIs).

The preformatted graphs and reports help you:

- ▶ Evaluate application and system performance
- ▶ Analyze usage trends
- ▶ Correlate usage
- ▶ Compare application and system performance

The following sections enable you to understand the different graphing functions:

Drawing Graphs

Graphing enables you to draw graphs from pre-defined templates or create your own graphs for a selected CI. You can launch a performance graph from one of the following areas:

- ▶ **MyBSM Page**

You can add performance graphs to MyBSM workspace. To view graphs, drag and drop a graphing component while creating your MyBSM workspace. You can choose to draw predefined graphs using the Performance Graphs component. You can also create ad hoc graphs for a selected CI using the Performance Graphs with Details component. For details, see "How to Draw Graphs in MyBSM Workspace" on page 150.

- ▶ **Performance Perspective Page**

Performance Perspective enables you to draw graphs from templates and also helps you draw ad hoc graphs by selecting required metrics for a selected CI. For details, see "How to Draw Graphs from the Performance Perspective" on page 152.

► **Event Browser Pane**

You can draw graphs from the Event Browser pane using **Show** option from the context menu. You can launch graphs that are available for a selected node, event, or the selected CI. For details, see "How to Draw Graphs from Operations Management" on page 150.

► **Model Explorer**

You can draw graphs for a selected CI from the Model Explorer pane using the available context menu. For details, see "How to Draw Graphs from Operations Management" on page 150.

Designing Graphs

Graphing enables you to design customized graphs using the design wizard. The Design wizard takes you through a series of steps and helps you create different types of graphs. You can design a graph from the following areas:

► **Performance Perspective Page**

Performance Perspective enables you to design a graph by selecting **Configure** from the **Options** menu of a drawn graph window. The Design Wizard window opens. For details, see "How to Edit Graphs" on page 154.

► **Event Browser Pane**

You can draw graphs from the Event Browser pane using **Configure** option from the context menu. The Design Wizard window opens. For details, see "How to Design Graphs" on page 154.

► **Model Explorer**

You can design a graph for a selected CI from the Model Explore pane using the **Configure** option from the context menu. The Design Wizard window opens. For details, see "How to Design Graphs" on page 154.

► **Operations Management Administration**

You can design a new graph template for a selected CI instance using the Performance Graph Designer. For more information on designing a new graph template, see "How to Launch the Performance Graph Designer" on page 306.

Note: For more information, see "Performance Graphs Pane" on page 311.

Managing Graphs

Graphing enables you to perform the following management-related functions.

► Editing Graphs

You can also edit out-of-box graph templates and save them as user-defined templates. For details, see "How to Edit Graphs" on page 154.

► Assigning Graphs

You can assign a graph family to a CI type. For details, see "How to Map CI Types to Graph Families" on page 305.

► Deleting Graphs

You can also delete any graph that you have created. For details, see "How to Delete Graphs" on page 156.

Types of Graphs

While designing or editing a graph, you can select the type of graph. The following list contains the available output types:

► Line

Displays each metric as a line. Only Line Styles are valid for this graph type.

► Bar

Displays vertical bars for each metric.

► Area

Displays each metric as a line with data below the line filled with the same color. All metrics in this graph must have the same unit. This graph is also known as a filled line graph.

► **Mixed**

Displays metrics that can be individually set as a line, area, or bar.

► **Horiz Bar**

Displays horizontal bars for each metric.

► **Pie**

Displays each metric as a portion of a circular pie chart.

► **Gauge**

Displays a single automotive-type dial gauge for each metric.

► **Table**

Displays the data in a table with columns for each metric, and rows for each record.

► **Horiz Table**

Displays a table with columns for each record and rows for each metric.

► **Baseline**

A baseline graph displays the average values for a single metric for a typical week. All available data from the data source is used to generate this baseline. To calculate the baseline for a typical week, you must have more than seven days of data for the selected system. If there is a large volume of historical data, it may take a few minutes to calculate.

Note: You cannot select the graph type as baseline when drawing or editing a graph from the Graph Design Wizard.

A baseline graph is useful in identifying patterns in system and application activities.

When you specify a baseline graph, eight graphs are drawn. The first graph in the series is a **Typical Week** graph that displays the average values of a metric, organized by days of the week, and by hours of the day. In addition, there are seven graphs, one for each day of the week. Each of these displays the expected daily high and low values for the metric as opposed to the actual metric value. In the daily graphs, the blue line indicates the range of the values that are **expected** at any particular hour of that day. The expected values are determined by examining all past data for the system and calculating statistics for every hour of every day of the week. The blue lines typically display the range where 80% of the data points are expected to fall. The red line displays the actual data for each hour of the day.

Overview of Graph Templates

For drawing graphs for the most common scenarios, Operations Management provides a set of standard templates.

A graph template contains information such as:

- ▶ Source of the data
- ▶ Metric or a set of metrics
- ▶ Instances of a metric
- ▶ Type of graph
- ▶ Graph attributes

You can also design your own graph templates or customize an existing template by using the Design Wizard. You cannot save changes made to standard templates, but you can save them as user-defined templates using a different name.

Graphing is organized using a graph family tree, which consists of:

- ▶ **Family**
 - Refers to the group that organizes graphs

► **Category**

Refers to the sub-groups of graphs that are logically grouped within the family

► **Name**

Uniquely identifies a graph definition

Default Graphs

A default graph in a graph family contains the most important metrics to measure the performance of any resource or application. You can map graph families or categories to a CI. When you launch a graph for a CI or an event that has a graph family or category associated with it, the default graph from the graph family or category is drawn. A graph family can have one or more default graphs. If a graph family does not have a default graph, the first graph in the family or category is selected.

You can also configure a graph as a default graph when designing or editing a graph using the Graph Design Wizard. For instructions on designing a graph, see "How to Design Graphs" on page 154.

Note: You cannot launch a default graph for Real-Time Measurement (RTM) data sources. However, you can use the ad hoc graphing function available in the Performance Perspective tab to draw graphs for RTM data sources.

Data Sources

A data source is an agent or an agent component that monitors an entity or an element on which it is deployed. However, HP SiteScope enables data collection without the deployment of an agent.

The data sources continuously collect data about the monitored elements and store it in the data store for future use. Graphing enables you to visualize this historical data stored in the persistent data stores.

Graphing supports the following data sources:

- HP Performance Agent
- HP Operations agent
- SiteScope (agentless)
- Business Process Monitor (BPM)
- Real User Monitor (RUM)

Note: The Real-Time Metric Access component of the HP Operations agent (11.00) provides you with real-time access to performance data for a monitored element.

Metrics

A metric gives an indication of the operational health and performance of a system or application. It is a parameter or a set of parameters that can be used to monitor and measure the health, performance, and availability of a monitored resource.

Graphing enables you to visualize this data in the graphical or tabular format. A drawn graph consists of metrics and data points available for the selected metrics. A metric class is a set of related metrics grouped together based on the type of data it reports.

The metric values collected by the HP Operations agent and HP Performance Agent provide information about the monitored systems: processes, applications, transactions, CPU, file system, disk, network interface, and logical systems. These details indicate operational efficiency and health of the monitored system. In addition, various Smart Plug-ins (SPIs) supplement these agents to provide in-depth information about different applications running on these managed systems.

SiteScope collects metrics from different systems without the help of the agent software. Metric values collected by HP SiteScope provides information on the server health, availability of a URL, Web service, database, or application servers. These collected parameters indicate the availability and performance of the IT infrastructure.

HP Real User Monitor monitors user and system initiated network traffic. Metric values collected by HP Real User Monitor provide real-time information on the availability and performance of the network and servers.

HP Business Process Monitor collects metrics from various points throughout your infrastructure by running transactions that are included in a business transaction flow or application.

How to Manage Graphs - Workflow

Along with out-of-box graph templates, you can also design custom graphs. Using the Design Wizard, you can create your own graph templates to display the required data. You can also edit the existing graph definition of a standard template and save it as a user-defined template. It enables you to map graph families or categories to configuration item types. For more information, see "Performance Graphs Manager" on page 300.

You can use the Performance Graphs component to draw graphs from the templates. The Performance Graphs component also enables you to draw graphs by making changes to the selected CIs or views. For more information, see "How to Draw Graphs in MyBSM Workspace" on page 150.

You can also draw ad hoc graphs from the graphing perspective view. For more information, see "How to Draw Graphs from the Performance Perspective" on page 152.

Only users with the appropriate access permissions can use Operations Management Administration tools. For more information about user management, see "Operations Management Users" on page 630.

How to Draw Graphs in MyBSM Workspace

You can add Performance Graphs as a component while creating your MyBSM workspace. You can use the Performance Graphs component to draw graphs from templates for a selected CI. You can also create your own graphs by selecting the required metrics for a CI.

To add performance graphs to your MyBSM workspace:

- ▶ Click the **New Page** button in the Page Management toolbar.
- ▶ Click the **Split** button. You can split the layout area into a number of vertical or horizontal panes.
- ▶ Click the **Add Component** icon. Double-click **Performance Graphs** or **Performance Graphs with Details** from the **Component Gallery** window, to place it in one of the panes.

Alternatively, click the **Component** button in the Page Management toolbar. Select **Performance Graphs** or **Performance Graphs with Details** from the component gallery and drag it to any area on the page.

- ▶ Select View Explorer from the component gallery and drag it to any area on the page.

You can use the Performance Graphs component to draw graphs from the templates. The Performance Graph with Details component enables you to launch the Performance pane, and draw graphs from templates or create your own ad hoc graphs. For more information on drawing graphs, see "How to Draw Graphs from the Performance Perspective" on page 152.

How to Draw Graphs from Operations Management

You can draw graphs from a set of predefined templates or design your own graph templates. You can draw a graph in one of the following ways.

To draw a graph from the Model Explorer pane:

- 1 Right-click the CI for which you want to draw a graph.
- 2 From the menu options, select **Show > Performance Graphs (CI)** to draw a graph for the selected CI.

Select **Show > Performance Graphs (Neighborhood)** to draw graphs for the selected CI and the neighborhood CIs.

To draw a graph from the Event Perspective tab:

- 1** Right-click the event for which you want to draw a graph in the **Event Browser** pane.
- 2** From the menu options, select **Show > Performance Graphs (Neighborhood)** or **Performance Graphs (CI)**.

You can launch graphs for the events originating from following BSM components:

- HP End User Management (EUM):
 - Business Process Monitor
 - Real User Monitor
- HP Operations agent

Note: If you are drawing a graph for a CI with multiple instances, make sure the value of the parameter **Maximum Instances** is configured accordingly. While drawing a graph, only as many instances as the value specified for this parameter are displayed. If the number of instances are more than the value of this parameter, the extra instances are excluded from the graph. For more information, see "Graphing Settings" on page 708.

When you launch a graph for an event, the default graph of each family/category is displayed in a new browser window. If a graph family/category does not have a default graph, the first graph in the family/category is selected. There are a multiple options that you can use to perform a more detailed analysis on the drawn graph. For more information, see "Options for Drawn Graphs" on page 157.

The number of graphs drawn depends on the attributes which is a part of the graph template such as the value of **Metrics per graph**, the graph type configured in the graph templates and number of CIs. See "Graph Attributes - List and Description" on page 187 and keywords (as they appear in the graph template).

You can also draw graphs from the Performance Perspective tab. For information see "How to Draw Graphs from the Performance Perspective" on page 152.

To modify your selection of graph for a selected CI:

- 1 Click  after you draw a graph. The selected CI along with a list of predefined graphs is displayed in the left pane.
- 2 Select a graph type from the list of predefined graphs.
- 3 Click the **Draw Graphs**  button. The selected graph is displayed.
- 4 Click the **Clear Selections**  button, to cancel all the previous selections.

How to Draw Graphs from the Performance Perspective

Performance Perspective tab enables you to launch graphs from predefined graph templates or create ad hoc graphs by selecting the required metrics for a selected CI. You can draw a graph from the Performance Perspective in one of the following ways.

To draw graphs from templates:

- 1 From the **Model Explorer** pane, select the CI, for which you want to draw graphs.
- 2 From the **Performance** pane, select **Predefined Graphs** tab. This tab displays a list of predefined graphs based on the CI that you select. Depending on the CI that you select, the default graphs are preselected.
- 3 Select a graph type from the list of predefined graphs.
- 4 Click the **Draw Graphs**  button. The selected graph is drawn.

To draw ad hoc graphs:

- 1** From the **Model Explorer** pane, select the CI, for which you want to draw graphs. Based on the CI you select, the Data Sources pane on the Performance pane lists the available nodes and data sources. The Metrics tab on the Performance pane displays the following:
 - Data Sources pane - Contains the list of data sources. The data source is displayed in the format:
`<monitored_entity>::<data_source_name>`
 - Metric Classes pane - Displays the list of classes based on the data source that you selected. The PROCESS class metric is not displayed in the metric classes pane. PROCESS class data can be viewed only as table graphs. You can design a process table graph using the Graph Design Wizard.
 - Instances pane - Instances pane is displayed only when you select a multi-instance metric class. It lists all the available instances for a metric class.
 - Metrics pane - Metrics pane displays the list of metrics when you select a metric class.
- 2** Select the data source required from the Data Sources pane. The Metric Classes pane populates the list of metric classes based on the data source you select.
- 3** Select the required metric class. The Metrics pane displays the list of numeric metrics belonging to that class.

Note: In addition, the Data Sources pane displays the Instances pane when you select a multi-instance class of metrics. For example, If you select Application class of metrics, the Instances pane displays all the instances of the application.

- 4** Drag and drop a metric from the metric list. The graph is drawn for the selected metrics.

You can drag and drop any number of metrics and draw graphs.

How to Design Graphs

You can design graphs using the Graph Design Wizard, and save them as customized templates. You can use these customized templates to draw graphs. You can also draw ad hoc graphs using the Graph Design Wizard. You can launch the Graph Design Wizard in one of the following ways.

To design a graph from the Model Explorer pane:

- 1 Right-click the CI, for which you want to design a graph.
- 2 From the menu options, select **Configure > Performance Graphs**. The Design Wizard window opens.

To design a graph from the Event Perspective tab:

- 1 Right-click the event, for which you want to design a graph.
- 2 From the menu options, select **Configure > Performance Graphs**. The Graph Design Window opens.

You can also launch the Graph Design Wizard from the following areas:

- ▶ From a drawn graph: Click **Options > Configure** from a drawn graph. The Design Wizard window opens.
- ▶ From a table graph: Click **Configure**  icon on the table graph. The Design Wizard window opens.

The Graph Design Wizard takes you through a series of steps required to design a graph. For detailed information about the individual panes, see the appropriate reference pages, such as "Graph Attributes Page" on page 166.

How to Edit Graphs

Graphing enables you to edit a graph that you have created. You can also edit out-of-the-box graph templates and save them as user-defined graph templates with different names.

To edit a graph template:

- 1 Open the Performance Graphs Manager:
Admin > Operations Management > Performance Graphs.

- 2 From the **Available Graph Families** pane, select the graph that you want to edit.
- 3 Click the **Edit**  button or right-click the graph and select **Edit Graph Template: Launch Designer** from the menu options. The Launch Performance Graph Designer window opens.
- 4 Select a CI Instance from the list and click **Next** >. Launch Parameters displays the list of parameters available for the CI instance you selected.
- 5 Click **Finish**. The **Graph Attributes Page** opens.
- 6 The Graph Design Wizard takes you through a series of steps required to edit a graph. For detailed information about the individual panes, see the appropriate reference pages, such as "Graph Attributes Page" on page 166.

To edit a drawn graph:

- 1 Select **Configure** from the **Options** menu of the drawn graph window. The Graph Design Wizard window opens.
- 2 The Graph Design Wizard takes you through a series of steps required to edit a graph. For detailed information about the individual panes, see the appropriate reference pages, such as "Special Attributes Page" on page 180.
- 3 Click **Preview** to view the modified graph.
- 4 Click **Back to Design** button to view the design wizard of the graph. If you have modified the graph by adding or removing metrics, launch the design wizard again by selecting **Configure** from the **Options** menu of the graph window.

Note: If you have more than one drawn graph appearing in the Performance pane, the **Configure** option of each drawn graph will invoke a Graph Design Wizard for the selected graph.

How to Delete Graphs

You can delete any graph that you have created. However, the out-of-the-box graphs cannot be deleted.

To delete a graph:

- 1 Open the Performance Graphs Manager:
Admin > Operations Management > Performance Graphs.
- 2 From the **Available Graph Families** pane, select the graph that you want to delete.
- 3 Click the **Delete Item**  button. The graph is deleted.

Note: A graph family without any graphs is deleted.

Performance Graphs User Interface

This section includes:

- ▶ Options for Drawn Graphs on page 157
- ▶ Performance Perspective Graphical User Interface on page 161
- ▶ Table Graph Window Button on page 164
- ▶ Graph Export Dialog Box on page 165
- ▶ Graph Design Wizard on page 165
- ▶ Graph Attributes Page on page 166
- ▶ Metric Selection Page on page 172
- ▶ Metric Selection Window on page 173
- ▶ Metric Properties Window on page 174
- ▶ Special Attributes Page on page 180

- Save Graphs Dialog Box on page 186
- Graph Attributes - List and Description on page 187
- Date Range Panel on page 191

Options for Drawn Graphs

To access	Select Applications > Operations Management > Performance Perspective
Important information	The following additional options are available to perform a more detailed analysis after you draw a graph.
Relevant tasks	For instructions to draw a graph, see "How to Draw Graphs from Operations Management" on page 150.

The information in this section aims to help you understand how to interpret the contents of graphs and use the available features and functionality to change the contents of graphs.

- "CI and Graph Selection Icons" on page 158
- "Performance Pane Options Menu" on page 158
- "Drawn Graph Window Options and Buttons" on page 159
- "Zoom-In and Zoom-Out Options" on page 160

CI and Graph Selection Icons

The Performance pane displays a list of graphs, graph families, and categories associated with the drawn graph. The default graphs in the graph families or categories and the CIs used are selected by default.

The following elements are included:

UI Elements	Description
	Clear Selection. Resets the options selected.
	Draw Graphs. Draws a graph for the selected CI.
	Refresh Graph List. Refreshes the Predefined Graphs listed.

Performance Pane Options Menu

The following table lists the elements available from the **Options** menu in the Title Bar of the Drawn Graph page:

UI Elements (A-Z)	Description
Close All Graphs	Closes all open graph windows.
Date Range Panel	Use this option to drag and drop a metric and draw a reference graph. The reference graph helps you understand the correlation between different metrics. You can also customize the graph to view granular data for a selected unit of time.
Help	Click this option to view the help content for the current page.

UI Elements (A-Z)	Description
Navigation Panel	If enabled, the navigation panel is displayed in the drawn graph window. However, this option will be available only for graphs displaying near-real time data.
Tooltips	If enabled, hovering the mouse on the graph area of a drawn graph opens a pop-up window displaying the actual value of the data point and the time interval of the selected data. If disabled, no pop-up window is displayed.

Drawn Graph Window Options and Buttons

The following table lists the options and buttons available in the Drawn Graph window (unlabeled UI elements are shown in angle brackets).

UI Elements (A-Z)	Description
	Auto Refresh On/Off: If Auto Refresh option is enabled, the data in drawn graph is refreshed at a specific interval, depending on the value specified for refresh rate in the graph template.
Metric Legend	Graphing provides Metric Legend buttons to hide or show the corresponding graphs of the metric. Select a Metric Legend to hide or show the corresponding metric in a graph. To remove a metric from a graph, right-click the legend of the metric, and then select Remove . The corresponding graph and the legend are removed from the graph window.
Options > Configure	Use this option to launch the design wizard. The Graph Design Wizard - Graph Attributes window opens.
Options > Export	Use this option to export graphs to formats such as TSV, CSV, XLS, and XML. For more information, see "Graph Export Dialog Box" on page 165.
Options > Navigate	Use this option to select the start date and end date from the Time Settings dialog box. The data in the drawn graph is refreshed to display the data for the selected period.

UI Elements (A-Z)	Description
Options > View as Table	Use this option to view the data in the graph as a table.
	Prepend/Append: Graphing provides the Append and Prepend buttons to append data for adjoining time intervals based on the value specified for points every while drawing a graph. For more information, see "Specifying Points Every Value" on page 169.
	Prev/Next: Graphing provides the Prev and Next buttons to navigate to adjacent time intervals based on the value specified for "points every" while drawing a graph. For more information, see "Specifying Points Every Value" on page 169.

Zoom-In and Zoom-Out Options

After you draw a graph, you can zoom-in to view a smaller set of data points and zoom-out to reset and view the original graph. Zooming-in or zooming-out enable you to adjust the summarization levels.

- ▶ To zoom-in on data, click and drag the mouse to a rectangular area on the graph from left to right.
- ▶ To zoom-out, click and drag on the graph from right to left. When you zoom-out a graph, the graph is reset to its previous state.

You can zoom-in on data up to multiple levels. Every zoom-out reverts to the graph's previous state.

Note: This option is available only for image graphs. However, this option is not available for pie, gauge, table, and forecast graphs, and graphs drawn for Real-time Measurement data sources.

Performance Perspective Graphical User Interface

To access	Select Applications > Operations Management > Performance Perspective
Important information	The section aims to help you become familiar with Performance Perspective tab. The Performance Perspective page enables you to draw graphs from templates and also create ad hoc graphs by selecting required metrics.
Relevant tasks	"How to Manage Graphs - Workflow" on page 149.
See also	"Graphing Overview" on page 142.

In this section you can find information about the following topics:

- Model Explorer on page 162
- Performance Pane on page 162

Model Explorer

Displays a list of CIs in a tree. You can create your own views. For information, see "Model Explorer Pane" on page 259.

Performance Pane

Enables you to draw and view performance graphs for the selected CI. You can draw a pre-defined graph for a CI or design a graph from the list of available metrics.

The Performance pane provides a list of pre-defined graphs and metrics based on the CI you select.

It consists of two tabs:

UI Elements (A-Z)	Description
Metrics	This tab displays the following information: <ul style="list-style-type: none"> ▶ Data sources - lists the data sources available for a selected CI ▶ Metric Classes - lists the metric classes available for the selected data source ▶ Instances - lists the instances available for the selected multi- instance metric class ▶ Metrics - lists the metrics available for the selected metric class
Predefined Graphs	This tab displays a list of graph templates based on the configuration item that you select from Model Explorer.

All drawn graphs are displayed in the Performance pane. For more information on drawing graphs, see "How to Draw Graphs from the Performance Perspective" on page 152.

The drawn graph window displays the following:

- ▶ Legends for the metrics that enable you to hide or show the graphs for the metrics.
- ▶ Name of the node from which the data source is collecting data.
- ▶ Metric name, metric value and the timestamp of the metric.

Listed below are the options available for drawn graphs:

Compare Metrics from Different CIs

- 1** Select a CI. The selected metrics and predefined graphs for the chosen CI appears. Drag and drop a metric from the Metrics pane. The graph is drawn in the Performance pane.
- 2** Select the second CI with which you want to compare. Select the same metric from the metrics pane. Drag and drop the metrics to the previously drawn graph to compare the data across CIs.

For example, select a metric BYCPU_TOTAL_UTIL from two CIs. You can now compare the total CPU utilization data from nodes associated with the two CIs.

Remove metric

Right-click the metric name from the legend and select remove. The corresponding line representing the metric is removed from the graph and will no longer appear in the legend.

Add metric

Drag and drop a metric into a drawn graph window. The new metric is displayed in the graph and will be listed in the legend.

Hide metric

Click the metric name from the legend in the graph window. The legend of the metric is disabled and the graph of the metric does not appear in the graph window.

Show metric

Click the disabled metric from the legend. The legend of the metric is enabled and the graph of the metric is displayed again on the graph window.

Copy metrics from one graph to another

You can drag a metric from one graph and add it to another. The target graph will display the newly added metric.

Pull out metric from a graph

You can drag a metric from one graph and drop it into the empty space in graph panel area. A new graph is drawn with the metric which you selected.

Table Graph Window Button

To access	After you draw a graph, select Options > View as Table from the graph window.
Important information	A table graph enables you to view granular data in the numeric format. This section describes in detail the information displayed in the Table Graph window.
Relevant tasks	"How to Manage Graphs - Workflow" on page 149.

The Table Graph window displays the following elements (unlabeled UI elements are shown in angle brackets>):

UI Elements	Description
	Configure: Use this option to launch the design wizard. The Graph Design Wizard - Graph Attributes window opens.
	Export: Use this option to export the data from table in CSV, TSV, XLS, and XML format.
Lock Column	Select this option to lock one or more columns in the table graph. This option enables you view the locked columns as you navigate across columns using the horizontal scroll bar.
	Sort Metric Columns: Use this option to sort the data in the metric columns in ascending or descending order.

Graph Export Dialog Box

To access	After you draw a graph, select Options > Export from the graph window. The Export from a Graph window opens.
Important information	You can export graphs to one of the following formats: TSV, CSV, XLS, and XML.
Relevant tasks	"How to Manage Graphs - Workflow" on page 149.

The Graph Export dialog box includes the following elements:

UI Elements (A-Z)	Description
Cancel	Click Cancel to close the dialog box and return to the drawn graph page.
OK	Click OK to export the data in the selected format.
Type	Select the format in which you want to export the graph.

Note: If you are selecting a Microsoft Excel or a TSV graph, you must configure the browser settings to display Microsoft Excel and TSV files. For more information on browser settings, see "Unable to View Graph in Certain Formats (XLS/TSV)" on page 194.

Graph Design Wizard

To access	Click Options > Configure from a drawn graph.
Important information	Graphing enables you to design custom graphs using the Design Wizard feature. You can create your own graph templates to display the required data. You can also edit the existing graph definition of an out-of-the-box template and save it as a user-defined template.

Relevant tasks	"How to Design Graphs" on page 154
See also	"How to Manage Graphs - Workflow" on page 149

The design wizard consists of the following:

- **Graph Attributes Page**
- **Metric Selection Page**
- **Special Attributes Page**

Graph Attributes Page

To access	From the menu options, select Configure > Performance Graphs > <Graph Attributes page>
Important information	From the Graph Attributes page, you can specify the graph attributes while designing a graph and save it as a template for later use.
Relevant tasks	"How to Design Graphs" on page 154.
See also	"How to Manage Graphs - Workflow" on page 149.

The following elements are included:

UI Elements (A-Z)	Description
Date Range	<p>The default date range is: 7 days ending 'Now' and Points Every value is auto. You can also modify default settings for date and time.</p> <p>Use Defaults - Clear Use Defaults check box to modify the default values.</p> <p>Duration - Specify the time duration for which you want to design the graph. Enter the number and specify the unit of time. You can specify time duration in minutes, hours, days, and weeks. If you select “all”, all the data gathered by the data source and logged in the agent log files is included in the graph.</p> <p>Points Every - Use the Points Every (POINTS EVERY) setting to control how much data is to be summarized in each point on the graph and hence determine the granularity (number of data points) of data on the graph. For more information, see Specifying Points Every Value.</p> <p>Ending - Specify the end date for the graph. Select from one of the following options:</p> <ul style="list-style-type: none"> ▶ Now - the current date and time on the server. ▶ Last - the date and time when data was last collected by the data source. ▶ Date/Time - When you select this option, the calendar button is enabled. Click the Calendar button to select the date. Select the time from the Time drop-down list.
Default Graph	<p>When you select the Default Graph check box, the graph which you design will be the default graph in the family or category to which it belongs.</p> <p>Note: A graph family or category can have one or more default graphs.</p>
Description	<p>Enter a general description of what the graph represents.</p> <p>Note: A description of each graph appears as a tooltip when you mouse hover on the graph names in the Selection panel.</p>

UI Elements (A-Z)	Description
Force Points Every	Select this option to force control on the granularity (number of points) on the graph. This value overrides any Points Every value specified while drawing a graph.
Graph Type	Select the type of graph you want to design from the drop-down list. Click here for a list of Types of Graphs with descriptions.
Help	Click Help to view the help content for the current wizard page.
Limit Number of Points	<p>Enter the number of records (table graph) or data points (for image graph) which you want to view on the graph at a time. The default value is 100. If the graph contains more data points, the Prev and Next buttons are enabled, so that you can navigate to view all the data points.</p> <p>The number of points also depends on the graph type which you have selected:</p> <ul style="list-style-type: none"> ▶ For a table graph, the default value for number of rows can be configured by the software administrator. However, the value specified while designing a graph template overrides the default value and the value is saved in the graph template. ▶ If you are designing a pie graph or a gauge graph, Limit Number of Points is set to one by default. You cannot change this value. <p>The recommended value for maximum number of points is 1000 for a graph. If you select a value greater than this, it will take a long time for the graph to appear.</p>
Next	Click Next to go to the next page.
Preview	Click Preview to preview the graph.
Save/Save As	Click Save or Save As to save your graph, The Graph Design Wizard - Save Graphs page opens.

UI Elements (A-Z)	Description
SubTitle	<p>You can specify a subtitle for the graph. You can also use any of the substitution variables as subtitle. The actual values will replace these variables. For more information see Substitution Variables.</p> <p>Note: Subtitle of a graph is visible only when you hover the mouse over the title bar of a drawn graph window.</p>
Title	<p>Type a name for the graph. This name will be displayed in the title bar of the drawn graph. Alternatively, you can also use any of the Substitution Variables as a title.</p>

Specifying Points Every Value

Use the Points Every (POINTSEVERY) option to control how much data is to be summarized in each point on the graph. You can use the Points Every option to determine the granularity (number of data points) on the graph. The default value is Auto. You can select from the following options:

- Auto
- 5 minutes
- 15 minutes
- 30 minutes
- hour
- 3 hours
- 6 hours
- 12 hours
- Day
- Unsummarized

Auto

Selecting this option automatically selects the value to display the data points within the configured limit. If you select **Auto**, Graphing automatically summarizes the data based on the date range that you have specified to a level that would make the graph easy to read. If the combination of Date Range and Points Every settings results in too many points, the Points Every value is automatically adjusted to display all of the requested data in one page. In addition, Graphing also provides the **Append** and **Prepend** buttons to increase the data points that you can view on a single page.

- ▶ Click **Append** >> to view data for the next set of data points, in addition to the data you are currently viewing.
- ▶ Click **Prepend** << to view data for the previous set of data points, in addition to the data you are currently viewing.

If you click **Append** or **Prepend**, Graphing adds additional data to the graph which you are currently viewing. The number of points displayed is same as the data points which appear in the initial graph, but the duration is doubled. For example, if you are viewing data for the previous one month, and you click **Prepend**, you can view the data for the previous two months.

All the data points are displayed in the same page. The Points Every setting is reset by Graphing to make the data readable. When all the data available is displayed, the Append and Prepend buttons are disabled.

Example for Append/Prepend:

When the combination of the date range and Points Every settings is one week of data from 1/1/2009 to 8/1/2009 with points every one hour, if you Click Append/Prepend additional one week of data is displayed in the same page. You can see two weeks of data with points every three hours.

Example for Auto:

For example, if you have specified the Duration as 12 hours, the graph displays this data for 12 hours and the summarization is automatically set by Graphing to accommodate this data within one page.

Note: In case of Image Graphs, based on the value set for **limit number of points**, summarization interval is decided by Graphing when 'points every' is selected as auto. The behavior of the **Next/Prev** button is different if 'points every' is selected as auto, unlike the behavior when 'points every' is specified as any other value other than auto from the drop-down. When auto is selected, you can view data for the duration which you have specified, in the same graph, with summarization interval specified by the Graphing. The **Next/Prev** options displays the graph from the next and previous duration with the same points every (summarization) value.

5 minutes

Displays one data point for every five minutes of the specified duration.

15 minutes

Displays one data point for every fifteen minutes of the specified duration.

30 minutes

Displays one data point for every thirty minutes of the specified duration.

hour

Displays one data point for every one hour of the specified duration.

3 hours

Displays one data point for every three hours of the specified duration.

6 hours

Displays one data point for every six hours of the specified duration.

12 hours

Displays one data point for every twelve hours of the specified duration.

Day

Displays one data point for every day of the specified duration.

Unsummarized

Data is not summarized. The raw data collected by the data source for the specified duration is displayed. Any value set in Graphing does not affect the summarization.

Note: If the points every value is anything other than **auto**, and if the data in the chosen time range cannot be fit into a single graph or table, the graph or table uses more than one page and **Prev** and **Next** buttons are enabled. Click **Prev** to move to the previous page and **Next** to go to the next page to view all the data. The **Append/Prepend** options are disabled when you set **Points Every** is set to anything other than **auto**.

Metric Selection Page

To access	From the menu options, select Configure > Performance Graphs > <Metric Selection page>
Important information	The Metric Selection page enables you to design a graph and save it as a template for later use.
Relevant tasks	"How to Design Graphs" on page 154.
See also	"How to Manage Graphs - Workflow" on page 149.

The following elements are included:

UI Elements (A-Z)	Description
Add Metrics	Opens the Metric Selection window. For details, see "Metric Selection Window" on page 173.
Help	Click Help to view the help content for the current wizard page.
Move Down	Click Move Down to move a metric one level down from its current position in the Metric column.

UI Elements (A-Z)	Description
Move Up	Click Move Up to move a metric one level up from its current position in the Metric column.
Next	Click Next to go to the next page.
Prev	Click Prev to go to the previous page.
Preview	Click Preview to preview the graph.
Properties	Click Properties to open the Metric Properties Window . Use this option to change properties for a metric.
Remove	Click Remove to remove a metric from the Metric column.
Remove All	Click Remove All to remove all the metrics from the list.
Save/Save As	Click Save or Save As to save your graph, the Save Graphs dialog box opens.

Metric Selection Window

To access	From the menu options, select Configure > Performance Graphs > <Metric Selection page> and click Add Metrics
Relevant tasks	"How to Design Graphs" on page 154.
See also	"How to Manage Graphs - Workflow" on page 149.

It includes the following elements (unlabeled UI elements are shown in angle brackets):

UI Elements (A-Z)	Description
<Metric classes tree>	The metric classes tree displays a list of metric classes and metrics belonging to each class that are available on the data source. The list of metrics appears when you expand the metric class name.
Add	Select one or more metrics for which you want to draw graph and click Add .
Close	Click Close after you complete the selection. The list of selected metrics now appears in a tabular form on the metric selection page of the design wizard.
Data Sources	Select a data source from the list to view the available metrics.
Help	Click this option to view the help content for the current window.

Metric Properties Window

You can configure the way a particular metric appears on the graph.

To access	From the menu options, select Configure > Performance Graphs > Metric Properties
Important information	To change the properties of a metric, perform the following tasks: <ol style="list-style-type: none"> 1 Select the metric from the table. 2 Click Properties, the Metric Properties window opens. Note: You cannot specify a color for the metric.
Relevant tasks	"How to Design Graphs" on page 154.
See also	"How to Manage Graphs - Workflow" on page 149.

The following elements are included:

UI Elements (A-Z)	Description
Cancel	Click Cancel to exit without saving the changes.
Filter	<p>You can specify a condition to filter metrics:</p> <ul style="list-style-type: none"> ▶ Metric name - Select the metric for which you want to apply the filter ▶ A comparison symbol - Select a comparison symbol. See list of Comparison Symbols. ▶ A value to compare - Type a value to compare ▶ Add - Click Add to apply the metric filter ▶ AND/OR - Use the logical operators AND or OR, to specify multiple filters. ▶ Update - To modify the condition you specified, select the filter condition, modify the conditions and click Update. ▶ Remove - To remove a filter condition, select the filter condition and click Remove. ▶ Remove All - Click Remove All to delete all the filter conditions.
Help	Click Help to view the help content for the current wizard page.

UI Elements (A-Z)	Description
<p>Label</p>	<p>Enter a label for the metric. The label identifies this metric on the graph or table. The label can be modified for one metric at a time. The label can be a literal string, or it can contain references to special substitution variables.</p> <ul style="list-style-type: none"> ▶ @@[LABEL] - The metric label is specified by the data source. For example, (CPU %). If a label is not specified by the data source, then the metric name is used. ▶ @@[METRIC] - The metric name. For example, (GBL_CPU_TOTAL_UTIL) ▶ @@[CLASS] - The metric class. For example: (GLOBAL) ▶ @@[SYSTEM] - The node name supplying the metric. For example: (mysys.net.com) ▶ @@[DATASOURCE] - The data source for this metric. For example: (PA, EPC) ▶ @@metric - The value of the metric from the same data source and class. For example: @@BYDSK_DEVNAME will label the metric with the value of the BYDSK_DEVNAME metric. If the BYDSK_DEVNAME metric value were "0", Disk @@BYDSK_DEVNAME would produce a label of Disk 0. <p>Example:</p> <p>@@[SYSTEM]:@@[CLASS]:@@[METRIC] might produce a label like "mysys.net.com:GLOBAL:GBL_CPU_TOTAL_UTIL"</p> <p>Note: Graphs that contain only one metric will automatically display the system name for the metric label, when multiple nodes are selected. If you do not specify a label, Graphing uses the default metric label specification; that is, any label supplied by the data source for the metric, or the metric name.</p>

UI Elements (A-Z)	Description
Line Style	<p>You can select a line style from the list. This option is available only if you select the graph type as Line.</p> <p>You can choose from the following line styles:</p> <ul style="list-style-type: none"> ▶ Solid ▶ Dotted ▶ Dashed ▶ Dash-dotted ▶ Dash-dot-dotted
OK	<p>Click OK to save all the changes and exit from this window. The Graph Design Wizard - Metric Selection page opens.</p>
Type	<p>Displays the type of graph that you selected while specifying graph attributes. If you have selected mixed graph, you can specify the graph type for the metric that you selected. The options available are Line, Area or Bar.</p>
YAxis	<p>Specify whether you want the Y-axis of the graph to appear on the left hand side or right hand side from the drop-down list.</p> <p>Note: This option is available only for graph types Line, Area and Mixed. For all other graph types, the option Right does not appear in the drop-down list.</p>

Comparison Symbols

The following elements are included (unlabeled UI elements are shown in angle brackets>):

Symbol	Description
=	Equal to
<	Less than
>	Greater than
~	Like (textual comparison with leading or trailing “.” expressions)
!=	Not Equal
!~	Not Like (textual comparison with leading or trailing “.” expressions)
<=	Less than or Equal to
>=	Greater than or Equal to

Note: While specifying strings or expressions for filters, use regular expressions. For example, `.*C.*` instead of `*C*`.

The like comparisons such as “~” and “!~” are textual comparisons that allow wild cards. When you select these symbols, specify a valid regular expression value; for example, specify `APP_NAME~.*xyz.*` to select data where the application name contains the text “xyz”.

Substitution Variables

The following variables can be used for Graph titles or subtitles. The actual values will replace these variables in the drawn graphs:

Variable	Description
@@[SYSTEM]	Displays the name of the system for which the graph is drawn.
@@DATERANGE	Displays the duration for which the graph is drawn. (For example, 7days).
@@POINTSEVERY	Displays the time summarization for each data point. (For example, points every 10 minutes).
@@STARTTIME	Displays the start time in a drawn graph.
@@STOPTIME	Displays the end time in a drawn graph.
@@metric	<p>Displays the value of a metric. (For example, if you use @@APP_NAME, the title or subtitle will include the value of the metric, that is the name of the application.</p> <p>Note: Use this parameter, only when a single instance of a metric is drawn in a graph. If there are multiple instances in a single graph, then all the instance names will be appended to the title or subtitle name.</p>

Special Attributes Page

To access	From the menu options, select Configure > Performance Graphs > Special Attributes
Important information	The Special Attributes page enables you to specify the special attributes while designing a graph.
Relevant tasks	"How to Design Graphs" on page 154.
See also	"How to Manage Graphs - Workflow" on page 149.

Click the options below based on the graph type you selected:

- "Special Attributes for Image Graphs" on page 180
- "Special Attributes for Tables" on page 183
- "Comparison Symbols" on page 185

Special Attributes for Image Graphs

The following elements are available if you select the graph type as Line, Area or Bar graph (unlabeled UI elements are shown in angle brackets>):

UI Elements (A-Z)	Description
Cancel	Click Cancel to exit the design wizard.
Effects	<p>Stacked: If you are designing an area or bar graph, select the Stacked option to stack one metric on top of the other metrics in the graph. The “Stacked” effect makes it easier to view the overlapping data.</p> <p>Note: The Effects option is available only for the bar and area graphs.</p>
Help	Click Help to view the help content for the current wizard page.

UI Elements (A-Z)	Description
Left Y Axis	<ul style="list-style-type: none"> ▶ Label - Specify a label for Y-axis appearing on the left side. ▶ Minimum - Specify minimum value for points on the left side Y-axis. If left blank, the initial scale of the axis will automatically be adjusted to accommodate the values in the graph. ▶ Maximum - Specify maximum value for points on the left side Y-axis. If left blank, the initial scale of the axis will automatically be adjusted to accommodate the values in the graph.
Metric Display Order	<p>Specify the order in which you want the metrics to be displayed. The default value is 'User defined'. You can select from the following options:</p> <ul style="list-style-type: none"> ▶ User defined (See Metric Selection Window) - Select this option if you want the metrics to appear in the order of the sequence on the Metric Selection page. ▶ Average Value - Select this option if you want the metrics to appear in the ascending order of the average value. When you select this option and draw a graph, the higher values appear at the top. You can use this feature in conjunction with the value specified in the Metrics Per Graph field. ▶ Reverse Average Value - Select this option if you want the metrics to appear in the descending order of the average value. When you select this option and draw a graph, the lowest values appear at the top.

UI Elements (A-Z)	Description
Metrics Per Graph	<p>Specify the number of metrics you want to see in a graph. The default value is eight.</p> <ul style="list-style-type: none"> ▶ Single graph - Click Single Graph to limit the number of graphs to one graph when number of metrics or instances exceeds the value specified for “Metrics Per Graph.” ▶ Multiple graphs - Click Multiple Graphs, to display multiple graphs when number of metrics or instances exceeds the value specified for “Metrics Per Graph.” The number of metrics or instances in each graph is less than or equal to the value specified for “Metrics Per Graph.”
Next	Click Next to go to the next page.
Prev	Click Prev to go to the previous page.
Preview	Click Preview to preview the graph.
Right Y Axis	<p>Label - Specify a label for Y-axis appearing on the right side. This enables you to specify a label for the right side of the graph to identify the right hand Y-axis. This field does not appear unless at least one metric has the “Right Y-axis” selected from the Metric Properties Window.</p> <p>Minimum - Specify minimum value for points on the right side Y-axis. If left blank, the initial scale of the axis is automatically be adjusted to accommodate the values in the graph.</p> <p>Maximum - Specify maximum value for points on the right side Y-axis. If left blank, the initial scale of the axis is automatically adjusted to accommodate the values in the graph.</p>
Save/Save As	Click Save or Save As to save your graph, The Graph Design Wizard - Save Graphs page opens.

Special Attributes for Tables

The following options are available when you select the graph type as table. It enables you to highlight a cell in a table based on its content so that the records can be accessed easily. You can also set conditions to filter the contents from a table based on the metric value. The following elements are included:

UI Elements (A-Z)	Description
Add	Click Add to include the table highlight condition that is specified in the list.
AND/OR	Select either AND or OR to apply multiple conditions: <ul style="list-style-type: none"> ▶ AND - filters the rows that satisfy the first condition you set and the row that satisfies the following condition as well. ▶ OR - filters the rows that satisfy either the preceding or the following condition.
Cancel	Click Cancel to exit the design wizard.
Color	Select a highlight condition from the list and click Color , to add a color to the cell. The Color Palette appears. Select a color, for example, blue from the color palette and click OK .
Help	Click Help to view the help content for the current wizard page.
Next	Click Next to go to the next page.
Prev	Click Prev to go to the previous page.
Preview	Click Preview to preview the graph.
Remove	Select any table highlight or filter condition, and click Remove . The table highlight or filter condition is deleted and will no longer appear when you preview or draw the graph.
Remove All	Click Remove All to delete all the filter conditions that is specified.

UI Elements (A-Z)	Description
Save/Save As	Click Save or Save As to save your graph, The Graph Design Wizard - Save Graphs page opens.
Table Filters	Select the metric for which you want to set a filtering condition. Select a Comparison Symbols and enter value to compare against the metric. For example, 50. Note: The metrics added in The Graph Design Wizard - Metric Selection page are listed for filtering. If you want to add or remove a metric, click Previous to go back to the Metric Selection screen and add or remove a metric.
Table Highlights	Select the metric for which you want to highlight from the drop-down list. Select a Comparison Symbols and enter value to compare against the metric. Note: The metrics added in the Graph Design Wizard - Metric Selection page are listed for filtering. If you want to add or remove a metric, click Previous to go back to the Metric Selection screen and add or remove a metric.
Update	Select the filter condition that you want to edit. Update the filter condition as required. Click Update . The changes are effective next time you preview or draw the graph.

Example for Table Highlight:

If you select the metric GBL_CPU_TOTAL_UTIL and > (greater than) as the comparison symbol, and 4 as a value to compare against the metric and color as red from the color palette, when you preview or draw the graph, you can see the cells with records satisfying the condition you set; that is GBL_CPU_TOTAL_UTIL>4 highlighted in red.

Comparison Symbols

Listed below are the comparison symbols which you can use while specifying a condition to highlight or filter a table:

Comparison Symbols	Description
=	Equal to
>	Greater than
<	Less than
>=	Greater than or Equal to
<=	Less than or Equal to
!=	Not Equal to
!~	Not like

Note: When specifying interest reason for table filters and table highlights, do not use the wildcard expressions such as *C*. Use a regular expression, for example, .*C*.

Save Graphs Dialog Box

To access	From the menu options, select Configure > Performance Graphs
Relevant tasks	"How to Design Graphs" on page 154.
See also	"How to Manage Graphs - Workflow" on page 149.

The following elements are included:

UI Elements (A-Z)	Description
Cancel	Click Cancel to close the dialog box.
Category	Enter the name of the graph category. (This is optional, graphs can be grouped directly under a family).
Help	Click Help to view the help content for the current wizard page.
Family	Enter the name of the graph family.
Name	Enter a name for the graph.
OK	Click OK and modify the graph name.
Save	Click Save to save the graph.
Save As	Click Save As to save the graph with a different name.

Tip: The name can be a combination of alphabets, numbers, and special characters and space. In case you use special characters other than #, -, or _, the following error message appears:

The name can only contain a combination of alphabets, numbers and the special characters: #, -, _ and space

If the family name and category already exist, the Graphing automatically populates the Family, Category, and Name fields text boxes with the names when you type the first few alphabets.

Graph Attributes - List and Description

To access	Select Applications > Operations Management > Performance Perspective
Important information	<p>The following table lists all graph attributes, keywords (as they appear in the graph template), and their descriptions. The table also details the way Graphing handles conflicting parameters defined in different default graph templates.</p> <p>Note: A software administrator can configure parameters specific to Graphing. For more information, see "Graphing Settings" on page 708.</p>
Relevant tasks	"How to Design Graphs" on page 154.
See also	"How to Manage Graphs - Workflow" on page 149.

The following elements are included (unlabeled UI elements are shown in angle brackets>):

UI Elements (A-Z)	Description
Auto-Refresh	The interval at which the Graphing can refresh the drawn graphs automatically so that the graph is updated with the latest data. Graphing enables this option if any of the selected graph templates has the option enabled.
Date range	<p>Range of date and time to include in the graph. If you do not specify any values for DATERANGE: the default date value (that is, duration of 7 Days, ending Now) is used. If you specify "all" for date range, all the data collected in the data source will be used in graphing.</p> <p>Graphing chooses the value of date range as "ALL" if any of the selected graph templates contain the value "All". However, if none of the default graphs templates contain the value ALL, the Graphing chooses the maximum value from all the graph templates.</p>

UI Elements (A-Z)	Description
Graph type	<p>For a list of graph types supported by the Graphing, see "Types of Graphs" on page 144.</p> <p>If the graph type is specified as table or Gauge in any of the graph templates then a separate graph is drawn for each of these graph types.</p>
Left-axis and right-axis max	<p>The maximum value on the right (optional) Y-axis.</p> <p>The maximum value on the left (default) Y-axis. For the Gauge graph type, the parameter will be the maximum value on the gauge scale.</p> <p>Graphing takes the maximum from all the values in the default graph template.</p>
Left-axis and right-axis min	<p>The minimum value on the left (default) Y-axis. For the Gauge graph type, this parameter is the minimum value on the gauge scale.</p> <p>The minimum value on the right (optional) Y-axis.</p> <p>Graphing takes the minimum values from all the values in the default graph template.</p>
Left-axis title and right-axis title	<p>Specifies the label for the left Y-axis.</p> <p>Specifies the label for the right Y-axis.</p> <p>Graphing combines all available values from the selected graph templates.</p>
LineStyle	<p>This specification is valid only when the GRAPHTYPE is solid line. You can select from the following values:</p> <ul style="list-style-type: none"> ➤ Solid ➤ Dotted ➤ Dashed ➤ Dashed-dotted ➤ Dash-dot-dotted <p>Graphing takes the value from the last metric.</p>

UI Elements (A-Z)	Description
LineWidth	<p>The number of pixels wide to draw the line for this metric. This specification is valid only when the GRAPHTYPE is line and the LINESTYLE is solid. The default value is 2.</p> <p>Graphing takes the value from the last metric.</p>
Metrics filter	<p>A data filter that is applied to the data. Data records that do not meet the filter specifications will not be used in the final calculation. Graphing combines all available values based on classes from the selected graph templates.</p>
Metrics per graph	<p>The maximum number of metrics on a single graph. The default is eight.</p> <p>Graphing chooses the maximum value specified from all the selected graph templates.</p> <p>Example</p> <p>If there are two graphs associated with the chosen CI, out of which one has metrics per graph as eight and other has twelve, the Graphing chooses the value as twelve.</p> <p>Note: The metrics per graph in the resulting graphs also depends on the value configured by a software administrator for the parameter Metrics Per Graph. For more information, see "Graphing Settings" on page 708.</p>

UI Elements (A-Z)	Description
Number of points	<p>The number of data points to be displayed on a graph. This value is used to summarize the data for each data point and to fit the graph in a single window, when POINTSEVERY value is set to auto. For other POINTSEVERY values, Graphing determines the number of (data points and time intervals) for each graph and provides options to view the next or previous set of data points or intervals. For line, area, and table graphs, the default value is 100. You are not required to specify a number for Pie and Gauge graph types.</p> <p>It is recommended that you do not to set the value to more than 1000 as this might impact the performance of the application. Graphing chooses the maximum value available from all the selected graph templates.</p>
Points every	<p>Determines the granularity (number of data points) on the graph. This value is used in conjunction with the NUMBEROFPOINTS value to determine the level of summarization to use. Graphing chooses the value Auto if any of the selected graph templates contain the value for points every as Auto. However, if none of the graph templates has the value Auto, the Graphing chooses the minimum value from all graph templates. For more information, see Specifying Points Every Value.</p>

Date Range Panel

To access	Select Options > Date Range Panel
Important information	The Date Range Panel option enables you to view the granular data for a specific period.
Relevant tasks	"How to Design Graphs" on page 154.
See also	"How to Manage Graphs - Workflow" on page 149.

The following table lists all the options available to customize a graph (unlabeled UI elements are shown in angle brackets>).

UI Element (A-Z)	Description
	Adjust to a unit of time: Use this option to move the slider to a unit of time you select from the list. For example, if you select an hour from the list, you can use adjust to an hour and the slider moves to show data for an hour
	Choose a time frame: Select a start date and end date from the Time Settings dialog box to view data for that period. The start date and end date values range between the earliest and the latest time stamps available in the data source.
	Next: Select Next to view the data for the adjacent unit of time. For example, if you select last hour from the list you can use the Next Hour option to view data for that period. In the same way, you can view adjacent data for any unit of time.
	Previous: Select Previous to view the data for the adjacent unit of time. For example, if you select last hour from the list, you can use the Previous Hour option to view data for that period. In the same way, you can view adjacent data for any unit of time.

UI Element (A-Z)	Description
<Unit of time>	<p>Select a unit of time from the list to view granular data for that period of time. The options available are:</p> <ul style="list-style-type: none"> ➤ hour ➤ day ➤ week ➤ month
All	<p>Select this option to apply the changes made within the date range panel to all the drawn graphs. If you do not select this option, the changes apply to the selected graph only.</p>
Range	<p>Select the time range from the list. The options available are:</p> <ul style="list-style-type: none"> ➤ Months in Year ➤ Weeks in Month ➤ Days in Weeks ➤ Hours in Day <p>By default, a Range value is displayed based on the unit of time selected.</p> <p>For example, if you select last hour from the list, the Range list displays hours in a day.</p>

Troubleshooting and Limitations

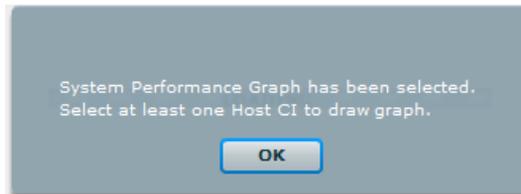
This section provides help in troubleshooting problems relating to performance graphs.

- "Unable to Draw a System Performance Graph" on page 193
- "Unable to Edit or Delete a Graph" on page 193
- "Graph Saved from Design Wizard but Not Mapped to Any CI Type" on page 193
- "Unable to View Graph in Certain Formats (XLS/TSV)" on page 194

- "Unable to Draw a Graph from a CI" on page 194
- "Some Instances of the CI Not Appearing in the Drawn Graph" on page 195
- "The Real-Time Graph Window Stops Receiving Updates" on page 195
- "Customized Graph Templates are Unavailable after Migrating from HP Operations Manager i 8.10 to BSM 9.10" on page 195

Unable to Draw a System Performance Graph

After launching a graph for a CI or a list of CIs, the following message appears:



You cannot draw a system performance graph without selecting a host CI. When you try to draw a system performance graph make sure you select at least one host CI.

Unable to Edit or Delete a Graph

You need to be a software administrator to edit or delete a graph. For information about the user roles, see "Operations Management Users" on page 630.

Graph Saved from Design Wizard but Not Mapped to Any CI Type

When you edit a graph from the design wizard or when you design a graph from the admin UI, you need to map the graph to a CI type. For instructions, see "How to Map CI Types to Graph Families" on page 305.

Unable to View Graph in Certain Formats (XLS/TSV)

You must check if the option to download files in the Microsoft Excel and TSV format is enabled in the browser security settings. To check the browser settings, perform the following tasks:

- 1** Select **Internet Options** from the **Tools** menu of Internet Explorer. The **Internet Options** window opens.
- 2** Click the **Security** tab. Check if the security level in your browser settings is set to high. Make sure the Internet icon is selected and click Custom Level. The **Security Settings** window opens.
- 3** Scroll down to the Downloads section and select the **Enable** option under **File Download**.
- 4** Click **OK** and close the Internet Options window.
- 5** Open the **Control Panel** and double-click **Folder Options**.
- 6** Click the **File Types** tab to display the registered file types.
- 7** Select the **XLS** file format and TSV file format from the Registered file types list, and then click the **Advanced** button. The **Edit File Type** window opens.
- 8** Click to clear the **Confirm Open After Download** check box.
- 9** Click **OK**.

Unable to Draw a Graph from a CI

This can happen when CI is not mapped to a graph family or category. When you edit a graph from the design wizard or when you design a graph from the admin UI, you need to map the graph to a CI type. For instructions, see "How to Map CI Types to Graph Families" on page 305.

Some Instances of the CI Not Appearing in the Drawn Graph

If you are drawing a graph for a CI with multiple instances, make sure the value of the parameter “Maximum Instances” is configured accordingly. While drawing a graph, graphing displays only as many instances as the value specified for this parameter. If the number of instances is more than the value of this parameter, graphing will not display those in the drawn graph. For more information, see "Graphing Settings" on page 708.

The Real-Time Graph Window Stops Receiving Updates

A graph drawn with metrics obtained from the RTM data source stops receiving updates if the HP Operations agent (or the RTM component of the agent) on the node that hosts the RTM data source stops running.

The graph window title bar shows the following message when the HP Operations agent or the RTM component stops working:

RTM data source is not responding

When the HP Operations agent (or the RTM component of the agent) starts running on the node again, the graph window starts showing the updated graph and restores the original window title.

Customized Graph Templates are Unavailable after Migrating from HP Operations Manager i 8.10 to BSM 9.10

When you migrate from HP Business Availability Center (BAC) 8.10—with HP Operations Manager i 8.10—to BSM 9.10, only out-of-the-box graph templates are imported whereas the custom templates are not imported. You must manually recreate the custom templates.

5

Actions Pane

This chapter includes:

Concepts

- ▶ Actions and the Actions Pane on page 198

Tasks

- ▶ How to Run an Action on page 199

Reference

- ▶ Actions Pane User Interface on page 201

Concepts

Actions and the Actions Pane

The Actions pane is used to display the actions that are available for the selected event, its related CI, or the node that hosts the CI. Actions include Tools, Run Books, Custom Actions, and Performance Graphs. The Actions pane is used in the Event Perspective and the Health Perspective and can be added to custom perspectives.

Tasks

How to Run an Action

In this task, you learn how to run an action available for a selected event.

To run an action from an event with related actions:

- 1 Open a perspective containing the Actions pane to display the list of known events and their associated actions:

Applications > Operations Management > <select a perspective>

- 2 Select an event.

The Actions pane displays the actions available for the selected event.

Action types are identified by the following icons:

-  — Automatic action
-  — Custom Actions
-  — Performance Graphs
-  — Run Books
-  — Tools
-  — User action

Note: The maximum script and executable command length for tools is limited to 2500 characters including resolved parameters.

If the script or command exceeds 2500 characters including parameters resolved during tool execution, an error message is displayed.

Review the possible custom parameter values or contact the tool designer to reduce the script or command length.

3 Select an action from the Actions pane.

If the action does not require any further data, it is run immediately. If further data is required, for example for a Tool or a Run Book, the associated user interface is launched and a wizard guides you through the action launch.

Optional: Enter the Action name or part of the Action name in the **Search** field to reduce the list of displayed Actions. Similarly, select **CI** or **Node** to limit the list of displayed Actions to those that are applicable to either the related CI or the host Node.

For further information on Performance Graphs, see "Performance Graphs" on page 141.

For further information on how to run Tools, see "How to Launch a Tool" on page 205.

For further information on how to run HPOM actions, see "How to Run an HPOM Action" on page 62.

For further information on how to launch a custom action, see "How to Launch a Custom Action" on page 63.

For further information on how to run Run Books, see "How to Launch an HP Operations Orchestration Run Book" on page 63.

Reference

Actions Pane User Interface

This section describes the information displayed in the Actions pane. The information in this section aims to help you to use actions.

The Actions pane displays a list of the Actions (Tools, Run Books, Custom Actions, and Performance Graphs) applicable to the selected event, its related CI, or the node that hosts the CI.

To access	Select Applications > Operations Management > Event Perspective
Relevant tasks	For more information about running actions, see "How to Run an Action" on page 199.
See also	For more information about the Actions Pane, see "Actions and the Actions Pane" on page 198.

The Actions pane displays the UI elements listed in the following table:

UI Element (A-Z)	Description
CI	CI related to the selected event.
Clear	Removes the currently applied search string and displays all applicable actions for the selected CI.
Event	Title of the event that provides a brief summary of the event.

UI Element (A-Z)	Description
Filter	<p>Used to reduce the number of actions displayed in the Actions pane by showing only those applicable to CIs or Nodes.</p> <p>All — Shows all applicable actions for the selected event.</p> <p>CI — Shows actions that can be run on the CI related to the selected event.</p> <p>Node — Shows actions that can be run on the Node related to the selected event.</p> <p>Source CI — Shows all actions that can be run on the source CI of the received event.</p>
Node	Host name to which the event is related.
Search	Used to reduce the number of actions displayed in the Actions pane by showing only those that match the entered search string.

6

User Tools

This chapter includes:

Concepts

- ▶ User Tools Basics on page 204

Tasks

- ▶ How to Launch a Tool on page 205

Reference

- ▶ Run Tools User Interface on page 207

Troubleshooting and Limitations on page 209

Concepts

User Tools Basics

You can specify tools in Operations Management, for example, to ping a system. These tools are run from events on the associated CI. Tools are designed to help you solve common problems quickly and efficiently.

In the context of an event, available tools are displayed in the **Launch > Tools** context menu.

In the context of a configuration item, available tools are displayed in the **Launch Tools** context menu and are also displayed in the Actions pane of a perspective.

The selection of tools a particular user sees in context menus depends on the tools that are available for the configuration item affected by a particular event.

For more information about using the Tools manager to configure custom tools, see "Tool Creation" on page 273.

Note: Access to Administration features may be restricted. You must have corresponding permissions to launch the Tools manager.

Tasks

How to Launch a Tool

In this task, you learn how to launch a tool that is configured for a particular configuration item type. Tools are displayed in the context menus.

Note: Tools, custom action, performance graphs, and OO Run Books available for a selected event are also displayed in the Actions pane of a perspective.

To launch a custom tool:

- 1 Open the Event Browser to display the list of known events:
Applications > Operations Management > <select a perspective>
- 2 In the Model Explorer pane, select a view containing the configuration item type with the tool you want to start.

Note: Use the search feature if you are not sure of the name or location of the configuration item.

Alternatively, in the Event Browser, select an event that concerns the configuration item of the type that includes the tool you want to run.

- 3 To open the Run Tool dialog box, make one of the following selections:
 - ▶ Right-click an event in the Event Browser and select:
Launch > Tool > <select a tool>
 - ▶ Right-click a configuration item in the Model Explorer and select
Launch Tool > <select a tool>

The Run Tool dialog box opens for the selected tool configured for the configuration item type associated with the event.

- 4 If the tool requires any additional information to resolve parameters, type the required information in the pages presented by the Run Tool wizard.
- 5 To run the selected tool, select **Run Tool**.

For scripts and executable commands, the Execution Result window opens and displays the output of the tool execution.

Use the **Word wrap for output** option to make sure that all output text is displayed within the output pane.

Use the **Refresh** button to update the displayed output or select a refresh interval to regularly update the displayed output while the tool is executing.

For URL launches, the target is opened in a browser.

- 6 For scripts and executable commands, after the tool is run, select **Close**.

Reference

Run Tools User Interface

The Run Tool dialog box enables you to view the tool you want to run before running it. You can also browse any other tools that are displayed in the same tools context menu.

To access	Select Applications > Operations Management > <select a perspective> Right-click an event in the Event Browser and select Launch > Tool > select a tool
Relevant tasks	For more information about launching tools, see "How to Launch a Tool" on page 205.
See also	For more information about the Tools, see "User Tools Basics" on page 204.

The Run Tools page displays the UI elements listed in the following table.

UI Element (A-Z)	Description
Back	Opens the previous page in the Run Tool Wizard, if available. The Back button is inactive (grey) if no previous page is exists.
Cancel	Closes the Run Tool Wizard without running a tool.
Close	Closes the Run Tool Wizard after a tool is run.
Next	Opens the next page in the Run Tool Wizard, if available. The Next button is inactive (grey) if no other page exists.
Refresh	Updates the displayed output of the active tool.
Refresh every	Automatically updates the displayed output of the active tool using the refresh interval selected from the list.

UI Element (A-Z)	Description
Run Tool	Starts the tool that is selected in the Run Tool Wizard. If the tool requires additional information to resolve parameters, a wizard enables you to supply the required information before the tool starts.
Word wrap for output	Wraps tool output text so that it is displayed within the width of the output pane.

Troubleshooting and Limitations

This section provides help for those people who are troubleshooting problems concerning the launch and use of Operations Management tools. For more information about troubleshooting tool configuration and availability, see "Tools Management" on page 272.

- "No Tools Display" on page 209
- "Tool Does Not Run" on page 209

No Tools Display

- No tools are available for the selected type of configuration item or the configuration item associated with the selected event.
- The selected event does not contain Related CI or Node information.

Tool Does Not Run

- The tool is incorrectly configured.

Tools are not launched in the context of an event. They can be run on configuration items only. However, all tools contain event parameters.

- The tool depends on external resources such as network or internet connectivity that are not currently available.

7

Filtering Events

This chapter includes:

Concepts

- ▶ Filtering Methods on page 212
- ▶ Event Filters on page 215

Tasks

- ▶ How to Filter Events by Views on page 218
- ▶ How to Filter Events by Configuration Items on page 219
- ▶ How to View and Apply Event Filters on page 220
- ▶ How to Define Simple Event Filters on page 221
- ▶ How to Define Advanced Event Filters on page 224

Reference

- ▶ Filter Manager User Interface on page 228

Troubleshooting and Limitations on page 253

Concepts

Filtering Methods

Large IT environments naturally create a large number of events. All active events are displayed in the Event Browser and maintaining a clear overview of the events that require attention becomes increasingly difficult as the number of received events increases.

You can filter the contents of the Event Browser, for example, in the Event and Health Perspectives (or perspective containing an Event Browser and the Model Explorer), according to a combination, where available, of the following selections:

► **Views**

Views are used to group configuration items into logical sets. Selecting a view, the Event Browser only displays events that are related to the CIs specified in the selected view.

► **Configuration Items**

Selecting one or more CI from the CI tree only displays events in the Event Browser that are related to the selected CIs.

► **Configuration Item Collection**

Selecting a CI Collection from the CI tree only displays events in the Event Browser that are related to the CIs that are contained within the selected collection.

► **Event Filters**

Applying an event filter enables you to limit the type of events displayed in the Event Browser by defining rules that filter events according to event criteria such as severity, lifecycle state, assignment (ownership), category, dates and times, custom attributes, resolution information and application name.

Note: An Event Browser page without a Model Explorer pane can only be filtered using event filters.

By applying a combination of the available filtering methods, you can display just the most important events that you are responsible for. It is possible to create a view to display a CI tree list tailored to the responsibilities of an operator. Operators can then select a CI from the CI tree and be shown all related events. Alternatively, operators can define filters to, for example, show only events labelled as **Critical** and **Major**. Combining the selection of a CI and applying the same filter displays all events labelled as **Critical** and **Major** for the select CI.

Filter Selection

The contents of the Event Browser pane in the Event Perspective and Health Perspective can be filtered by the selected view or configuration item and by the selected event filter.

The active view or configuration item used to filter the Event Browser content is indicated in the Event Browser title. For example, if a view with the name **Host Resources** is selected, The Event Browser title displays:

Event Browser for Host Resources

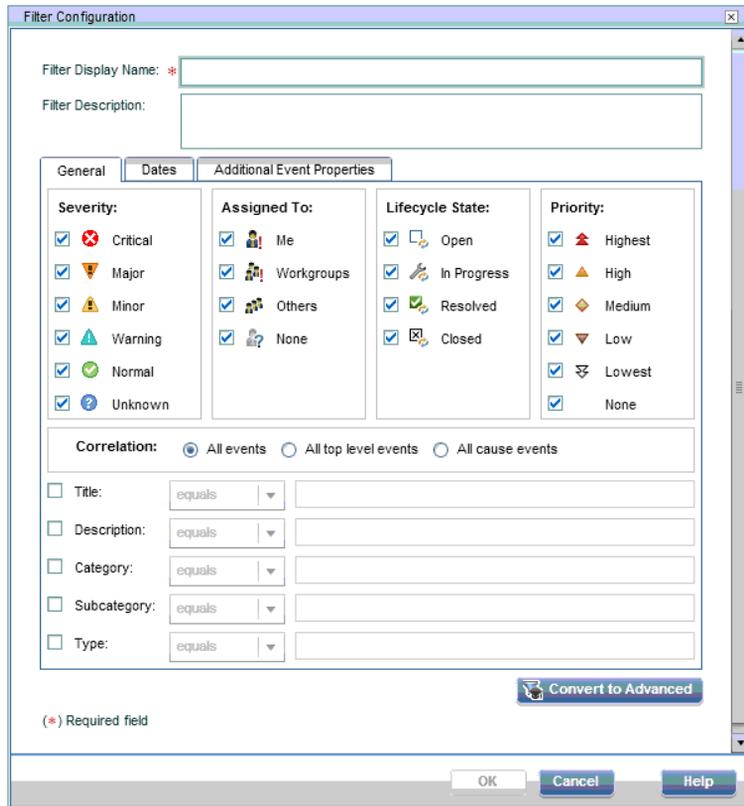
When you open the Event Browser for the first time, no filters are applied and **Select an event filter** is displayed in the Event Browser Filter applied list. After you select a filter, the name of the active event filter is displayed in the filter selection field. If you want to clear the selected filter, select **No Filter**. The effect of the filter on the Event browser is cleared, but can be reapplied as required.

Note: By default, the contents of the Event Browser pane are filtered according to the selected configuration item or view. To disable filtering by configuration item or view use the **Enable/Disable View Filtering**  toggle button.

Event Filters

Event filters enable you to limit the type of events displayed in the Event Browser by defining rules that filter events according to criteria such as severity, origin, type, and ownership. The filters you define are available from the Select an Event Filter dialog box or the filter selection drop-down box of the Event Browser. The active filter remains on display in the filter selection drop-down box.

You define and edit filters using the Filter Configuration dialog box available from the Event Browser. Simple filtering information is grouped under the General, Dates, and Additional Event Properties tabs. A Simple Filter definition is the combination of all information specified in the three tabs.



Filter Configuration

Filter Display Name: *

Filter Description:

General | Dates | Additional Event Properties

Severity:

-  Critical
-  Major
-  Minor
-  Warning
-  Normal
-  Unknown

Assigned To:

-  Me
-  Workgroups
-  Others
-  None

Lifecycle State:

-  Open
-  In Progress
-  Resolved
-  Closed

Priority:

-  Highest
-  High
-  Medium
-  Low
-  Lowest
-  None

Correlation: All events All top level events All cause events

Title: equals []

Description: equals []

Category: equals []

Subcategory: equals []

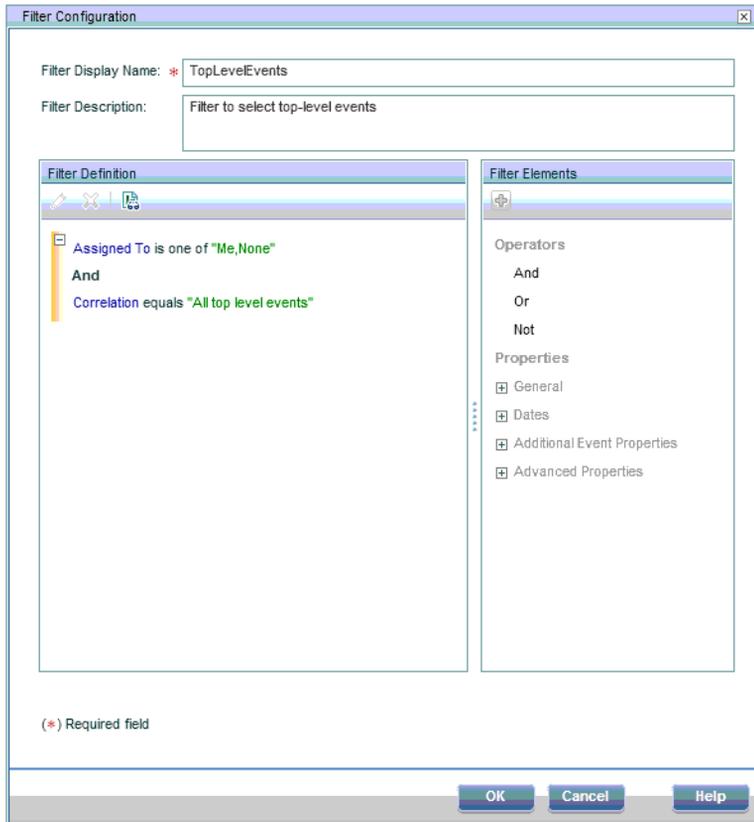
Type: equals []



(* Required field)

OK Cancel Help

You can also use the Advanced Mode for defining more complex filters. An advanced filter definition is specified in the Filter Definition pane using combinations of properties and operators.



Note: When investigating closed events using the Closed Events Browser, you must first specify the time period of interest. Filters can then be applied to the available events.

Filters are specified by individual users for use locally in their own Event Browser. A user-configured filter is available only to the user under which it was configured.

Filter Application

You can create filters for use in the Event Browser, the Closed Events Browser, and many Operations Management administration areas. Most filters are dedicated to the browser or manager for which they are configured. You can apply a different filter for each instance of a perspective. Filters defined for the Event Browser are also available in the Closed Events Browser and vice versa.

Tasks

How to Filter Events by Views

In this task, you learn how to filter the events displayed in the Event Browser according to a view. Only events related to configuration item included in the selected view appear in the Event Browser.

To filter events by Views:

- 1 Start the Event Perspective or Health Perspective:

Applications > Operations Management > <select a perspective>

- 2 In the Browse Views tab of the Model Explorer, use the view list to select a view to apply.

The events displayed in the Event Browser are limited to events associated with the selected view.

Note: The View filter is combined with the currently applied event filter.

To disable filtering by views, click the Enable/Disable View Filtering  toggle button.

How to Filter Events by Configuration Items

In this task, you learn how to filter the events displayed in the Event Browser by configuration item. Only events related to the selected configuration item appear in the Event Browser.

To filter events by configuration item:

- 1 Start a perspective containing an Event Browser and a Model Explorer, for example, the Event Perspective or the Health Perspective:

Applications > Operations Management > <select a perspective>

In the Browse Views tab of the Model Explorer, use the view list to select a view to apply.

- 2 Select one or more configuration items, CI collections, or a combination of both from the Model Explorer pane to use as an event filter.
- 3 Enable CI Filtering . Displays all events selected by the active filter for the selected CI. The events displayed in the Event Browser are limited to events associated with the selected configuration item.

Alternatively, enable CI Filter (include events for child CIs) . Displays all events selected by the active filter for the selected CI and all its child CIs.

Note: The CI filter is combined with the currently applied event filter.

To disable filtering by CIs, click the Disable CI Filter  button.

How to View and Apply Event Filters

In this task, you learn how to display a list of configured event filters and apply one to the Event Browser.

To view a list of configured event filters:

- 1 Start a perspective containing an Event Browser and a Model Explorer, for example, the Event Perspective or the Health Perspective:

Applications > Operations Management > <select a perspective>

Select a filter from the Filter list.

- 2 Alternatively, in the Event Browser, click the **Event Filter**  button. The Select an Event Filter dialog box opens containing a list of available event filters.

Note: The contents of the list of event filters displayed in the Select an Event Filter are user specific. The list contains only event filters that the active user has configured.

- 3 Select the event filter you want to apply.
- 4 *Optional:* Open the Filter Configuration dialog box using the **Edit Item**  button and modify the selected filter and click **OK**.
- 5 Click **OK** to enable the selected event filter.
Enabling a filter updates the contents of the browser immediately.
- 6 If the selected filter does not display the results you require, redefine the selected event filter or select an alternative event filter.

Note: If you want to clear the selected filter, select **No Filter** from the filter selection box. Deleting the filter selected in the Event Browser from the list of filters automatically applies no filter to the Event Browser.

How to Define Simple Event Filters

In this task, you learn how to set up a Simple Filter for the Event Browser or the Closed Event Browser using the Filter Configuration dialog box.

To define an event filter:

- 1** From the Event Browser or the Closed Event Browser, open the Select an Event Filter dialog box using the **Event Filter**  button.

Note: The Select an Event Filter dialog box is also available using the Manage Event Filters (...) button in the New and Edit dialog boxes of the Administration managers.

- 2** From the Select an Event Filter dialog box, open the Filter Configuration dialog box using the **New Item**  button and select **Simple Filter**.

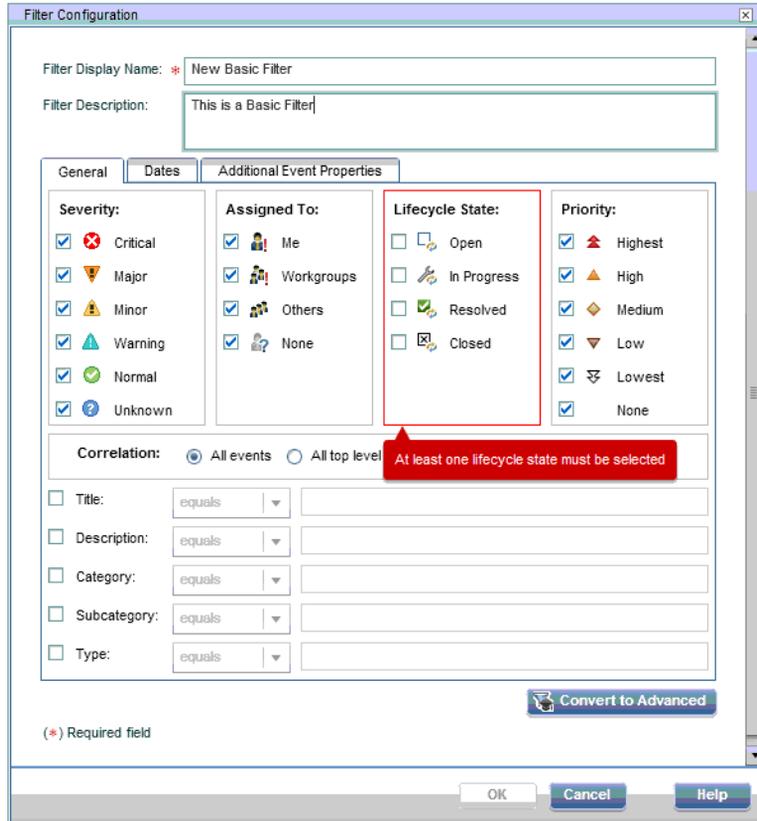
The Filter Configuration dialog box opens.

- 3** Enter a name and description for the new filter.
- 4** Use the displayed tabs to configure the new filter (General, Dates, and Additional Event Properties).

In the Filter Configuration dialog box, if any one of the selected criteria within a frame is true, for example, **Severity** of the event is **Critical**, the event is selected by the filter.

All selections in the frames themselves and the other filter criteria, for example, **Severity** is **Critical** and **Assigned to** is **Me**, must be matched by the event for it to be selected by the filter.

For example, if the severities Critical and Major are selected within the same pane, events exhibiting either severity are displayed. If the assignment Not assigned is also selected from another pane, only events not assigned to a user and exhibiting one of the selected severities are displayed.



- 5 *Optional:* Select **Convert to Advanced** to switch to the advanced filter definition mode and further tailor your filter. For details, see "How to Define Advanced Event Filters" on page 224.

Note: An Advanced Filter cannot be converted back to a Simple Filter.

6 Select **OK** to save the changes.

The Filter Configuration dialog box closes and the new event filter is added to the list of filters in the Select an Event Filter dialog box.

7 *Optional:* Select the newly created event filter and click the **Find Matching Events**  button. This opens a new Event Browser window, displaying the results of applying the newly defined filter. If the filter does not display the results you require, redefine the filter.

For details of the Filter Configuration dialog box, see "Simple Filter Configuration Dialog Box" on page 231.

How to Define Advanced Event Filters

In this task, you learn how to set up an advanced event filter for the Event Browser or the Closed Event Browser using the Filter Configuration dialog box.

To define an advanced event filter:

- 1 From the Event Browser or the Closed Event Browser, open the Select an Event Filter dialog box using the **Event Filter**  button.

Note: The Select an Event Filter dialog box is also available using the Manage Event Filters (...) button in the New and Edit dialog boxes of the Administration managers.

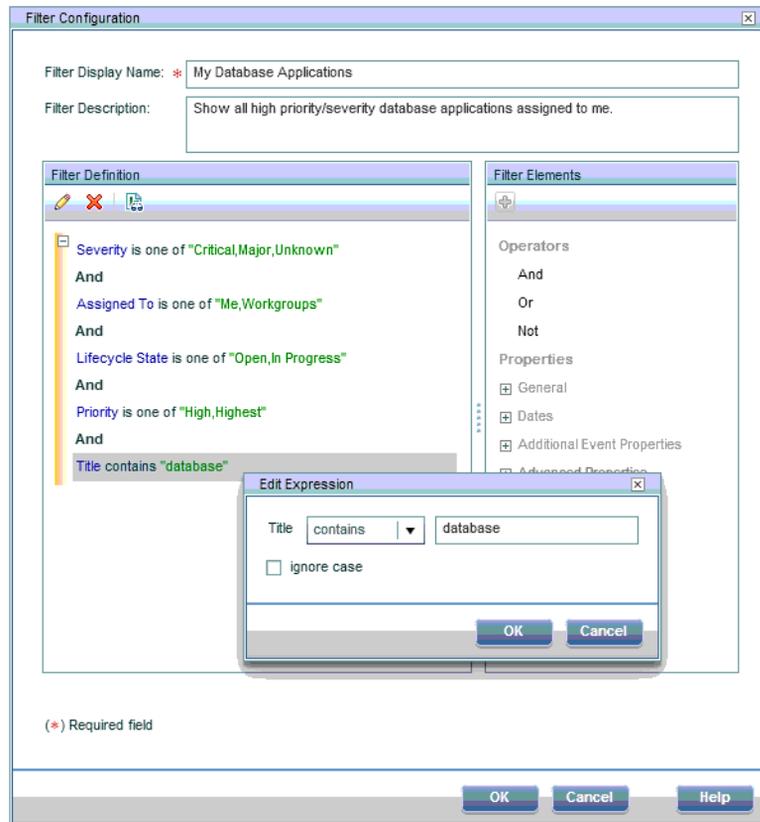
- 2 From the Select an Event Filter dialog box, open the Filter Configuration dialog box using the **New Item**  button and select **Advanced Filter**.

The Filter Configuration dialog box opens.

Note: Alternatively, select **Simple Filter** and the Use the displayed tabs to make any suitable Simple configurations for the new filter (**General**, **Dates**, and **Additional Event Properties**). These configurations become the starting point for the advanced filter configuration after selecting **Convert to Advanced** and switching to the Advanced Filter definition mode. For details, see "How to Define Simple Event Filters" on page 221.

- 3 Enter a name and description for the new filter.
- 4 *Optional:* If you started with a Simple Filter, select **Convert to Advanced** to switch to the advanced filter definition mode.

The Advanced Mode enables you to very precisely specify filters using a combination of operators, properties, and expressions.



Note: Advanced Filters cannot be displayed in the Simple Filter view and it is not possible to switch to the Simple Filter view from the Advanced Filter view.

- 5 Start assembling a filter by dragging properties and operators to the Filter Definition pane, for example, **Description**. Alternatively, select elements or operators and add them to the active filter specification using the **Add**  button.

The Edit Expressions dialog box opens containing an editor specific to the selected property type.

- 6 There are two basic types of Edit Expressions dialog boxes: string filters and pre-specified filters

► **Defining a string filter:**

Select a matching criteria for the selected property, for example, contains and specify a text string to search for.

The matching criteria **matches** and **not matches** are used for specifying regular expressions providing you with a very powerful filtering tool.

Note: Processing filters containing regular expressions requires higher resources than for filters without them and it is recommended that regular expressions are used only when a simpler alternative is not possible.

Optional: Select **ignore case** to make the expression case-insensitive.

► **Defining a pre-specified filter:**

Pre-specified filters are used to select attributes which have a known range of values, for example, severities, priorities, lifecycle states, and dates.

Select a matching criteria for the selected property, for example, equals, one of, is true, before, not older than, and, where appropriate, select one or more of the available options, for example, severity values, priority values, dates and times, or lifecycle states.

- 7 Select **OK** to close the Edit Expression dialog box.
- 8 Repeat steps 5 to 7 to specify additional filtering components to the filter specification.

If you want to change an entry, double-click it. The Edit Expression window opens from which you can change the specification of the expression.

- 9 Select **OK** to save the changes.

The Filter Configuration dialog box closes and the new event filter is added to the list of filters in the Select an Event Filter dialog box.

- 10 *Optional:* Select the newly created event filter and click the **Find Matching Events**  button. This opens a new Event Browser window, displaying the results of applying the newly defined filter. If the filter does not display the results you require, redefine the filter.

For details of the Filter Configuration dialog box, see "Simple Filter Configuration Dialog Box" on page 231.

Reference

Filter Manager User Interface

The Select an Event Filter and Manage Event Filters dialog boxes display a list of the filters that are configured by the active user for the current browser or manager. You can select a filter from the list of configured event filters and apply it, edit or delete an existing filter, or create and test a new filter.

Further filtering interface elements are described in detail in the following topics:

- ▶ Select an Event Filter and Manage Event Filters Dialog Boxes on page 229
- ▶ Simple Filter Configuration Dialog Box on page 231
- ▶ Advanced Filter Configuration Dialog Box on page 237
- ▶ Edit Expression Dialog Boxes for Advanced Filters on page 244
- ▶ Operators Used in Filter Configuration Dialog Boxes on page 250

Select an Event Filter and Manage Event Filters Dialog Boxes

To access	Select Applications > Operations Management > <select a perspective> and open the Select an Event Filter dialog box using the Event Filter  button.
Relevant tasks	To filter events, see: <ul style="list-style-type: none"> ▶ "How to Filter Events by Views" on page 218. ▶ "How to Filter Events by Configuration Items" on page 219. ▶ "How to View and Apply Event Filters" on page 220. ▶ "How to Define Simple Event Filters" on page 221. ▶ "How to Define Advanced Event Filters" on page 224.
See also	For more information about filtering events, see "Filtering Methods" on page 212 and "Event Filters" on page 215.

The Select an Event Filter and Manage Event Filters dialog boxes display the UI elements listed in the following table.

UI Element (A-Z)	Description
	Synchronizes the filter data displayed in the list of available filters with the latest information available in the database.
	Opens the selection box from which you can select the type of filter that you want to specify: Simple Filter or Advanced Filter . The Filter Configuration dialog box opens, from which you can create and define a new event filter. Click OK to save the new filter.
	Creates a copy of the selected filter and opens the Filter Configuration dialog box.
	Opens the Filter Configuration dialog box for the selected event filter from which you can modify the selected event filter. Click OK to save the modifications to the selected event filter.

UI Element (A-Z)	Description
	<p>Opens the Delete Event Filter dialog box for the selected event filter.</p> <p>Click Yes to delete the selected filter annotation.</p>
	<p>Displays events that match the selected filter in an Event Browser pop-up window. Useful for testing an event filter before applying it to the Event Browser.</p>

Simple Filter Configuration Dialog Box

The Simple Filter Configuration dialog box displays the attributes that you can use either individually or in combination to filter events before displaying them.

To access	Select Applications > Operations Management > <select a perspective> and open the Select an Event Filter dialog box using the Event Filter  button.
Relevant tasks	To filter events, see: <ul style="list-style-type: none"> ➤ "How to Filter Events by Views" on page 218. ➤ "How to Filter Events by Configuration Items" on page 219. ➤ "How to View and Apply Event Filters" on page 220. ➤ "How to Define Simple Event Filters" on page 221. ➤ "How to Define Advanced Event Filters" on page 224.
See also	For more information about filtering events, see "Filtering Methods" on page 212 and "Event Filters" on page 215.

For more information about the information displayed in the Filter Configuration tabs, see the following sections:

- "Common Buttons and Icons" on page 232
- "General Tab" on page 232
- "Dates Tab" on page 234
- "Additional Event Properties Tab" on page 235

Common Buttons and Icons

The Filter Configuration window includes the UI elements listed in the following table.

UI Element (A-Z)	Description
Convert to Advanced	<p>Opens the Advanced Mode used to define more comprehensive filters. For details, see "How to Define Advanced Event Filters" on page 224.</p> <p>Note: Advanced filters cannot be displayed in the Simple Filter view.</p>

General Tab

The General tab in the Filter Configuration dialog box displays the UI elements listed in the following table.

UI Element (A-Z)	Description
Assigned To	User or user group to whom the events you want to find are assigned. Multiple assignments can be selected. For example, you can select Assigned To Me and Not Assigned.
Category	Category of event that you want to use as a filter option, for example: DB, Storage, System, or WebApp.
Correlation	<p>Select the desired option to search for all events, only top level events, or only cause events:</p> <p>All events: All events, which includes events correlated as symptoms of other events.</p> <p>All top level events: All events that not classified as symptom of another event.</p> <p>All cause events: All events that are root cause events. They cannot be symptoms of another cause event.</p>
Description	Description of an event as displayed in the contents of the original event's description field.

UI Element (A-Z)	Description
Lifecycle State	Stage in the problem lifecycle that the events you are looking for have reached, for example: Open, In Progress, Resolved or Closed. Multiple lifecycle states can be selected.
Priority	Searches for events that match the specified priorities, for example: None, Low, or Medium. Multiple priorities can be selected.
Severity	Selects an event severity to use as a filter option. Multiple severities can be selected.
Subcategory	Name of the event subcategory to which the events you are looking for belong.
Title	Title of the events you are looking for.
Type	Type of event you want to display with the filter.

Dates Tab

The Dates tab in the Filter Configuration dialog box displays the UI elements listed in the following table.

UI Element (A-Z)	Description
Absolute Time	Specifies the date and time in absolute (calendar) terms. A time can be specified by entering a calendar date, and time values for hours and minutes.
Relative Time	<p>Specifies a point in time used to filter events. Events either before or after the specified time can be selected using operators such as:</p> <ul style="list-style-type: none"> ➤ older than ➤ not older than <p>The time period can be specified in minutes, hours, days, or weeks.</p> <p>Note: The Event Browser is dynamically updated. Events that no longer match a relative time filter are removed from the Event Browser and new events that match are added.</p>
Time Created	Specifies the dates and times between which the events you are searching for occurred.
Time Lifecycle State Changed	Date and time when the last lifecycle state change took place.
Time Received	Specifies the dates and times between which Operations Management first received notification of the events you are searching for.

Additional Event Properties Tab

The Additional Event Properties tab in the Filter Configuration dialog box displays the UI elements listed in the following table.

UI Element (A-Z)	Description
Application	Selects events linked to the named application.
CI Type	Selects the option to search for events that are related to the specified CI type or are a child of the specified CI type. The dedicated operators for filtering CI types are: <ul style="list-style-type: none"> ▶ equals: Related CI matches a specified CI type ▶ is derived from: Related CI is derived from the specified CI type
Custom Attribute	Selects the Custom Attributes editor where you can specify a custom attribute, an operator, and a value for use in filtering. <p>You define a custom attribute filter by specifying the name of the custom attribute in the field on the left, selecting a filter matching criteria from the list, and specifying the value of the custom attribute in the field on the right.</p> <p>Note: In the Advanced mode, You can add further custom attribute specifications. These can be related using any of the available operators.</p>
Key	Selects events that contain a reference to the named key.
Object	Selects events that are related to a named object, as specified in the original HPOM message.

UI Element (A-Z)	Description
<p>Original Data</p>	<p>Original event text as captured from HPOM agents before being formatted into an HPOM message.</p> <p>Contains information about the original input before being normalized by HPOM agent policies into a message. Typically, the information available includes node name, message group, application, object, severity, and message text.</p>
<p>Solution</p>	<p>A text field used to describe the solution steps taken to solve the problem identified by the event.</p> <p>Solution texts can be synchronized with external managers such as Service Manager.</p>

Advanced Filter Configuration Dialog Box

The Advanced Filter Configuration dialog box displays the attributes that you can use either individually or in combination to filter events before displaying them.

To access	Select Applications > Operations Management > <select a perspective> and open the Select an Event Filter dialog box using the Event Filter  button.
Relevant tasks	To filter events, see: <ul style="list-style-type: none"> ➤ "How to Filter Events by Views" on page 218. ➤ "How to Filter Events by Configuration Items" on page 219. ➤ "How to View and Apply Event Filters" on page 220. ➤ "How to Define Simple Event Filters" on page 221. ➤ "How to Define Advanced Event Filters" on page 224.
See also	For more information about filtering events, see "Filtering Methods" on page 212 and "Event Filters" on page 215.

For more information about the information displayed in the Filter Configuration tabs, see the following sections:

- "Advanced Filter Configuration" on page 238
- "General Filter Elements" on page 239
- "Dates Filter Elements" on page 240
- "Additional Event Properties Filter Elements" on page 241
- "Advanced Properties Filter Elements" on page 242

Advanced Filter Configuration

The filter matching criteria lists display the UI elements listed in the following table.

UI Element (A-Z)	Description
	<p>Opens the Edit Expression dialog box for the selected event filter element from which you can modify the selected event filter element.</p> <p>Click OK to save the modifications to the selected event filter element.</p>
	<p>Deletes the selected event filter element from the selected event filter specification.</p>
	<p>Toggles between full view and compact view of the filter specification.</p>
	<p>Adds a new element and opens the Expression dialog box for the newly added element.</p>
<p>Edit Expression</p>	<p>Dialog boxes used to specify filter component definitions that describes, for example, what values of a selected attribute is included in the filter definition. For examples of Edit Expression dialog boxes, see "Edit Expression Dialog Boxes for Advanced Filters" on page 244.</p>
<p>Filter Definition</p>	<p>Contains the components chosen to define the filter. Properties are associated with a value and are connected using operators.</p>
<p>Filter Elements</p>	<p>Contains the available operators and properties used to specify an advanced filter. Drag each required property or operator to the filter definition pane and drop it in its logical location in the filter. To edit and delete entries from the filter definition, use the buttons or double-click the expression that you want to change.</p>

General Filter Elements

The General tab in the Filter Configuration dialog box displays the UI elements listed in the following table.

UI Element (A-Z)	Description
Assigned To	User or user group to whom the events you want to find are assigned. Multiple assignments can be selected. For example, you can select Assigned To Me and Not Assigned.
Category	Category of event that you want to use as a filter option, for example: DB, Storage, System, or WebApp.
Correlation	Select the desired option to search for all events, only top level events, or only cause events: All events: includes events correlated as symptoms of other events. All top level events: includes all events that do not have a cause assigned. All cause events: includes all events that are root cause events. They cannot be symptoms of another cause event.
Description	Description of an event as displayed in the contents of the original event's description field.
Lifecycle State	Stage in the problem lifecycle that the events you are looking for have reached, for example: Open, In Progress, Resolved or Closed. Multiple lifecycle states can be selected.
Priority	Searches for events that match the specified priorities, for example: None, Low, or Medium. Multiple priorities can be selected.
Severity	Selects an event severity to use as a filter option. Multiple severities can be selected.
Subcategory	Name of the event subcategory to which the events you are looking for belong.

UI Element (A-Z)	Description
Title	Title of the events you are looking for.
Type	Type of event you want to display with the filter.

Dates Filter Elements

The Dates tab in the Filter Configuration dialog box displays the UI elements listed in the following table.

UI Element (A-Z)	Description
<Absolute Time>	Specifies the date and time in absolute (calendar) terms. A time can be specified by entering a calendar date, and time values for hours and minutes.
<Relative Time>	Specifies a point in time used to filter events. Events either before or after the specified time can be selected using operators such as: <ul style="list-style-type: none"> ➤ older than ➤ not older than The time period can be specified in minutes, hours, days, or weeks. <p>Note: The Event Browser is dynamically updated. Events that no longer match a relative time filter are removed from the Event Browser and new events that match are added.</p>
Time Created	Specifies the dates and times between which the events you are searching for occurred.
Time Lifecycle State Changed	Date and time when the last lifecycle state change took place.
Time Received	Specifies the dates and times between which Operations Management first received notification of the events you are searching for.

Additional Event Properties Filter Elements

The Additional Event Properties tab in the Filter Configuration dialog box displays the UI elements listed in the following table.

UI Element (A-Z)	Description
Application	Selects events linked to the named application.
CI Type	<p>Selects the option to search for events that are related to the specified CI type or are a child of the specified CI type. The dedicated operators for filtering CI types are:</p> <ul style="list-style-type: none"> ▶ equals: Related CI matches a specified CI type ▶ is derived from: Related CI is derived from the specified CI type
Custom Attribute	<p>Selects the Custom Attributes editor where you can specify a custom attribute, an operator, and a value for use in filtering.</p> <p>You define a custom attribute filter by specifying the name of the custom attribute in the field on the left, selecting a filter matching criteria from the list, and specifying the value of the custom attribute in the field on the right.</p> <p>Note: In the Advanced mode, You can add further custom attribute specifications. These can be related using any of the available operators.</p>
Key	Selects events that contain a reference to the named key.
Object	Selects events that are related to a named object, as specified in the original HPOM message.

UI Element (A-Z)	Description
Original Data	Original event text as captured from HPOM agents before being formatted into an HPOM message. Contains information about the original input before being normalized by HPOM agent policies into a message. Typically, the information available includes node name, message group, application, object, severity, and message text.
Solution	A text field used to describe the solution steps taken to solve the problem identified by the event. Solution texts can be synchronized with external managers such as Service Manager.

Advanced Properties Filter Elements

The Additional Properties tab in the Filter Configuration dialog box displays the UI elements listed in the following table.

UI Element (A-Z)	Description
Assigned User	Selects events that are assigned or not assigned to a user, or assigned to the specified user.
Assigned Workgroup	Selects events that are assigned or not assigned to a group, or assigned to the specified group.
Automatic Action State	Selects events that exhibit any of the specified Automatic Action States. The possible states are: <ul style="list-style-type: none"> ➤ Available ➤ Running ➤ Success ➤ Failed ➤ Not Available
CI Resolution Quality Measure	Selects events with the specified CI Resolution Quality Measure.
CI Resolution Success Status	Selects events with the specified CI Resolution Success Status.

UI Element (A-Z)	Description
Control Transferred	Selects events for which control was transferred to an external server or not transferred to an external server.
ETI Resolution Hint	Selects events with the specified ETI Resolution Hint.
External ID	Selects events with the specified External ID.
Received During Downtime	Selects events which were received during downtime or not received during downtime.
Related CI Hint	Selects events with the specified Related CI Hint.
User Action State	<p>Selects events that exhibit any of the specified User Action States. The possible states are:</p> <ul style="list-style-type: none"> ➤ Available ➤ Running ➤ Success ➤ Failed ➤ Not Available

Edit Expression Dialog Boxes for Advanced Filters

The Advanced Filter Configuration dialog box includes edit expression dialog boxes dedicated to types of expressions being specified. The following sections describe these edit expression dialog boxes.

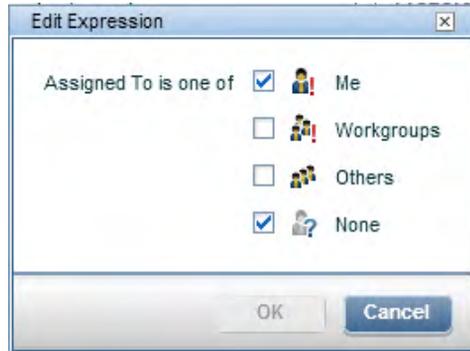
To access	Select Applications > Operations Management > <select a perspective> and open the Select an Event Filter dialog box using the Event Filter  button.
Relevant tasks	To filter events, see: <ul style="list-style-type: none"> ➤ "How to Filter Events by Views" on page 218. ➤ "How to Filter Events by Configuration Items" on page 219. ➤ "How to View and Apply Event Filters" on page 220. ➤ "How to Define Simple Event Filters" on page 221. ➤ "How to Define Advanced Event Filters" on page 224.
See also	For more information about filtering events, see "Filtering Methods" on page 212 and "Event Filters" on page 215.

For more information about the edit expression dialog boxes, see the following sections:

- "Attributes Included in a Preconfigured List" on page 245
- "Attributes Identified by a Text String" on page 245
- "Custom Attributes" on page 246
- "Events Selected by Dates" on page 247
- "CI Type" on page 247
- "Attribute Selection from a List" on page 248
- "Numerical Values" on page 248
- "True or False" on page 249

Attributes Included in a Preconfigured List

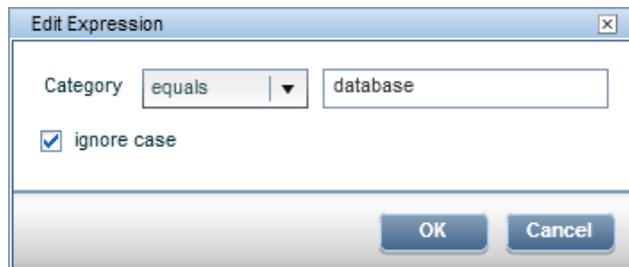
This Edit Expression dialog box is used to typically select a combination of attributes, for example, events assigned to the current user and events not assigned to any user.



Select one or more of the available event attributes that you want to include in your list of events.

Attributes Identified by a Text String

This Edit Expression dialog box is used to typically select an attribute with a specified relationship to its value, for example, events with the **Category** value equal to **database**, where the selection is insensitive to case.



For the selected attribute, enter a text string to search for and select an operator to establish the relationship between the attribute and its value. For a description of the available operators, see "Text Operators" on page 251.

Select **ignore case** to search for all forms of the specified text.

Custom Attributes

This Edit Expression dialog box is used to select an custom attributes with a specified relationship to its value, for example, events including the Custom Attribute ForwardToTroubleTicket with value equal to true, where the selection is insensitive to case.



For the specified custom attribute, enter a text string for the attribute value to search for and select an operator to establish the relationship between the custom attribute and its value. For a description of the available operators, see "Text Operators" on page 251.

Select **ignore case** to search for all forms of the specified text.

Events Selected by Dates

This Edit Expression dialog box is used to select events depending on when they were, created, received, or when their lifecycle state changed. In this example, events created longer than 4 hours ago are selected.

The screenshot shows a dialog box titled 'Edit Expression'. It contains a label 'Time Created' followed by a dropdown menu set to 'older than', a numeric input field containing '4', and another dropdown menu set to 'hour(s)'. At the bottom right, there are two buttons: 'OK' and 'Cancel'.

For the selected attribute, enter a time and an operator to be used to identify the appropriate events. For a description of the available operators, see "Date Operators" on page 250.

CI Type

This Edit Expression dialog box is used to select events related to the specified CI type or related to a CI type derived from the specified CI type. In this example, events with a CI type derived from the CI type Computer are selected.

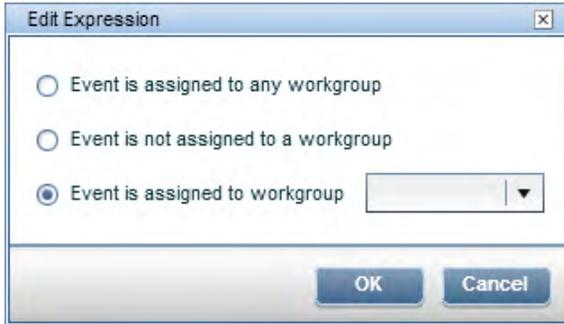
The screenshot shows a dialog box titled 'Edit Expression'. It contains a label 'CI Type' followed by a dropdown menu set to 'derived from', a text input field containing 'Computer', and a small button with three dots (...). At the bottom right, there are two buttons: 'OK' and 'Cancel'.

Select a CI type from the Select a CI Type dialog box (...) and select an operator (equals or derived from).

- ▶ **equals:** Related CI matches a specified CI type
- ▶ **is derived from:** Related CI is derived from the specified CI type

Attribute Selection from a List

This Edit Expression dialog box is used to typically select one attribute from a predefined list, for example, events assigned to a specified workgroup.



Select one event attributes that you want to include in your list of events, and, if necessary, specify the value of the attribute, for example, the workgroup called Administrators.

Numerical Values

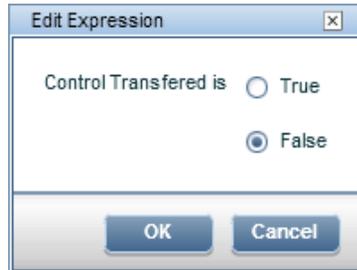
This Edit Expression dialog box is used to typically select an attribute with a specified relationship to its numerical value, for example, events with the value of the CI Resolution Quality Measure equal to or greater than 3.



Select a value for the event attributes and select an operator to establish the relationship between the event attribute and its value. For a description of the available operators, see "Numerical Operators" on page 250.

True or False

This Edit Expression dialog box is used to typically select the true or false attribute value for the event attribute being configured, for example, Control Transferred is False.



Select true or false for the event attribute being configured.

Operators Used in Filter Configuration Dialog Boxes

The Advanced Filter Configuration dialog boxes supports the operators listed in the following tables:

- "Date Operators" on page 250
- "Numerical Operators" on page 250
- "Text Operators" on page 251
- "True-False Operators" on page 252

Date Operators

The following table lists the operators for use in date expressions.

Operators (A-Z)	Description
After	When specifying absolute times, selects events that have a timestamp more recent than the specified time.
Before	When specifying absolute times, selects events that have a timestamp older than the specified time.
not older than	When specifying relative times, selects events that have a timestamp more recent than the selected time point, for example, not older than one day.
older than	When specifying relative times, selects events that have a timestamp less recent than the selected time point, for example, older than one day.

Numerical Operators

The following table lists the operators for use in numerical expressions.

Operators	Description
=	Displays any event that has a value of the selected attribute that is identical to the specified value.
<	Displays any event that has a value of the selected attribute that is less than the specified value.

Operators	Description
<=	Displays any event that has a value of the selected attribute that is lower than or identical to the specified value. For example, selecting the value 33, for CI Resolution Quality Measure displays all events with CI Resolution Quality Measure below 33%
>	Displays any event that has a value of the selected attribute that is greater than the specified value.
>=	Displays any event that has a value of the selected attribute that is higher than or identical to the specified value. For example, selecting the value 50, for CI Resolution Quality Measure displays all events with CI Resolution Quality Measure values above 50%.

Text Operators

The following table lists the operators for use in text expressions.

Operators (A-Z)	Description
contains	Displays any event that contains a reference to the specified string in the selected attribute. For example, searching for any string that contains database returns: <ul style="list-style-type: none"> ▶ database ▶ database status ▶ Oracle Database status
equals	Displays any event that has an attribute or attribute value that is identical to the specified string. For example, searching for events of a category type that equals database returns events of the following category: <ul style="list-style-type: none"> ▶ database
matches	Displays any event that matches the specified regular expression. Processing filters containing regular expressions requires higher resources than for filters without them and it is recommended that regular expressions are used only when a simpler alternative is not possible.

Operators (A-Z)	Description
not contains	<p>Displays any event that does not contain a reference to the specified string in the selected attribute. Searching for a string that does not contain database returns all strings except those containing database, for example:</p> <ul style="list-style-type: none"> ➤ Blue moon ➤ Almost everything else
not equals	<p>Displays any event that has an attribute that is not identical to the specified string. For example, searching for events of a category that does not equal database returns events with categories that are not identical to database, returns event attributes such as:</p> <ul style="list-style-type: none"> ➤ Storage ➤ DB ➤ Network
not matches	<p>Displays any event that does not match the specified regular expression.</p> <p>Processing filters containing regular expressions requires higher resources than for filters without them and it is recommended that regular expressions are used only when a simpler alternative is not possible.</p>

True-False Operators

The following table lists the operators for use in true and false expressions.

Operators (A-Z)	Description
False	Used to set an attribute not to be matched.
True	Used to set an attribute to be matched.

Troubleshooting and Limitations

This section provides help for those people who are troubleshooting problems relating to Operations Management event filters, including creating, modifying, and enabling filters.

- "Filters Not Available in Event Filter List" on page 253
- "Events Not Visible" on page 253

Filters Not Available in Event Filter List

- Filter does not belong to active user.
- Filters are only available for the area for which they are created. For example, an Event Browser filter is not available in the Closed Events Browser.

Events Not Visible

- Make sure that the correct filter is enabled.
- Make sure that the currently enabled filter is correctly configured.
- Make sure that the currently applied CI or View does not filter out events that you want to see.

8

Views for Operations Management

This chapter includes:

Concepts

- ▶ Views on page 256
- ▶ View Mapping on page 257

Tasks

- ▶ How to Select a View on page 258

Reference

- ▶ Model Explorer Pane on page 259

Concepts

Views

This chapter describes the main concepts of views. The ConfigurationItem model in the configuration management database can be very large, holding thousands of configuration items (CIs). A view enables you to build a subset of the overall ConfigurationItem model, containing only those CIs relating to a specific area of interest. You can define your own views to display only the information that is relevant to your organization's business needs.

Views for Operations Management help you to limit the configuration items displayed in the Model Explorer. Operations Management filters the contents of the Event Browser in the Event Perspective and the Health Perspective according to the selected configuration items.

To configure and modify views, use the Modeling Studio:

Admin > RTSM Administration > Modeling > Modeling Studio

Operations Management Content Packs provide views that group configuration items into sets that help you to perform your tasks more efficiently. You can modify existing (or configure new) views to change, increase, or decrease the amount and type of information displayed. You can exchange the views between instances of Operations Management using the Import and Export features of the Content Packs manager.

Note: You can use views to limit the contents of the CI Tree. Selecting a configuration item from the CI Tree restricts the contents of the Event Browser to events related to that configuration item only.

To learn how to display a complete list of the Operations Management views, see "How to Select a View" on page 258. For more information about the CI Tree, see "Model Explorer Pane" on page 259.

View Mapping

A view displays a subset of the overall ConfigurationItem model, for example, only those CIs that relate to a specific area of interest. Selecting a view enables you to refine both the type and the amount of information displayed, for example, in the CI Tree or the Health Top View pane.

You can map views to configuration item types. The mapped views appear in the Selected Views list displayed in the Health Top View pane of the Health Perspective tab. For more information about the contents of the Health Top View pane and the Selected Views list, see "Health Top View" on page 135.

You can exchange the view mappings that you configure between instances of Operations Management using the Import and Export features of the Content Packs manager.

Note: Only users with the appropriate access permissions can use the Administration features.

To learn how to display a complete list of the Operations Management views, see "How to Select a View" on page 258. For more information about the CI Tree, see "Model Explorer Pane" on page 259.

Tasks

How to Select a View

You can use views to configure the Model Explorer to display any combination of the available configuration items. The following steps explain how to select a view from the drop-down list of views available.

Note: For information about button actions, see "Model Explorer Pane" on page 259.

To display a list of views:

- 1 Open the Event Perspective or the Health perspective to display the list of known events:

Applications > Operations Management > <select a perspective>

In the Model Explorer pane, select the Browse Views tab.

- 2 Use the **View** list to display the available views and select the required view.

Entering a character in the View field highlights the first matching view name.

Reference

Model Explorer Pane

The Model Explorer displays an overview of the configuration items (CIs) stored in the RTSM. Displaying the CIs in a tree enables you to browse and locate them more easily.

You can use views to configure the Model Explorer to display any combination of the available configuration items. You can also highlight configuration items that match a specific pattern or search through the database to locate individual or groups of configuration items.

The Model Explorer contains tabs that enable you to browse and search through views of the RTSM.

Part II

Configuring Operations Management

9

Introduction and Overview

The information in this section describes how to configure Operations Management.

This chapter includes:

- ▶ Licensing on page 263
- ▶ How This Section Is Organized on page 265
- ▶ Who Should Read This Section on page 268

Licensing

BSM Operations Management is available with an HP Business Service Management (BSM) deployment with an active Operations Manager *i* (OMi) license.

If no OMi license is installed, or if you are using the 60-day evaluation license, BSM Operations Management is not enabled. Only the event channel features are enabled, for example:

- ▶ CI Resolution
- ▶ ETI Resolution by ETI Hint
- ▶ Event Forwarding
- ▶ Event Notifications
- ▶ Health Indicator Updates
- ▶ Event Reconciliation

The Operations Manager *i* (OMi) licensing structure is as follows:

► **Event Management Foundation license only**

The Event Management Foundation license is required for BSM Operations Management functionality.

BSM Operations Management functionality includes:

- ETI Resolution by ETI Rule
- Event Store in the RTSM
- User and Group Assignments
- Automatic Closing of Events
- Duplicate Event Suppression
- KPI Calculation
- EPI Scripts Management
- Topology Discovery
- Graphing
- Event Synchronization
- Event Priorities
- ETI Mapping
- Downtime Management

► **Topology-Based Event Correlation License**

The Topology-Based Event Correlation license is required for the topology-based event correlation (TBEC) functionality. The TBEC license builds on the Event Management Foundation license.

► **Target Connector License**

A Target Connector license is required for each node managed by a third-party (non-HP) management solution, where events are consolidated in BSM Operations Management. For example, if a Microsoft SCOM system is connected to BSM Operations Manager, and manages 20 nodes, you require 20 target connector licenses.

Note: For licensed HP management products, such as HP Operations Manager (HPOM) for Windows, HPOM agents, or HP SiteScope, no additional target connector licenses are required.

A Target Connector license builds on the Event Management Foundation license.

How This Section Is Organized

This part of the guide contains the following chapters:

Chapter 9 Introduction and Overview

The information in this chapter introduces you to the topics covered in Part 2 of this guide, which describes more advanced use of Operations Management, including software configuration and administration.

Chapter 10 Tools

This chapter provides information that helps you understand how to configure and manage the User Tools.

Chapter 11 Performance Graphs

This chapter describes the Performance Graphs Manager used to configure the mapping of CI types to available graph families.

Chapter 12 Indicator Mapping Rules

This chapter introduces the Indicators manager. You learn how to configure event type indicators, health indicators and key performance indicators to provide information for Views, which Operations Management operators can use to pinpoint problems in the monitored IT environment.

Chapter 13 View Mappings

This chapter describes the View Mappings manager used to map existing Views to one or more configuration item types and manage the mapped Views. The information provided aims to help you understand how to use the View Mappings manager to configure and manage Operations Management Views, and exchange them between management servers.

Chapter 14 Correlation Rules

This chapter introduces the Correlation Rules manager, used for configuring topology-based event correlation. You learn how to configure correlation rules and apply them to health indicators to help you better understand, monitor, and manage the problems that have an affect on the objects in your IT environment.

Chapter 15 Connecting Servers

This chapter describes how to specify HP Operations Manager servers, external event processing servers, and other Operations Management (BSM) servers as event forwarding targets.

Connected servers are used in conjunction with event forwarding rules to redirect selected events to specific event managers.

Chapter 16 Event Forwarding to External Servers

This chapter describes how to set up rules to select and forward events to external event managers such as another BSM server, HP Operations Manager and or a help desk application.

Chapter 17 Time-Based Event Automation

This chapter describes how to configure the rules for automating event handling to execute actions on events matching a user-defined set of criteria after a specified time.

Chapter 18 Launching Run Books Automatically

This chapter describes how to configure the rules used to automatically run a Run Book or a series of Run Books in the context of an event.

Chapter 19 Event Automation Script Configuration

This chapter describes how to set up scripts that can be used in Time-based Event Automation. For example, you can add a text string to certain events to make them easier to identify in the Event Browser.

Chapter 20 Notifications

This chapter describes how to set up rules to notify people who are located remotely when events with predefined characteristics are received. Notifications can take the form of Emails, SMSs and Pager messages

Chapter 21 Downtime Configuration

This chapter describes how to configure Operations Management to manage the events received from CIs which were in downtime (configuration of CIs specifying periods of unavailability due to predetermined maintenance times).

Chapter 22 Custom Actions

This chapter describes how to set up scripts to run custom actions on events. For example, you can add a text string to certain events to make them easier to identify in the Event Browser.

Chapter 23 Advanced Event Automation

This chapter describes how to automate handling and processing of incoming events.

Chapter 24 Event Assignment

This chapter describes how to automatically assign incoming events to available user groups. Automatic assigning of events to user groups responsible for solving these event significantly improves the efficiency of event management. Each events is assigned to an appropriate user group as soon as it is received. All operators in a user group are permitted to work on those events assigned to that user group.

Chapter 25 User Management

This chapter introduces the concept of users, user roles, and user views and provides information that helps you understand how to create and manage users and groups.

Chapter 26 Auditing in Operations Management

This chapter describes how to audit the configurations of Operations Management and monitor changes to those configurations.

Chapter 27 Tracing and Logging Operations Management User Interfaces

This chapter describes how to configure and run logging and tracing of the Operations Management user interfaces.

Chapter 28 Topology Synchronization

This chapter describes how to configure and run topology synchronization from HP Operations Manager servers to Operations Management.

Chapter 29 Infrastructure Settings for Operations Management

This chapter provides an details of the settings required for Operations Management including information that helps you understand how to set and configure Operations Management within the BSM platform.

Chapter 30 Content Packs

This chapter introduces Content Packs in Operations Management. Details of available content packs are documented at the end of this document.

Who Should Read This Section

This guide is intended for the following users of Operations Management:

- ▶ Operations Management software administrators
- ▶ Operations Management subject matter experts (for example, DB and Exchange)

Users of this section should know about both Operations Management and Business Service Management. Users should also possess a good understanding of the technical areas they are responsible for (for example, databases, or Microsoft Exchange) and know about enterprise monitoring and management concepts.

10

Tools

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Concepts

Tools Management

You can add your own tools to help users and administrators to perform the basic tasks they need to carry out their designated roles. The tools you configure with the Tools manager are assigned to a particular configuration item type, for example, **Node**, **Router**, or **Database**. You can launch tools available for an event from the context menus and the Actions pane of a perspective.

Tool categories are used to grant controlled execution access to tools for operators. Each tool is assigned a category, and for operators to be able to use the tools with a certain category, they must be granted execution permissions for this Tool Category.

If you want to grant a user access to a specific tool category, you grant execution permissions explicitly for that Operations Management tool category. If you want to grant access to all tool categories for a user, you grant execution permissions for all Operations Management tool categories (Tool Categories top-level entry). For more information about user authorizations, see "User Management" on page 629.

Note: Only users with the appropriate access permissions can use Operations Management Administration. For more information about user management, see "User Management" on page 629.

Tool Creation

Operations Management enables you to create tools to help users to perform common tasks on configuration items. When you create a tool, it is associated with a configuration item type.

Note: Tools created for a CI type are inherited by all child CI types of that CI type.

The following are some examples of typical tools:

- ▶ Command tool to check the status of an Oracle Database instance. The tool is assigned to the configuration item type **Oracle Database**.

If you are managing multiple versions of Oracle Databases, where the tool requires different parameters and options to check the status of the Oracle Database processes, you can create copies of the most appropriate tool and customize them for the different Oracle versions using the duplicate feature. Each tool is then dedicated to a specific version of Oracle.

- ▶ Command tool to check for firmware updates. The tool is assigned to the configuration item type **Net Device**.
- ▶ URL tool to search for problems with the operating system running on the host system. The tool is assigned to the configuration item type **Windows (ConfigurationItem > InfrastructureElement > Node > Computer > Windows)** Using known attributes for the configuration item type **Node**, such as `ci.host_os` and `ci.host_osversion`, the tool automatically recognizes the type and version of the operating system. You need to only add keywords to refine the search. The tool runs the command shown in the following example:

```
http://search.technet.microsoft.com/
Default.aspx?Brand=technet&Query=${ci.host_os} ${ci.host_osversion} ${Additional
Keywords}
```

Tool Inheritance

When you create tools, you associate them with a particular configuration item type, for example, **Node** or **Net Device**. When you run a tool, you run it from an event that must be associated with the CI type for which the tool is specified.

If you configure a tool for a configuration item type, for example, **Node**, all configuration item types below **Node** in the hierarchy inherit the tool and it is also available for the configuration item types, **Computer**, **Mainframe**, **VAX**.

The Tools manager indicates the configuration item type with which a tool is associated. The name of the configuration item type is displayed in parentheses alongside the tool in the Tools pane, for example: **Ping (Node)**.

For more information about UI elements in the Tools manager, see "Tools User Interface" on page 282.

Tasks

How to View Tools

In this task, you learn how to display a list of the tools configured and available for use in your environment.

To view a list of tools:

- 1** Open the Tools manager from Operations Management Administration:
Admin > Operations Management > Design Operations Content > Tools
- 2** In the CI Types pane, select the configuration item type for which you want to view tools.

The Tools pane displays a list of the tools configured for the selected configuration item type.

How to Search and Filter CI Types

In this task, you learn how to search for specific CI types and view CI types that match specified filter criteria. There are two filters:

- Show only CI types with assigned tools
- View (Show CI types contained within a specified view)

Note: Join relationships defined in views are ignored.

For information on button actions, see "Tools User Interface" on page 282.

Searching for a CI Type

You can use the Search field to locate the first instance of the CI type name or part of a name that you specify.

To search for a specified CI type:

- 1 Open the Tools manager from Operations Management Administration:
Admin > Operations Management > Design Operations Content > Tools
- 2 In the Search field, enter a string.

Note: The search string must be at least three characters long. Searching is automatically started as soon as the third character is entered and the first match is highlighted. This prerequisite avoids searches being started too often and resources being blocked. Names with less than three characters can be found by clicking on the  button.

The first CI type in the CI Types tree to match the specified string is highlighted. If that CI is not initially visible, the CI tree is expanded to display the CI Type.

- 3 Click the  button to find the next occurrence of the CI Type for which you are searching.

Finding CI Types with Assigned Tools

You can use the filter to display all CI types that have content assigned to them.

To filter the CI tree to show only CI types with assigned tools:

- 1 Open the Tools manager from Operations Management Administration:
Admin > Operations Management > Design Operations Content > Tools
- 2 In the Filter pane, select **Show only CI types with assigned tools**.
The CI Types pane displays only those CI types that have tools assigned.

Note: You can use the Show only CI types with assigned tools filter and the filtering by a selected view together. The result displays only CI types contained within the specified view and with assigned tools.

Filtering the CI Types Tree with a View

You can use the filter to display all CI types that are contained within a certain view.

Note: Join relationships defined in views are ignored.

To filter the CI Types tree with a view:

- 1** Open the Tools manager from Operations Management Administration:
Admin > Operations Management > Design Operations Content > Tools
- 2** In the Search pane, select **View**.
The View field becomes active.
- 3** Select a view from the list or use the Browse Views (...) button to open the Views selection dialog box, select the view that you want to use, and select **OK**.

The CI Types tree is updated to display only the CI types that match the view selected.

You can use the Expand () and Collapse () buttons to expand or collapse the CI tree. The **Expand** () button expands all CI types which are under the selected CI type. The **Collapse** () button collapses all open nodes except for the selected node.

If no item matches the filter, the No CI type found message is displayed.

Note: You can use the Show only CI types with assigned tools filter and the filtering by a selected view together. The result displays only CI types contained within the specified view and with assigned tools.

How to Create Tools

In this task, you learn how to create a tool and make it available for use in your environment.

To create a tool:

- 1 Open the Tools manager from Operations Management Administration:
Admin > Operations Management > Design Operations Content > Tools
- 2 In the CI Types pane, browse to and select the configuration item type for which you want to create a tool.
- 3 In the Tools pane, click the  button to open the Create New Tool wizard.
- 4 Enter a unique tool name, display name, and (optional) a description of the function of the tool.
- 5 *Optional:* Select a category for the tool.
- 6 Select a category from the list or use the Browse Views (...) button to open the Select a Category dialog box, select the category that you want to use, and select **OK**.

Tool categories are used to group tools that are to be accessible for a specific group of users. The Default category is the default selection. If a suitable category is not available, you can define a new category using the  button in the Select a Category window. For details, see "How to Define Tool Categories" on page 280.

- 7 Select **Next**.
- 8 Select the type of Tool to be created (Executable, Script, or URL), and select **Next**.

9 Complete the subsequent panes, for example:

Script: Script and target panes, and select **Finish**.

Executable: Command and target panes, and select **Finish**.

URL: URL pane, and select **Finish**.

For more information about the buttons, icons, labels, and options in the Create New Tool wizard, see "Create New Tool and Edit Tool Dialog Boxes" on page 288.

Note: For URLs, you can test your configuration before saving the settings.

10 Select **Finish** to save your new tool configuration.

How to Edit Tools

In this task, you learn how to modify an existing tool and make it available for use in your environment.

Note: To simplify creating a tool that is similar to an existing tool, you can create duplicates of any existing tool using the  button.

To edit a tool:

- 1** Open the Tools manager from Operations Management Administration:
Admin > Operations Management > Design Operations Content > Tools
- 2** In the CI Types pane, browse to and select the configuration item type for which you want to modify an existing tool.
- 3** In the Tools pane, click the  button to open the Edit Tool dialog box.
The Edit Tool opens and displays the General Tool Information tab.

Alternatively, double-click a section in the Details pane to open the appropriate tab in the Edit Tool dialog box.

- 4 Modify the entries in any of the available tabs as required, for example:

Script: Script and target panes.

Executable: Command and target panes.

URL: URL pane.

Note: The maximum script and executable command length is limited to 2500 characters including resolved parameters.

For more information about the buttons, icons, labels, and options in the Create New Tool wizard, see "Create New Tool and Edit Tool Dialog Boxes" on page 288.

Note: For URLs, you can test your configuration before saving the settings.

- 5 Select **OK** to save your new tool configuration.

How to Define Tool Categories

In this task, you learn how to define a new tool category and make it available for assigning to tools. If you need a new tool category, click the **Manage Tool Categories**  button, or select an existing tool and open the edit tool dialog box or use the  button in the Select a Category window.

To define a new tool category:

- 1 Open the Tools manager from Operations Management Administration:

Admin > Operations Management > Design Operations Content > Tools

- 2** In the CI Types pane, click the **Manage Tool Categories**  button.

Alternatively, browse to and select the configuration item type for which you want to create a tool or edit an existing tool and the appropriate button:  or .

Click the **Other category** radio button.

Click the Browse (...) button.

The Select a Category window opens.

- 3** Click the  button in the Select a Category window.

The Create New Tool Category dialog box opens.

- 4** Enter a unique tool category name, display name, and a description of the requirement for the tool category.
- 5** Select **OK** to save your new tool category.
- 6** This category can now be assigned to the selected tool from the Browse Tool Categories window.

Note: It is not possible to delete an assigned tool category. Before deleting an assigned tool category:

- Assign the tool using the unwanted tool category to the default category and save the tool.
 - From the Select a Category Tool dialog box, delete the unwanted tool category.
-

Reference

Tools User Interface

This section describes the describes the buttons, icons, labels, and menu options in the Tools manager that you use to create the tools.

In this section, you can find information about the following topics:

- CI Types Pane on page 282
- Tools Pane on page 285
- Tool Details Pane on page 286
- Create New Tool and Edit Tool Dialog Boxes on page 288
- Attribute Selection Dialog Boxes on page 294

CI Types Pane

The CI Types pane in the Tools manager displays an overview of the configuration item types that represent the objects in your IT environment. The list includes all default items, any items you modified, and any items you added, for example, with additional content packs.

To access	Select Admin > Operations Management > Design Operations Content > Tools
Important information	If you want to modify or manage configuration item types, use the CI Types Manager: Admin > RTSM Administration > Modeling > CI Type Manager

Relevant tasks	To use the CI Types pane, see "How to Search and Filter CI Types" on page 275.
See also	For more information about tools, see: <ul style="list-style-type: none"> ➤ "Tools Management" on page 272. ➤ "Tool Creation" on page 273. ➤ "Tool Inheritance" on page 274.

The information displayed in the CI Types pane of the Tools manager includes the following details:

UI Element (A-Z)	Description
	Refreshes the contents of the configuration item tree. Use if new content becomes available while you are working or you uploaded new contents (for example, from another user or the command-line interface).
	Expand Selection: Expands the list to display items belonging to the selected group.
	Collapse Others: Collapses all open branches except for the selected branch.
	Entering a string with more than 2 characters in the search field locates the first instance of the string in the CI Tree. Clicking the search button finds the next occurrence of the string for which you are searching. For more information about searching, see "How to Search and Filter CI Types" on page 275.
	Collapses the Filter pane.
	Expands the Filter pane for use.

UI Element (A-Z)	Description
CI Types	<p>Hierarchical list representing the configuration item types that you want to monitor in your IT environment. To display the required CI Type, browse to and select the item of interest. The details associated with the CI Type are displayed.</p> <p>If the CI Types list is filtered, (filtered) is displayed next to the CI Types title.</p> <p>When CI types and their children have no objects assigned, their entries appear dimmed.</p> <p>When objects are directly assigned to a CI type, their entries appear bolded.</p>
Filter	<p>Used to search for specific CI types and view CI types that match specified filter criteria. There are two filters:</p> <ul style="list-style-type: none"> ▶ Show only CI types with assignments ▶ View (Shows CI types contained within a specified view) ▶ ... Opens the Views dialog box from which you can select a view with which to filter CI types. <p>Note: If you apply a view to the filter CI Types tree which removes all CI types with assignments, the ConfigurationItem entry remains in normal text, indicating that assignments exist. Remove the view, or select a more appropriate view to display the CI types with assignments that you require.</p> <p>For more information about searching and filtering, see "How to Search and Filter CI Types" on page 275.</p>
Show only CI types with	Displays in the CI Tree only CI Types with assignments.
View	Displays in the CI Tree only CI Types contained within the selected view.

Tools Pane

The Tools pane displays in a list all the tools configured for your users.

To access	Select Admin > Operations Management > Design Operations Content > Tools
Relevant tasks	To create tools, see "How to Create Tools" on page 278.
See also	For more information about the tools, see: <ul style="list-style-type: none"> ➤ "Tools Management" on page 272. ➤ "Tool Creation" on page 273. ➤ "Tool Inheritance" on page 274.

The Tools pane displays the UI elements listed in the following table.

UI Element (A-Z)	Description
	Refreshes the contents of the tools list. Use if new content becomes available while you are working or you uploaded new contents (for example, from another user or the command-line interface).
	New Item: Opens the Create New Tool wizard, which enables you to define a new tool. For more information about the Create New Tool wizard, see "Create New Tool and Edit Tool Dialog Boxes" on page 288.
	Duplicate Item: Creates a duplicate of the selected tool in the Edit Tool dialog box. For more information about the Edit Tool dialog box, see "Create New Tool and Edit Tool Dialog Boxes" on page 288.
	Edit Item: Opens the Edit Tool dialog box, which enables you to modify the tool selected in the Tools pane. Alternatively, double-click a section in the Details pane to open the appropriate tab in the Edit Tool dialog box. For more information about the Edit Tool dialog box, see "Create New Tool and Edit Tool Dialog Boxes" on page 288.

UI Element (A-Z)	Description
	Delete Item: Deletes the selected tool from the database.
	Manage Tool Categories: Opens the Manage Tool Categories dialog box.

Tool Details Pane

The Tool Details pane displays an overview of the tool that is selected in the list of tools in the Tools pane. There are three types of tools: Executables, Scripts, and URLs. The details displayed for each type of tool changes, depending on the type of tool selected.

To access	Select Admin > Operations Management > Design Operations Content > Tools
Relevant tasks	To create tools, see "How to Create Tools" on page 278.
See also	For more information about the tools, see: <ul style="list-style-type: none"> ➤ "Tools Management" on page 272. ➤ "Tool Creation" on page 273. ➤ "Tool Inheritance" on page 274.

The Tool Details pane displays the UI elements listed in the following table.

UI Element (A-Z)	Description
General	
Category	Used to grant controlled access to tools. Tools are assigned a category and users are given execute permissions to tool categories appropriate to their roles. For further details, see "Tools Management" on page 272.

UI Element (A-Z)	Description
Description	Brief description of the tool that is selected for viewing or modification. If the tool is one instance of the same tool, the description can include information about the operating system (or application) version it is intended for.
Display Name	External name for the tool. The external name is the name that you want to expose to users.
Name	Name you want to assign to the tool for internal use only. The name must be unique and is verified when saving.
Type	Type of tool configured, for example, URL.
Command Details	
Command	Command statement
Run as	Account under which the command must be run.
Run on	Target on which the tool (executable or script) can be run.
Script Details	
Language	Language in which the script is written.
Run as	Account under which the script must be run.
Run on	Target on which the tool (executable or script) can be run.
Script	Text of the script to be run.
URL Details	
URL	URL to be run.

Create New Tool and Edit Tool Dialog Boxes

The Create New Tool wizard enables you to create new tools. The Edit Tool dialog box enables you to modify the selected tool. Both dialog boxes are similar and divided into the following sections:

- "General" on page 289
- "Command" on page 290
- "Script" on page 291
- "URL" on page 292
- "Target" on page 293

To access	<p>Select Admin > Operations Management > Design Operations Content > Tools</p> <p>In the CI Types pane, browse to and select the configuration item type for which you want to create a tool. In the Tools pane, click the  button to open the Create New Tool wizard.</p>
Relevant tasks	To create tools, see "How to Create Tools" on page 278.
See also	<p>For more information about the tools, see:</p> <ul style="list-style-type: none"> ➤ "Tools Management" on page 272. ➤ "Tool Creation" on page 273. ➤ "Tool Inheritance" on page 274.

General

The General pane of the Edit Tool dialog box or the Create New Tool wizard displays the UI elements listed in the following table.

UI Element (A-Z)	Description
Category	Used to grant controlled access to tools. Tools are assigned a category and users are given execute permissions to tool categories appropriate to their roles. For further details, see "Tools Management" on page 272.
Default category	Tool category applied to all tools when an alternative category is not selected.
Description	Brief description of the tool you are modifying. The description typically includes information about the operating system (or application) version it is intended for.
Display Name	External name for the tool. The display name is the name you want to display to users. The display name can be changed for localization purposes.
ID	Unique identification number for internal purposes only (Edit only).
Name	Short name for the tool for internal use only. The name must be unique. You cannot save a new tool if the name you choose is already in use.
Other category	Selected custom tool category.
Type	Type of tool configured, for example, URL (Edit only).

Command

The Command pane of the Edit Tool dialog box or the Create New Tool wizard displays the UI elements listed in the following table.

UI Element (A-Z)	Description
Command	Command specification that is executed on tool launch. Note: The maximum executable command length is limited to 2500 characters including resolved parameters.
Insert runtime parameters at cursor	If required, insert parameters into the command field. These parameters are replaced with values on tool launch. Possible parameters are: <ul style="list-style-type: none"> ➤ CI attributes ➤ Event attributes ➤ Infrastructure settings ➤ Monitoring host name (on the host that the monitoring HPOM Agent is running) ➤ Management server name ➤ Hosted on host name (the host on which the CI is hosted)
(xxx/2500)	Indicates the number of characters contained in the command being specified and the maximum number of characters supported.

Script

The Script pane of the Edit Tool dialog box or the Create New Tool wizard displays the UI elements listed in the following table.

UI Element (A-Z)	Description
Insert runtime parameters at cursor	<p>If required, insert parameters into the command field. These parameters are replaced with values on tool launch. Possible parameters are:</p> <ul style="list-style-type: none"> ➤ CI attributes ➤ Event attributes ➤ Infrastructure settings ➤ Monitoring host name (on the host that the monitoring HPOM Agent is running) ➤ Management server name ➤ Hosted on host name (the host on which the CI is hosted) <p>Note: You can also specify custom parameters using the @@<parameter>@@ syntax.</p>
Language	Language in which the script is written. Supported scripts are Perl, Visual Basic, Batch files, and Microsoft Windows Script Host.
Script	<p>Text of the script to be run.</p> <p>Note: The maximum script length is limited to 2500 characters including resolved parameters.</p>
(xxx/2500)	Indicates the number of characters contained in the script being specified and the maximum number of characters supported.

URL

The URL pane of the Edit Tool dialog box or the Create New Tool wizard displays the UI elements listed in the following table.

UI Element (A-Z)	Description
Insert runtime parameters at cursor	If required, inserts parameters into the command field. These parameters are replaced with values on tool launch. Possible parameters are: <ul style="list-style-type: none"> ➤ CI attributes ➤ Event attributes ➤ Infrastructure settings ➤ Monitoring host name (on the host that the monitoring HPOM Agent is running) ➤ Management server name ➤ Hosted on host name (the host on which the CI is hosted) Note: You can also specify custom parameters using the <code>\${<parameter>}</code> syntax.
Test	Tests the URL before saving. When parameters are inserted into the URL, you are prompted for values before the test launch.
URL	URL specification that is executed on tool launch.

Target

The Target pane of the Edit Tool dialog box or the Create New Tool wizard displays the UI elements listed in the following table (not required for URL tools).

UI Element (A-Z)	Description
Run as	<p>Account under which the command or script must be run. The possible options are:</p> <ul style="list-style-type: none"> ▶ Monitoring Agent User: agent account credentials are used to execute the command or script. ▶ Operator Specified User: on tool launch, the operator is prompted for user credentials.
Run on	<p>Target on which the tool (executable or script) can be run.</p> <p>Possible targets are:</p> <ul style="list-style-type: none"> ▶ Monitoring Host (for example a system being monitored by an HPOM agent) ▶ Management Server (for example, the HPOM management server) ▶ Other Host <p>The Other Host text field is free form with the possibility to insert parameters. These parameters are replaced with values on tool launch. Possible parameters are:</p> <ul style="list-style-type: none"> ▶ CI Attributes ▶ Event Attributes ▶ Infrastructure Settings

Attribute Selection Dialog Boxes

This section includes the following sections:

- "Available Attributes Dialog Box" on page 294
- "Available Infrastructure Settings Dialog Box" on page 295
- "Available Event Attributes Dialog Box" on page 295
- "Manage Tool Categories" on page 297

Available Attributes Dialog Box

The Available Attributes dialog box enables you to browse a list of attributes that are available for the configuration item type associated with the tool you are creating or modifying. You can add these attributes as part of your command, script, or URL.

The Available Attributes dialog box displays the UI elements listed in the following table.

UI Element (A-Z)	Description
CI Type	Configuration item type associated with the tool you are creating or modifying, for example: ConfigurationItem, Node, or Computer.
Description	Brief description of the attribute listed for the associated configuration item type.
Display Name	Name of the attribute listed for the available configuration item type, for example: (System) Language, or Codepage.
Type	Type of attribute available, for example: BOOLEAN, STRING, STRING_LIST, or LONG.

Available Infrastructure Settings Dialog Box

The Available Infrastructure Settings dialog box enables you to browse a list of settings that are available in BSM and added them to the tool you are creating or modifying. You can add these settings as part of your command, script, or URL.

The Available Infrastructure settings dialog box displays the UI elements listed in the following table.

UI Element (A-Z)	Description
Application / Foundation / All	Name of the context selected in the Infrastructure Settings Manager.
Display Name	External name for the infrastructure setting as specified in the Infrastructure Settings Manager.
Value	Actual value assigned to the infrastructure setting. Values include Boolean (true or false), numeric values, system names, application names, and symbols.

Available Event Attributes Dialog Box

The Available Event Attributes dialog box enables you to browse a list of available event attributes that are available for the configuration item type associated with the tool you are creating or modifying. You can add these attributes, one at a time, as part of your command, script, or URL. You can also specify custom attributes by entering the name of the custom attribute in the custom attribute field.

The Available Event Attributes dialog box displays the UI elements listed in the following table. In the table, unlabeled UI elements are shown in angle brackets (<>).

UI Element (A-Z)	Description
Attribute	Selects the event attribute list from which you can select available event attributes.
Custom Attribute	Selects the custom attribute field in which you can specify a custom attribute. The custom attribute that you specify is entered using the syntax: <code>#{event.custom<custom attribute name>}</code>
Display Name	Name of the event attribute listed for the available configuration item type, for example: Originating Server, HI Value, or Custom Attribute.
Key Value	Event attribute key used to identify the event attribute.

Manage Tool Categories

The Select a Category dialog box enables you to browse a list of available Tool Categories. Click the Manage Tool Categories  button, or, if you need to create a Tool Category or edit an existing one, use the appropriate button to open the Create or Edit dialog boxes.

The Select a category dialog box displays the UI elements listed in the following table. In the table, unlabeled UI elements are shown in angle brackets (<>).

UI Element (A-Z)	Description
	New Item: Opens the Create New Tool Category dialog box, which enables you to define a new tool category. For more information about the Create New Tool Category dialog box, see "How to Define Tool Categories" on page 280.
	Edit Item: Opens the Edit Tool Category dialog box, which enables you to modify the tool category selected in the Select a Category dialog box. For more information about the Edit Tool dialog box, see "How to Define Tool Categories" on page 280.
	Delete Item: Deletes the selected tool category from the database.
Description	Brief description of the selected tool category.
Display Name	Name displayed in the UI for the selected tool category.
Name	Internal name of the selected tool category.

Troubleshooting and Limitations

This section provides the following help for those people who are troubleshooting problems with the tools you use for Operations Management administration, including creating, modifying, and enabling tools.

- ▶ "Tools Display Incorrectly" on page 298
- ▶ "Tools Not Shown For Configuration Item Type" on page 298
- ▶ "Tools Execution Fails on HPOM Clusters" on page 298

Tools Display Incorrectly

Make sure a tool or a tool instance is configured for the related CI of the selected event.

Tools Not Shown For Configuration Item Type

- ▶ Make sure a tool or a tool instance is configured for the selected configuration item type
- ▶ Contains event parameters

Tools Execution Fails on HPOM Clusters

If the HPOM server is running on a cluster, it is possible that events contain the physical address of one of the cluster nodes as the originating node and not the virtual cluster node itself. If a tool is executed after the original node is no longer active, tool execution fails.

To avoid this issue, define the physical nodes of the cluster and the virtual node as connected servers, and define the virtual node as the execution host for the physical nodes.

In this way, when a tool is executed, the physical host is found by the originating node of the event, the execution is then forwarded to the virtual node, and then finally redirected to the active node.

11

Performance Graphs

This chapter includes:

Concepts

- ▶ Performance Graphs Manager on page 300

Tasks

- ▶ How to Search and Filter CI Types on page 301
- ▶ How to Map CI Types to Graph Families on page 305
- ▶ How to Launch the Performance Graph Designer on page 306

Reference

- ▶ Performance Graphs User Interface on page 308

Concepts

Performance Graphs Manager

This chapter describes the Performance Graphs manager used to map and manage performance graphs. Configuration item types must be mapped to available graph families so that instance-based graphs can be launched at runtime from a configuration item.

An instance identifier is required to launch instance-based graphs at runtime from a configuration item. To be able to display graphs for a CI type, available graph families must be mapped to the CI type.

The Performance Graphs manager enables users to perform the following management-related tasks:

- ▶ Map graph families to configuration item types.
- ▶ Launch the Designer dialog box to create a new graph template or edit an existing graph template.
- ▶ Delete graph template.
- ▶ Configure calculation of instance identifiers based on CI attributes.

Note: Only users with the appropriate access permissions can use Operations Management Administration. For more information about user management, see "User Management" on page 629.

Tasks

How to Search and Filter CI Types

In this task, you learn how to search for specific CI types and view CI types that match specified filter criteria. There are two filters:

- Show only CI types with assigned performance graphs
- View (Show CI types contained within a specified view)

Note: Join relationships defined in views are ignored.

For information on button actions, see "Performance Graphs User Interface" on page 308.

Searching for a CI Type

You can use the Search field to locate the first instance of the CI type name or part of a name that you specify.

To search for a specified CI type:

- 1 Open the Performance Graphs manager from Operations Management Administration:
Admin > Operations Management > Design Operations Content > Performance Graphs
- 2 In the Search field, enter a string.

Note: The search string must be at least three characters long. Searching is automatically started as soon as the third character is entered and the first match is highlighted. This prerequisite avoids searches being started too often and resources being blocked. Names with less than three characters can be found by clicking on the  button.

The first CI type in the CI Types tree to match the specified string is highlighted. If that CI is not initially visible, the CI tree is expanded to display the CI Type.

- 3 Click the  button to find the next occurrence of the CI Type for which you are searching.

Finding CI Types with Assigned Performance Graphs

You can use the filter to display all CI types that have content assigned to them.

To filter the CI tree to show only CI types with assigned performance graphs:

- 1 Open the Performance Graphs manager from Operations Management Administration:

Admin > Operations Management > Design Operations Content > Performance Graphs

- 2 In the Filter pane, select **Show only CI types with assigned performance graphs**.

The CI Types pane displays only those CI types that have performance graphs assigned.

Note: You can use the Show only CI types with assigned performance graphs filter and the filtering by a selected view together. The result displays only CI types contained within the specified view and with assigned performance graphs.

Filtering the CI Types Tree with a View

You can use the filter to display all CI types that are contained within a certain view.

Note: Join relationships defined in views are ignored.

To filter the CI Types tree with a view:

- 1 Open the Performance Graphs manager from Operations Management Administration:

Admin > Operations Management > Design Operations Content > Performance Graphs

- 2 In the Search pane, select **View**.

The View field becomes active.

- 3 Click the Browse Views (...) button to open the Views selection dialog box.

- 4 Select the view that you want to use, and select **OK**.

The CI Types tree is updated to display only the CI types that match the view selected.

You can use the Expand () and Collapse () buttons to expand or collapse the CI tree. The **Expand** () button expands all CI types which are under the selected CI type. The **Collapse** () button collapses all open nodes except for the selected node.

If no item matches the filter, the No CI type found message is displayed.

Note: You can use the Show only CI types with assigned performance graphs filter and the filtering by a selected view together. The result displays only CI types contained within the specified view and with assigned performance graphs.

How to Map CI Types to Graph Families

This task shows you how to map a configuration item type to a graph family.

Note: For information on button actions, see "Performance Graphs User Interface" on page 308.

To map a CI type to a graph family:

- 1 Open the Performance Graphs manager from Operations Management Administration:

Admin > Operations Management > Design Operations Content > Performance Graphs

- 2 In the CI Types pane, select the configuration item that you want to map to a graph family.
- 3 In the Performance Graphs pane, click the  button to open the Assign Performance Graphs dialog box.
- 4 In the Graph Instance ID Configuration pane, enter the value for Instance ID Definition. You can access the available attributes using the **Insert CI Attributes** button.
- 5 *Optional:* Enter the values for **Search Pattern** and **Replace Occurrences by**. These values are used to look for the specified pattern in the attribute value and replace it with the value of the replacement. The attribute is resolved using the new value.

For example, if you want to search for oracle and replace it with ORA, specify oracle as the pattern value and ORA as the replacement value.

- 6 In the Available Graph Families dialog box, select the graph families that you want to map to the selected configuration item type.

Either drag the graph families to the **Assigned Graph Families** pane or use the context sensitive menu item **Add to Assigned Graph Families** or use the  button.

Adding families to the Assigned Graph Families pane implicitly adds all graph categories and templates that belong to the selected family. These families are displayed in bold text and the implicitly added categories are displayed in italics. Individual categories added to the Assigned Graph Families pane are displayed in bold text and are arranged under the family to which they belong, displayed in italics.

- 7 Select **OK** to apply your mapping and close the Graph Instance ID Configuration dialog box.

How to Launch the Performance Graph Designer

This task shows you how to launch the New Graph Template Launch Designer in the context of a selected CI instance to help you to design a new graph template. Launch parameters are required to identify the CI instance.

For more information about creating a graph template, see "How to Design Graphs" on page 154.

Note: For information on button actions, see "Performance Graphs User Interface" on page 308.

To launch the Performance Graph Designer for a selected CI:

- 1 Open the Performance Graphs manager from Operations Management Administration:
Admin > Operations Management > Design Operations Content > Performance Graphs
- 2 In the CI Types pane, select the configuration item type from which you want to launch the Performance Graph Designer.
- 3 Click the * button in the Available Graph Families pane. The Launch Performance Graph Designer dialog box opens.
- 4 In the CI Instances pane of the Launch Performance Graph Designer dialog box, select the CI instance to use as a sample for the creation of a graph template for this CI type, and select **Next**.

The calculated launch parameters for the selected CI are displayed in the Launch Parameters pane.

5 Select Finish.

The Performance Graph Designer wizard opens. For information about creating a graph template, see "How to Design Graphs" on page 154.

Reference

Performance Graphs User Interface

This section lists and describes the layout of the Performance Graphs manager.

- ▶ CI Types Pane on page 308
- ▶ Performance Graphs Pane on page 311
- ▶ Assign Performance Graphs Dialog Box on page 314
- ▶ Launch Performance Graph Designer Dialog Box on page 316

CI Types Pane

The CI Types pane enables you to choose the configuration item types that you want to map to available graph families.

To access	Select Admin > Operations Management > Design Operations Content > Performance Graphs
Important information	If you want to modify or manage configuration item types, use the CI Types Manager: Admin > RTSM Administration > Modeling > CI Type Manager
Relevant tasks	To use the CI Types pane, see "How to Search and Filter CI Types" on page 301.
See also	For more information about configuring performance graphs, see "Performance Graphs Manager" on page 300.

The information displayed in the CI Types pane of the Performance Graphs manager includes the following details:

UI Element (A-Z)	Description
	Refreshes the contents of the CI Types pane.
	Expand Selection: Expands the list to display items belonging to the selected group.
	Collapse Others: Collapses all open branches except for the selected branch.
	Finds the next occurrence of the CI Type for which you are searching. For more information about searching, see "How to Search and Filter CI Types" on page 301.
	Collapses the Filter pane.
	Expands the Filter pane for use.

UI Element (A-Z)	Description
<p>CI Types</p>	<p>Hierarchical list representing the configuration item types that you want to monitor in your IT environment. To display the event type indicators, KPIs, and mapping rules associated with a configuration item, browse to and select the item of interest. The various tabs display the details.</p> <p>If the CI Types list is filtered, (filtered) is displayed next to the CI Types title.</p> <p>When CI types and their children have no objects assigned, their entries appear dimmed.</p> <p>When objects are directly assigned to a CI type, their entries appear bolded.</p>
<p>Filter</p>	<p>Used to search for specific CI types and view CI types that match specified filter criteria. There are two filters:</p> <ul style="list-style-type: none"> ➤ Show only CI types with assigned performance graphs ➤ View (Show CI types contained within a specified view) ➤ ... Opens the Views dialog box from which you can select a view with which to filter CI types. <p>Note: If you apply a view to the filter CI Types tree which removes all CI types with assignments, the ConfigurationItem entry remains in normal text, indicating that assignments exist. Remove the view, or select a more appropriate view to display the CI types with assignments that you require.</p> <p>For more information about searching and filtering, see "How to Search and Filter CI Types" on page 301.</p>

Performance Graphs Pane

The Performance Graphs manager enables you to choose the graph families you want to map to the selected configuration item.

To access	Select Admin > Operations Management > Design Operations Content > Performance Graphs
Important information	If you want to modify or manage configuration item types, use the CI Types Manager: Admin > RTSM Administration > Modeling > CI Type Manager
Relevant tasks	To configure performance graphs, see "How to Map CI Types to Graph Families" on page 305 and "How to Launch the Performance Graph Designer" on page 306.
See also	For more information about configuring performance graphs, see "Performance Graphs Manager" on page 300.

The Performance Graphs pane displays the UI elements listed in the following table.

UI Element	Description
	Reloads the performance graphs configuration for the selected CI Type. Use if new content becomes available while you are working or you uploaded new contents (for example, from another user or the command-line interface).
	Opens the Assign Performance Graphs dialog box to create a new performance graphs configuration for the selected CI type.
	Opens the Assign Performance Graphs dialog box, which enables you to modify the mapping for the CI selected in the CI Types pane. For more information about the Assign Performance Graphs dialog box, see "Assign Performance Graphs Dialog Box" on page 314.
	Removes the performance graphs configuration from the selected CI type.

Graph Instance ID Pane

The Graph Instance ID pane displays the attributes and modifiers used to identify configuration items for which you want to display graphs.

The Graph Instance ID Configuration pane displays the UI elements listed in the following table.

UI Element (A-Z)	Description
Instance ID Definition	String consisting of configuration item attributes and free form text. The configuration item attributes are specified as variables that refer to attributes of the CI Type. The value is resolved at runtime against a configuration item instance.

Available Graph Families

The Available Graph Families pane displays the graphs, graph categories and templates available on the system. For more information about creating and editing graph templates, see "How to Design Graphs" on page 154 and "How to Edit Graphs" on page 154.

The Available Graph Families pane displays the UI elements listed in the following table.

UI Element	Description
	Reloads the available graph families for the selected CI Type. Use if new content becomes available while you are working or you uploaded new contents (for example, from another user or the command-line interface).
	Launches the Launch Performance Graph Designer dialog box to help you to launch a new graph template. For more information about creating a graph template, see "How to Design Graphs" on page 154.

UI Element	Description
	Launches the Launch Performance Graph Designer for editing the selected graph template launch details. For more information about editing a graph template, see "How to Edit Graphs" on page 154.
	Removes the selected custom graph template from the system.
	Expands the list to display items belonging to the selected group.
	Collapses all open branches except for the selected branch.

Assigned Graph Families

The Assigned Graph Families pane displays the graph and graph categories assigned to the selected CI Type.

The Assigned Graph Families pane displays the UI elements listed in the following table. In the table, unlabeled UI elements are shown in angle brackets (<>).

UI Element (A-Z)	Description
Categories	Sub-groups of graphs that are logically grouped within the family.
Families	Top-level group that is used to organize graphs.

Assign Performance Graphs Dialog Box

The Assign Performance Graphs dialog box displays the graph and graph categories assigned to the selected CI Type.

To access	Select Admin > Operations Management > Design Operations Content > Performance Graphs
Relevant tasks	To configure performance graphs, see "How to Map CI Types to Graph Families" on page 305 and "How to Launch the Performance Graph Designer" on page 306.
See also	For more information about configuring performance graphs, see "Performance Graphs Manager" on page 300.

The Assign Performance Graphs dialog box displays the UI elements listed in the following table.

UI Element (A-Z)	Description
	Add to Assigned Graph Families: Adds the graph family (and all associated categories) or category selected in the Available Graph Families pane to the list of Assigned Graph Families to be included in performance graphs configuration.
	Unassign: Removes the graph family and all associated categories from the Assigned Graph Families pane, which excludes it from the performance graphs configuration.
	Unassign All: Removes all items from the list of items selected for inclusion in the performance graphs configuration.
	Expand Selection: Expands the list to display items belonging to the selected group.
	Collapse Others: Collapses all open branches except for the selected branch.

UI Element (A-Z)	Description
<bold>	Adding families to the Assigned Graph Families pane implicitly adds all graph categories that belong to the selected family. These families are displayed in bold text. Individual categories added to the Assigned Graph Families pane are displayed in bold text and are arranged under the family to which they belong, displayed in italics.
<italics>	Categories added implicitly to the Assigned Graph Families pane as a result of adding the families to which these categories belong are displayed in italics. Families are displayed in italics if they are added to show to which family an individually selected category belongs.
Assigned Graph Families	Lists the graph families and categories that you selected to map to the selected configuration item type. Adding families to the Assigned Graph Families pane implicitly adds all graph categories that belong to the selected family. These families are displayed in bold text and the implicitly added categories are displayed in italics. Individual categories added to the Assigned Graph Families pane are displayed in bold text and are arranged under the family to which they belong, displayed in italics.
Available Graph Families	Lists the available graph families and categories that you can map to the selected configuration item type. Either drag the graph families and categories to the Assigned Graph Families pane or use the context sensitive menu item Add to Assigned Graph Families.
Insert CI Attribute	Access the available CI attributes.
Instance ID Definition	String consisting of configuration item attributes and free form text. The configuration item attributes are specified as variables that refer to attributes of the CI Type. The value is resolved at runtime against a configuration item instance.

UI Element (A-Z)	Description
Replace Occurrences by	<i>(Optional)</i> : String used as the replacement for pattern matches within the string resolved by Attribute.
Search Pattern	<i>(Optional)</i> : Regular expression pattern that is matched within the string resolved from the Attribute. Any portion of the string that matches the pattern is replaced by the Replace Occurrences by string. For example, if you want to search for oracle and replace it with ORA, specify oracle as the pattern value and ORA as the replacement value.

Launch Performance Graph Designer Dialog Box

The Launch Performance Graph Designer dialog box specifies the CI instance and the launch parameters for which you want to create a graph template.

To access	Select Admin > Operations Management > Design Operations Content > Performance Graphs
Relevant tasks	To configure performance graphs, see "How to Map CI Types to Graph Families" on page 305 and "How to Launch the Performance Graph Designer" on page 306.
See also	For more information about configuring performance graphs, see "Performance Graphs Manager" on page 300.

The Launch Performance Graph Designer dialog box displays the UI elements listed in the following table.

UI Element (A-Z)	Description
CI Instances	CI for which the graph designer is to be launched.
CI Type	Name of the configuration item type to which the selected configuration item belongs.

UI Element (A-Z)	Description
Name	Name of the configuration item to which the CI Instance is related, for example, DB_Server.example.com.
Type	Type of the configuration item to which the CI Instance is related, for example, Related Host or Instance ID.

12

Indicator Mapping Rules

Note: To be able to use the health-related functionality of Operations Management, the Event Management Foundation and Health licenses are required. For detailed information on licensing, see the *HP Business Service Management Deployment Guide* PDF.

This chapter includes:

Concepts

- ▶ Indicator Mapping Rules Manager Basics on page 320
- ▶ Mapping Events to Indicators on page 322

Tasks

- ▶ How to Search and Filter CI Types on page 326
- ▶ How to Create and Edit Indicator Mapping Rules on page 330
- ▶ How to Order Indicator Mapping Rules on page 333

Reference

- ▶ Indicator Mapping Rules User Interface on page 334

Concepts

Indicator Mapping Rules Manager Basics

This chapter introduces the features of the Indicator Mapping Rules manager, used to help you manage indicator mapping rules.

Indicators are used to represent the different types of events that can occur in the monitored environment, for example, **System restart**, **Host state**, **Memory usage**, or **Print-queue length**. Indicators can simply report that an event has occurred, for example, **System restart:Occurred**. They can also be used to represent the likely states for the defined events, for example, **host state:down**, **memory usage:high**, or **print-queue length:full**. Changes of state often indicate the existence of a problem.

Appropriate indicators must be created for each configuration item type, and the RTSM database model definition for configuration item types includes information about the specific indicator assignments. Assigning event type indicators to a specific configuration item type ensures that the all instances of that configuration item type can be similarly monitored.

Operations Management uses two types of indicators:

► **Event Type Indicators (ETI)**

Event type indicators indicate that a problem has occurred. They use the severity attribute from the event. This severity can be used to set an ETI state using the based on severity option. One indicator state is required. By default, the state **Normal** is created when creating an event type indicator.

An ETI could read: **System Restart: occurred**.

ETIs are necessary for topology-based event correlation.

► Health Indicators

Health indicators (HI) are used to indicate the detailed health of CIs by setting a severity status. When an HI is defined, an associated event type indicator is automatically created. HIs are independent of the event lifecycle. You can close events, but the health of the associated CI is still available.

For example, you can use the attributes of a critical event reporting a lack of storage space on a logical volume to set an HI state `Down` with the severity `Critical` assigned to the configuration item type `Logical Disk`.

HIs when assigned to KPIs are intended for use in the calculation of the severity status of health-based KPIs. However, HIs provide more fine grained information using the `Status Snapshot`.

When HIs are configured to work in conjunction with KPIs, they show the effect of a problem on the CI's neighborhood in a clear and easy to understand way, by propagating the effect of a problem with a low-level CI to higher-level CIs using the `Health Top View`.

An event being sent from a manager such as HPOM to Operations Management signifies an occurrence in the managed environment. This event includes information about the source of the problem and could include health-related attributes. When this event is received by Operations Management, indicators are set based on this attribute. If the event attribute is not, or cannot be included, indicator mapping rules can be used to set indicators.

Operations Management uses HIs to determine and display the health of different aspects of a monitored object. An HI is an event-specific monitor that uses one or more states to represent the individual states of a monitored object, such as `Running` or `Stopped`. HIs can be used to show if a hardware resource is available and responding or, if the performance of a software application changes according to whether the load is normal, high, or exceeding specification.

Operations Management creates an HI in conjunction with an event type indicator. When creating an HI, the associated event type indicator is automatically created.

HIs monitor and show specific aspects of the health of the configuration item type to which they are assigned. A configuration item inherits HI assignments from its parent configuration item type. For example, HIs assigned to the configuration item type `Database` also apply to the configuration item type `Oracle` or `DB2` and are applied to any `Oracle` and `DB2` database configuration items.

HIs provide the data that key performance indicators (KPI) need to calculate the health-based severity status for the availability and performance of monitored resources. You assign HIs to KPI calculation rules, to collate health-related data, determine a configuration item's availability and performance, and indicate its overall health, for example, with a severity status and color.

Mapping Events to Indicators

An event can contain the `EventTypeIndicator` custom message attribute from HPOM specifying a severity. If this is available, the Operations Management custom attribute `ETI Resolution Hint` is set and this is used to set the indicator state automatically.

For events that do not include this custom attribute, you can define indicator mapping rules to set indicator states.

Indicator mapping rules are intended to help in the following situations:

- ▶ Monitoring events that are not integrated in either Operations Management or forwarded from HPOM.
- ▶ Integrating events from a custom application or a Smart Plug-in that is not Operations Management-ready.

The mapping of event attributes to indicator states occurs either through the installation and setup of an Operations Management content pack or as a result of a manually created indicator mapping rule.

You can set indicators in one of the following ways:

- ▶ at a specific event using indicator mapping rules
- ▶ by setting the indicator with an HPOM message policy

Note: One event can set only one indicator state. However, you can configure multiple message policies to report on different aspects of the same event and use the event generated by each policy to set dedicated indicators.

Indicator mapping rules exist in the context of a specific type of configuration item, for example, Computer, Host, or Router. The indicator mapping rules defined for a specific configuration item type can use only the indicators assigned to the specified configuration item type.

This section includes:

- "Filters for Indicator Mapping Rules" on page 323
- "Mapping Rule or CMA" on page 324
- "Order of Indicator Mapping Rules" on page 325
- "Inheritance of Indicator Mapping Rules" on page 325

Filters for Indicator Mapping Rules

You can define indicator mapping rules that search filtered events for strings and values which are then used to set an indicator state. If the mapped indicator sets an HI, the corresponding state for the HI is also set. For more detailed information about defining filters, see "Filtering Events" on page 211.

Using the Manage Event Filters dialog box, you can define filters that target the events to be considered in an indicator mapping rule. The filter can use any of the available event attributes. For example, you can define an indicator mapping rule that considers only those events that have a critical or major severity status and are assigned to a particular user or user group.

Note: You can test new filters while defining or editing an indicator mapping rule.

An indicator mapping rule filter can only be used with indicator mapping rules. They are not interchangeable with event filters.

If the EventTypeIndicator custom message attribute is not available from HPOM or overriding of automatic settings is enabled, but the event matches an indicator mapping rule filter, the rule maps the event to the specified indicator.

The state of the indicator is set by one of the following methods:

► **Specific Indicator State**

The event is mapped to an indicator which is set to the state specified in the mapping rule.

For example, you are monitoring databases and Operations Management receives an event that matches the mapping rule filter of the Database Status indicator. The event sets the indicator state that is specified in the mapping rule, for example, Down.

► **Based On Severity**

Events matching the mapping rule filter are assigned the severity associated with the indicator state that matches the severity of the event.

For example, you are monitoring the CPU load and Operations Management receives an event that matches the mapping rule filter of the CPU Load indicator and has a severity of major. The event automatically sets the indicator state that is specified to correspond to this severity, for example, Overloaded.

Mapping Rule or CMA

If an event generated by an HPOM Smart Plug-in uses custom attributes to set an indicator state automatically, you can configure Operations Management to override this automatic setting and set the indicator state in accordance with an indicator mapping rule. For further information, see "Event Type Indicator Settings" on page 707.

Order of Indicator Mapping Rules

You can create many indicator mapping rules for a CI type. Where more than one indicator mapping rule is available for a configuration item type, the number in the Order column indicates the order in which the indicator mapping rules are applied during the mapping process. As soon as one indicator mapping rule matches, the mapping process stops and ignores all subsequent rules further down the specified order.

The indicator mapping rules configured for a CI type and inherited from higher-level CI types are listed in the Mapping Overview pane. The indicator mapping rules configured for each CI type are listed in the Mapping Rules list for their respective CI type names. You can change the order of the indicator mapping rules only for the selected CI type.

Inheritance of Indicator Mapping Rules

A CI type inherits indicator mapping rules from CI types higher in the hierarchy. An indicator mapping rule defined for the Host configuration item type is inherited by all configuration items types lower in the hierarchy, such as Unix, and Windows.

You can control which configuration items inherit defined indicator mapping rules by choosing the level in the configuration item hierarchy at which to define them. The higher in the CI type hierarchy the mapping rule is specified, the greater the number of CI types that inherit it.

The Mapping Overview pane shows the inheritance of indicator mapping rules in the reverse order of the CI types in the CI Types tree.

Tasks

How to Search and Filter CI Types

In this task, you learn how to search for specific CI types and view CI types that match specified filter criteria. There are two filters:

- ▶ Show only CI types with assigned indicator mapping rules
- ▶ View (Show CI types contained within a specified view)

Note: Join relationships defined in views are ignored.

For information on button actions, see "Indicator Mapping Rules User Interface" on page 334.

Searching for a CI Type

You can use the Search field to locate the first instance of the CI type name or part of a name that you specify.

To search for a specified CI type:

- 1** Open the Indicator Mapping Rules manager from Operations Management Administration:

Admin > Operations Management > Design Operations Content > Indicator Mapping Rules

- 2** In the Search field, enter a string.

Note: The search string must be at least three characters long. Searching is started as soon as the third character is entered and the first match is highlighted. Names with less than three characters can be found by clicking on the  button.

The first CI type in the CI Types tree to match the specified string is highlighted. If that CI is not initially visible, the CI tree is expanded to display the CI type.

- 3 Click the  button to find the next occurrence of the CI type for which you are searching.

Finding CI Types with Assigned Indicators

You can use the filter to display all CI types that have indicators assigned to them.

To filter the CI tree to show only CI types with assigned indicator mapping rules:

- 1 Open the Indicators Mapping Rules manager from Operations Management Administration:

Admin > Operations Management > Design Operations Content > Indicator Mapping Rules

- 2 In the Filter pane, select **Show only CI types with assigned indicator mapping rules**.

The CI Types pane displays only those CI types that have indicators assigned along with the parents of these CI types. If a parent CI type has no assigned indicators, they are unavailable in the display.

Note: You can use the Show only CI types with assigned indicator mapping rules filter and the filtering by a selected view together. The result displays only CI types contained within the specified view and with assigned indicators.

Filtering the CI Types Tree with a View

You can use the filter to display all CI types that are contained within a certain view.

Note: Join relationships defined in views are ignored.

To filter the CI Types tree with a view:

- 1** Open the Indicator Mapping Rules manager from Operations Management Administration:
Admin > Operations Management > Design Operations Content > Indicator Mapping Rules
- 2** Expand the Filters pane, select **View**.
The View field becomes active.
- 3** Select a view from the Views list or click the Browse Views (...) button to open the Views selection dialog box, select the view that you want to use, and select **OK**.

The CI Types tree is updated to display only the CI types that match the view selected.

If no item matches the filter, the No CI type found message is displayed.

Note: You can use the Show only CI types with assigned indicator mapping rules filter and the filtering by a selected view together. The result displays only CI types contained within the specified view and with assigned indicators.

How to Create and Edit Indicator Mapping Rules

In this task, you learn how to set up an indicator mapping rule that searches filtered events for attribute values that are then used to set an indicator state. If the mapped indicator sets an HI, the corresponding state for the HI is also set.

Note: For information on button actions, see "ETI Mapping Rules Pane" on page 338. For more information about the window you use to set up and test filters, see "Filtering Events" on page 211.

To define an indicator mapping rule:

- 1 Open the Indicator Mapping Rules manager from Operations Management Administration:
Admin > Operations Management > Design Operations Content > Indicator Mapping Rules
- 2 Select the CI type for which you want to define an Indicator Mapping Rule.
- 3 To create or edit indicator mapping rules, in the ETI Mapping Rules pane, use the * button to open the Create New Mapping Rule, or use the  button to open the Edit Mapping Rule dialog box for an existing indicator mapping rule.

The Create New Mapping Rule or Edit Mapping Rule dialog box opens.

Note: Use the Duplicate item  button to create a mapping rule that is similar to an existing mapping rule.

- 4 Enter a Display Name, Name, and a short description for the new mapping rule.

- 5** *Optional:* Select **Active** to include the current mapping rule in the matching process.

Clearing **Active**, disables an indicator mapping rule. This can be useful if you want to exclude an indicator mapping rule from a list of rules for testing purposes.

- 6** Select an event filter for the mapping rule from the **Events Filter** list. The filter determines which events to consider in the mapping operation.

If no appropriate filter is already configured, click the Browse (...) button, which opens the Select an Event Filter dialog box. Create a filter or edit an existing one. For information about filters, see "How to Define Simple Event Filters" on page 221.

- 7** Select an Event Type Indicator.

Note: Only indicators associated with the selected CI are shown in the Select Indicator dialog box. Indicators inherited from parent CIs are not displayed.

The indicator that you want to select must already be available. If a suitable indicator is not available, first create it and then create the ETI Mapping Rule.

The  button in the ETI Mapping Rules menu bar opens the Indicators manager.

- 8** Select a Map to Indicator State mode.

An event attribute value must be mapped to an indicator state, using one of the following methods:

- Based on Severity (information from the event)
- Specific Indicator State (can be selected in the mapping rule)

Note: If no obvious indicator state is available for **Based on Severity** mapping, Operations Management uses the nearest available state. For example, if a **Critical** event is mapped to an event type indicator that only has states of **Major** and **Normal** severities, Operations Management maps critical events to the event type indicator state with severity **Major**.

If you define multiple states with the same severity, mapping is undefined.

- 9 Select **OK** to save your changes.

The new indicator mapping rule is added to the end of the list of indicator mapping rules displayed in the ETI Mapping Rules pane.

How to Order Indicator Mapping Rules

In this task, you learn how to change the order of indicator mapping rules.

Note: For information on button actions, see "ETI Mapping Rules Pane" on page 338. For more information about the window you use to set up and test filters, see "Simple Filter Configuration Dialog Box" on page 231.

To change the order of execution of an indicator mapping rule:

- 1 Open the Indicator Mapping Rules manager from Operations Management Administration:
Admin > Operations Management > Design Operations Content > Indicator Mapping Rules
- 2 Select the CI type for which you want to change the order of the indicator mapping rules, for example:
ConfigurationItem > InfrastructureElement > Node > Computer > Windows
- 3 Select the mapping rule for which you want to change the order.
- 4 Using the **Move Up**  and **Move Down**  buttons, rearrange the order of the selected mapping rule and repeat for any other indicator mapping rules that you want to move.

The order of the indicator mapping rules, including inherited rules, can also be seen in the Mapping Overview pane.

Note: Reordering rules has an affect on lower CI type levels. For example, if you reorder rules for Computer, this change is made on both the Windows and Computer level.

Reference

Indicator Mapping Rules User Interface

This section describes the information displayed in the Indicator Mapping Rules manager. The information in this section describes the buttons, icons, labels, and menu options that you use to create, configure, and manage the indicator mapping rules that to set indicator states.

In this section, you can find information about the following topics:

- ▶ CI Types Pane on page 335
- ▶ ETI Mapping Rules Pane on page 338
- ▶ Mapping Overview Pane on page 341
- ▶ Create New and Edit Mapping Rule Dialog Box on page 342
- ▶ Select Indicator Dialog Box on page 345

CI Types Pane

The CI Types pane in the Indicator Mapping Rules manager displays the configuration item types that represent the objects in your IT environment. You use the Indicator Mapping Rules manager to perform the following tasks:

- ▶ View the indicator mapping rules that are assigned to a selected configuration item type
- ▶ Configure new indicator mapping rules and assign them to individual configuration items types

You can use the Expand () and Collapse () buttons to expand or collapse the CI tree. The **Expand** () button expands all CI types which are under the selected CI type. The **Collapse** () button collapses all open nodes except for the selected node.

To access	Select Admin > Operations Management > Design Operations Content > Indicator Mapping Rules
Important information	If you want to modify or manage configuration item types, use the CI Types Manager: Admin > RTSM Administration > Modeling > CI Type Manager
Relevant tasks	To use the CI Types pane, see "How to Search and Filter CI Types" on page 326.
See also	For more information about configuring indicator mapping rules, see "How to Create and Edit Indicator Mapping Rules" on page 330 and "How to Order Indicator Mapping Rules" on page 333.

The information displayed in the CI Types pane of the Indicator Mapping Rules manager includes the following details.

UI Element (A-Z)	Description
	Refreshes the contents of the configuration item tree. Use if new content becomes available while you are working or you uploaded new contents (for example, from another user or the command-line interface).
	Expand Selection: Expands the list to display items belonging to the selected group.
	Collapse Others: Collapses all open branches except for the selected branch.
	Finds the next occurrence of the CI Type for which you are searching. For more information about searching, see "How to Search and Filter CI Types" on page 326.
	Collapses the Filter pane.
	Expands the Filter pane for use.
CI Types	<p>Hierarchical list representing the configuration item types that you want to monitor in your IT environment. If the CI Types list is filtered, (filtered) is displayed next to the CI Types title.</p> <p>The font weight is used to show the assignment of indicators to CI types:</p> <ul style="list-style-type: none"> ➤ Normal font weight: No assignment but a child has assigned indicators. ➤ Gray font weight: No indicator mapping rule assigned for this CI type and its children. ➤ Bold font weight: Indicator mapping rules assigned directly to this CI Type.

UI Element (A-Z)	Description
Filter	<p>Used to search for specific CI types and view CI types that match specified filter criteria. There are two filters:</p> <ul style="list-style-type: none"> ▶ Show only CI types with assigned indicator mapping rules ▶ View (shows CI types contained within a specified view) ▶ ... Opens the Views dialog box from which you can select a view with which to filter CI types. <p>Note: If you apply a view to the filter CI Types tree which removes all CI types with assignments, the ConfigurationItem entry remains in normal text, indicating that assignments exist. Remove the view, or select a more appropriate view to display the CI types with assignments that you require.</p> <p>For more information about searching and filtering, see "How to Search and Filter CI Types" on page 326.</p>
Show only CI Types with assigned mapping rules	<p>Filters the CI Types tree to display all CI types that have indicator mapping rules assigned to them.</p>
View	<p>Enables selection of the view that you want to use.</p> <p>The CI Types tree is updated to display only the CI types that match the view selected.</p>

ETI Mapping Rules Pane

The ETI Mapping Rules pane displays a list of the rules that Operations Management uses to map the attributes of events to indicator states in Operations Management. You can edit and delete existing indicator mapping rules, and configure and test filters for them. You can also change the order of execution the indicator mapping rules. For more information, see "How to Create and Edit Indicator Mapping Rules" on page 330.

To access	Select Admin > Operations Management > Design Operations Content > Indicator Mapping Rules
Relevant tasks	To configure indicator mapping rules, see: <ul style="list-style-type: none"> ▶ "How to Create and Edit Indicator Mapping Rules" on page 330. ▶ "How to Order Indicator Mapping Rules" on page 333.
See also	For more information about configuring indicator mapping rules, see "Indicator Mapping Rules Manager Basics" on page 320 and "Mapping Events to Indicators" on page 322.

The ETI Mapping Rules pane displays the UI elements listed in the following table.

UI Element (A-Z)	Description
	Refreshes the contents of the ETI Mapping Rules pane. Use if new indicator mapping rules become available while you are working.
	New Item: Opens the Create New Mapping Rule dialog box, which enables you to define a new indicator mapping rule and add it to the list already assigned to the selected configuration item type.
	Duplicate Item: Opens the Edit Mapping Rule dialog box and creates a duplicate of the selected indicator mapping rule. The name of an indicator mapping rule is for internal use only and must be unique.

UI Element (A-Z)	Description
	Edit Item: Opens the Edit Mapping Rule dialog box, which you can use to modify and save indicator mapping rules.
	Delete Item: Removes the selected mapping rule.
	Find Matching Events: Finds events that match the selected filter specified in the selected indicator mapping rule. Find Matching Events selects all events containing the indicator set by the selected indicator mapping rule. These events must match the filter configured for the selected mapping rule and must be related to the selected CI type.
	Go to Indicators: Opens the Indicators Repository.
	Manage Event Filters: Opens the Manage Event Filters dialog box, enabling you to select the event filter that you want to apply. From the Select an Event Filter dialog box, you can also open the Filter Configuration dialog box to create an event filter, edit or delete an existing event filter. For information about defining filters, see "Filtering Events" on page 211.
	Move Down: Moves the selected mapping rule down to a lower priority position.
	Move Up: Moves the selected mapping rule up to a higher priority position.
Active	Indicates if the mapping rule is active or not. Only active rules are applied during the mapping process.
Display Name	Display name of the mapping rule available.

UI Element (A-Z)	Description
Event Filter	Name of the event filter that is active in the mapping rule. Filters determine which events the mapping rule should consider.
Indicator	Name of the selected indicator.
Map to Indicator State	<p>Indicator state set using one of the following methods:</p> <ul style="list-style-type: none"> ▶ Based on severity: Indicator state used is governed by the severity information from the event. ▶ Specific Indicator State: Specifies an indicator state independent of any severity information from the event.
Order	<p>Where more than one mapping rule is available for a configuration item type, the number in the Order column indicates the order in which the rules are applied during the mapping process. Using the Move Up and Move Down buttons, you can change the position of rules in the list.</p> <p>Note: If a rule matches, no further rules are applied.</p>

Mapping Overview Pane

The Mapping Overview pane displays a summary of the rules that Operations Management uses to map the attributes of events to indicator states in Operations Management for the selected CI type. Inherited rules are also displayed and labeled with the CI type for which they are defined.

To access	Select Admin > Operations Management > Design Operations Content > Indicator Mapping Rules
Relevant tasks	To configure indicator mapping rules, see: <ul style="list-style-type: none"> ▶ "How to Create and Edit Indicator Mapping Rules" on page 330. ▶ "How to Order Indicator Mapping Rules" on page 333.
See also	For more information about configuring indicator mapping rules, see "Indicator Mapping Rules Manager Basics" on page 320 and "Mapping Events to Indicators" on page 322.

The Mapping Overview pane displays the UI elements listed in the following table.

UI Element (A-Z)	Description
Display Name	Display name of the mapping rule available.
Event Filter	Name of the event filter that is active in the mapping rule. Filters determine which events the mapping rule should consider.
Indicator	Name of the selected indicator.
Map to Indicator State	Indicator state set using one of the following methods: <ul style="list-style-type: none"> ▶ Based on severity: Indicator state used is governed by the severity information from the event. ▶ Specific Indicator State: Specifies an indicator state independent of any severity information from the event.

Create New and Edit Mapping Rule Dialog Box

The Create New Mapping Rule and Edit Mapping Rule dialog boxes are used to create and edit indicator mapping rules. Indicator mapping rules use event filters to identify event attributes that are used to set or modify an indicator state.

Note: Use the Duplicate Item  button to create a mapping rule that is similar to an existing mapping rule.

To access	<p>Select Admin > Operations Management > Design Operations Content > Indicator Mapping Rules</p> <p>In the ETI Mapping Rules pane, click the  button to open the Create New Mapping Rule dialog box or the  button to open the Edit Mapping Rule dialog box.</p>
Important information	<p>Only indicators associated with the selected CI are shown in the Select Indicator dialog box. Indicators inherited from parent CIs are not displayed.</p>
Relevant tasks	<p>To configure indicator mapping rules, see:</p> <ul style="list-style-type: none"> ▶ "How to Create and Edit Indicator Mapping Rules" on page 330. ▶ "How to Order Indicator Mapping Rules" on page 333.
See also	<p>For more information about configuring indicator mapping rules, see "Indicator Mapping Rules Manager Basics" on page 320 and "Mapping Events to Indicators" on page 322.</p>

The Create New Mapping Rule dialog box and the Edit Mapping Rules dialog box display the UI elements listed in the following table.

UI Element (A-Z)	Description
Active	Indicates if the mapping rule is active or not. Only active rules are applied during the mapping process.
Description	Brief summary of the rule's action.
Display Name	External name for the mapping rule. The external name (label) is the name that is visible to users.
Event Filter	<p>Name of the event filter that is active in the mapping rule. Filters determine which events the mapping rule should consider.</p> <p>Use the list to select the filter to apply in the rule. The filter determines which events to consider in the mapping operation. For details about creating filters, see "Filtering Events" on page 211.</p> <p>Note: The filter dialog box displayed for Indicator Mapping Rules is customized for this task. For example, the Assigned To: pane is not displayed as it is not relevant.</p>
Indicator	Selects the indicator you want to set with the event attribute.

UI Element (A-Z)	Description
<p>Map to Indicator State</p>	<p>Selects how the indicator state is mapped to the event. You can select one of the following:</p> <ul style="list-style-type: none"> ▶ Based on Severity: Indicator state used is governed by the severity information from the event. ▶ Specific Indicator State: Specifies an indicator state independent of any severity information from the event.
<p>Name</p>	<p>Internal name of the indicator mapping rule. This is the name used in the event received from HPOM to match the indicator in Operations Management.</p> <p>Automatically generated from the Display Name value. The first character must be a letter (A-Z, a-z) or an underscore (_). All other characters can be a letter (A-Z, a-z), a number (0-9), or an underscore (_). Can be manually overwritten.</p> <p>Note: Maybe disabled for certain locales (for example ja_JP, zh_CN, ko_KR).</p>

Select Indicator Dialog Box

The Select Indicator dialog box is used to select an indicator to be mapped to events matching the mapping rule.

To access	Select Admin > Operations Management > Design Operations Content > Indicator Mapping Rules In the ETI Mapping Rules pane, click the  button to open the Create New Mapping Rule dialog box or the  button to open the Edit Mapping Rule dialog box. Open the Select Indicator (...) dialog box.
Important information	Only indicators associated with the selected CI are shown in the Select Indicator dialog box. Indicators inherited from parent CIs are not displayed.
Relevant tasks	To configure indicator mapping rules, see: <ul style="list-style-type: none"> ▶ "How to Create and Edit Indicator Mapping Rules" on page 330. ▶ "How to Order Indicator Mapping Rules" on page 333.
See also	For more information about configuring indicator mapping rules, see "Indicator Mapping Rules Manager Basics" on page 320 and "Mapping Events to Indicators" on page 322.

The Select Indicator dialog box display the UI elements listed in the following table.

UI Element (A-Z)	Description
	Refreshes the contents of the Select Indicators list. Use if new indicators becomes available while you are working.
	Toggle Grouping by Type: Toggles between a flat list of all indicators, identified with indicator type icons and a list where HIs and event type indicators are grouped in separate lists.

13

View Mappings

This chapter includes:

Concepts

- ▶ View Mappings Manager on page 348
- ▶ Health Top View Management on page 348
- ▶ Mapping Health Top Views on page 349

Tasks

- ▶ How to Search and Filter CI Types on page 351
- ▶ How to Map a View to a Configuration Item Type on page 354
- ▶ How to Test a View Mapping on page 356

Reference

- ▶ View Mappings User Interface on page 357

Troubleshooting and Limitations on page 366

Concepts

View Mappings Manager

This chapter describes the View Mappings manager used to map existing Views to one or more configuration item types for the Health Top View in the Health Perspective and manage the list of mapped views.

The View Mappings manager enables users to perform the following management-related tasks:

- ▶ Map an existing View to one or more configuration item types
- ▶ Manage the list of mapped Views
- ▶ Display the list of mapped Views in the Selected View list located in the Health Top View pane of the Health Perspective tab

Note: Only users with the appropriate access permissions can use Operations Management Administration. For more information about user management, see "User Management" on page 629.

Health Top View Management

Health Top Views are the Views that Operations Management uses to display configuration items in the Health Top View pane of the Health Perspective tab. A view displays a defined subset of the RTSM ConfigurationItem model, for example, only configuration items that relate to a specific area of interest such as Storage or Databases.

Note: Health Top Views and topology views are not the same. Health Top Views have one parent and the same element can appear more than once if required by the relationships being displayed. Topology views are a flat representation of the database elements where elements appear only once.

Generally, views enable you to limit both the type and the amount of information displayed. For example, selecting a view in the Event Browser CI Tree refines the number and type of configuration item types loaded from the RTSM and displayed in the list of available configuration item types.

Similarly, you can restrict the amount and type of information presented in the Health Top View pane by selecting a view from the Selected View list. The contents of the Select View list depend on the configuration items in the Health Top View, which are themselves related to the event selected in the Event Browser, and the views mapped to them in View Mappings.

You can use the Content Packs manager to import and export the list of mapped views displayed in the Selected View list. The Import and Export features of the Content Packs manager provide a convenient way for software administrators to exchange lists of mapped views between instances of Operations Management.

Mapping Health Top Views

You can map Views to configuration item types. The mapped Views appear in the Selected Views list displayed in the Health Top View pane of the Health Perspective tab.

Views enable users to refine both the type and the amount of information displayed. For example, selecting a view in the Event Perspective CI Tree refines the number and type of configuration item types loaded from the RTSM and displayed in the list of available configuration item types. Similarly, users can restrict the amount and type of information presented in the Health Top View pane by selecting a view from Selected View list. The views displayed in the Selected View list is determined by the view mappings defined in the View Mappings manager.

You can also use the View Mappings manager to filter the views that the user sees in the Selected View list according to the category of an event, such as DB or Storage. In this way, you refine the available views to those that make most sense for a given usage model. For example, if you map the DB2 view to the configuration item type DB Tablespace, you can also specify in the mapping rule that only views containing configuration item types concerning events belonging to event categories DB or Storage (or both) are visible.

For more information about the contents of the Health Top View pane and, in particular, the contents of the Selected Views list, see "Health Top View" on page 135.

Tasks

How to Search and Filter CI Types

In this task, you learn how to search for specific CI types and view CI types that match specified filter criteria. There are two filters:

- Show only CI types with assigned view mappings
- View (Show CI types contained within a specified view)

Note: Join relationships defined in views are ignored.

For information on button actions, see "View Mappings User Interface" on page 357.

Searching for a CI Type

You can use the Search field to locate the first instance of the CI type name or part of a name that you specify.

To search for a specified CI type:

- 1 Open the View Mappings manager from Operations Management Administration:
Admin > Operations Management > Design Operations Content > View Mappings
- 2 In the Search field, enter a string.

Note: The search string must be at least three characters long. Searching is started automatically as soon as the third character is entered and the first match is highlighted. This prerequisite avoids searches being started too often and resources being blocked. Names with less than three characters can be found by clicking on the  button.

The first CI type in the CI Types tree to match the specified string is highlighted. If that CI is not initially visible, the CI tree is expanded to display the CI Type.

- 3 Click the  button to find the next occurrence of the CI Type for which you are searching.

Finding CI Types with Assigned View Mappings

You can use the filter to display all CI types that have content assigned to them.

To filter the CI tree to show only CI types with assigned view mappings:

- 1 Open the View Mappings manager from Operations Management Administration:

Admin > Operations Management > Design Operations Content > View Mappings

- 2 In the Filter pane, select **Show only CI types with assigned view maps**.

The CI Types pane displays only those CI types that have view mappings assigned.

Note: You can use the Show only CI types with assigned view maps filter and the filtering by a selected view together. The result displays only CI types contained within the specified view and with assigned view mappings.

Filtering the CI Types Tree with a View

You can use the filter to display all CI types that are contained within a certain view.

Note: Join relationships defined in views are ignored.

To filter the CI tree with a view:

- 1 Open the View Mappings manager from Operations Management Administration:

Admin > Operations Management > Design Operations Content > View Mappings

- 2 In the Search pane, select **View**.

The View field becomes active.

- 3 Select a view from the list or use the Browse Views (...) button to open the Views selection dialog box, select the view that you want to use, and select **OK**.

The CI Types tree is updated to display only the CI types that match the view selected.

You can use the Expand () and Collapse () buttons to fully expand or collapse the CI tree. If a filter is set, only those items selected by the filter are expanded.

If no item matches the filter, the No CI type found message is displayed.

Note: You can use the Show only CI types with assigned view maps and the filtering by a selected view together. The result displays only CI types contained within the specified view and with assigned view mappings.

How to Map a View to a Configuration Item Type

This task shows you how to map a view to a configuration item type and add the newly created view mapping to the complete list of the Operations Management views that are mapped to configuration item types.

Note: For information on button actions, see "View Mappings User Interface" on page 357.

To map an view to a CI type:

- 1** Open the View Mappings manager from Operations Management Administration:
Admin > Operations Management > Design Operations Content > View Mappings
- 2** In the Model Explorer pane, select the configuration item that you want to map to a view.
- 3** In the View Mappings manager, click the  button to open the Create New View Mapping dialog box.
- 4** In the Create New View Mapping dialog box, select a view that contain a reference to the selected configuration item from the list or use the Browse Views (...) button to open the Views selection dialog box, select the view that you want to use, and select **OK**.

Make sure that the view you selected in the previous step is now displayed in the View field.

- 5 *Optional:*** If you want to further restrict the views displayed according to event category, select the new view mapping definition and type all or part of the name of an event category into the Event Category Pattern box using standard regular expression, if desired. If you want to specify multiple event categories, use the pipe symbol (|), for example:

Unix | Windows

Note: It is also possible to define more than one view mappings with the same view but different event categories, for example:

CI type: Node, View All Unix Nodes, event category: Unix

CI type: Node, View All Unix Nodes, event category: Windows

6 Enter a precedence value for the view mapping.

The view with the highest precedence is shown in the Health Top View as default. The precedence of inherited view mappings is also taken into account. The valid Precedence range is 0 to 1000.

7 Select **OK** to close the Create New View Mapping dialog box.

How to Test a View Mapping

This task shows you how to check a view mapping.

To test a view mapping:

1 Open the Health Perspective tab:

Applications > Operations Management > Health Perspective

- 2** In the Event Browser pane, select an event related to the view specified in the view mapping and, if you set an additional event category filter, one that belongs to one of the event categories specified in the filter.
- 3** In the Health Top View pane, make sure that the new view mapping definition is displayed in the Selected Views list.

Reference

View Mappings User Interface

This section lists and describes the layout of the View Mappings manager.

- ▶ CI Types Pane on page 358
- ▶ View Mappings Pane on page 361
- ▶ New and Edit View Mapping Dialog Boxes on page 363
- ▶ Select a View Dialog Box on page 365

CI Types Pane

The CI Types pane in the View Mappings Manager enables you to choose the configuration item types that you want to map to a view.

To access	Select Admin > Operations Management > Design Operations Content > View Mappings
Important information	If you want to modify or manage configuration item types, use the CI Types Manager: Admin > RTSM Administration > Modeling > CI Type Manager
Relevant tasks	To use the CI Types pane, see "How to Search and Filter CI Types" on page 351.
See also	For more information about configuring view mappings rules, see: <ul style="list-style-type: none"> ➤ "View Mappings Manager" on page 348. ➤ "Health Top View Management" on page 348. ➤ "Mapping Health Top Views" on page 349.

The CI Types pane displays the UI elements listed in the following table.

UI Element (A-Z)	Description
	Refreshes the contents of the configuration item tree. Use if new content becomes available while you are working or you uploaded new contents (for example, from another user or the command-line interface).
	Expand Selection: Expands the list to display items belonging to the selected group.
	Collapse Others: Collapses all open branches except for the selected branch.

UI Element (A-Z)	Description
	<p>Entering a string with more than 2 characters in the search field locates the first instance of the string in the CI Tree.</p> <p>Clicking the search button finds the next occurrence of the string for which you are searching. For more information about searching, see "How to Search and Filter CI Types" on page 351.</p>
	<p>Expands the Filter pane.</p>
	<p>Collapses the Filter pane.</p>
<p>CI Types</p>	<p>Hierarchical list representing the configuration item types that you want to monitor in your IT environment. To display the required CI Type, browse to and select the item of interest. The details associated with the CI Type are displayed.</p> <p>If the CI Types list is filtered, (filtered) is displayed next to the CI Types title.</p> <p>When CI types and their children have no objects assigned, their entries appear dimmed.</p> <p>When objects are directly assigned to a CI type, their entries appear bolded.</p>

UI Element (A-Z)	Description
Filter	<p>Used to search for specific CI types and view CI types that match specified filter criteria. There are two filters:</p> <ul style="list-style-type: none"> ▶ Show only CI types with assignments ▶ View (Shows CI types contained within a specified view) ▶ ... Opens the Views dialog box from which you can select a view with which to filter CI types. <p>Note: If you apply a view to the filter CI Types tree which removes all CI types with assignments, the ConfigurationItem entry remains in normal text, indicating that assignments exist. Remove the view, or select a more appropriate view to display the CI types with assignments that you require.</p> <p>For more information about searching and filtering, see "How to Search and Filter CI Types" on page 351.</p>
Show only CI types with	Displays in the CI Tree only CI Types with assignments.
View	Displays in the CI Tree only CI Types contained within the selected view.

View Mappings Pane

The View Mappings manager enables you to choose the view you want to map to the selected configuration item.

To access	Select Admin > Operations Management > Design Operations Content > View Mappings
Relevant tasks	To configure view mapping rules, see: <ul style="list-style-type: none"> ▶ "How to Map a View to a Configuration Item Type" on page 354. ▶ "How to Test a View Mapping" on page 356.
See also	For more information about configuring view mappings rules, see: <ul style="list-style-type: none"> ▶ "View Mappings Manager" on page 348. ▶ "Health Top View Management" on page 348. ▶ "Mapping Health Top Views" on page 349.

The View Mappings pane displays the UI elements listed in the following table.

UI Element (A-Z)	Description
	Refreshes the list of view mappings.
	New Item: Opens the Create New View Mapping dialog box, to create a view mapping definition. Enter a description and select a view.
	Edit Item: Displays the Edit View Mapping dialog box, which enables you to modify the selected View Mapping.
	Delete Item: Removes the selected view mapping definition from the list of view mappings displayed.

UI Element (A-Z)	Description
Event Category Pattern	<p>You can restrict the views displayed in the Selected View list of the Health Top View pane in the Health Perspective tab based on the event category, for example, DB or Storage. Enter a regular expression that matches all or part of the event category name that you want to use to filter the displayed views.</p> <p>Note: Event category pattern can contain a maximum of 255 characters.</p>
Mapping Description	<p>Short description of the mapping listed in the View column.</p>
Precedence	<p>The view with the highest precedence is shown in the Health Top View as default. The precedence of inherited view mappings is also taken into account. The valid Precedence range is 0 to 1000.</p>
View	<p>Name of the view mapped to the selected configuration item type.</p>

New and Edit View Mapping Dialog Boxes

The Create New View Mapping dialog box enables you to map a view to the selected configuration item. From the and Edit View Mapping dialog box, you can edit existing view mappings.

To access	Select Admin > Operations Management > Design Operations Content > View Mappings In the View Mappings manager, click the  button to open the Create New View Mapping dialog box.
Relevant tasks	To configure view mapping rules, see: <ul style="list-style-type: none"> ▶ "How to Map a View to a Configuration Item Type" on page 354. ▶ "How to Test a View Mapping" on page 356.
See also	For more information about configuring view mappings rules, see: <ul style="list-style-type: none"> ▶ "View Mappings Manager" on page 348. ▶ "Health Top View Management" on page 348. ▶ "Mapping Health Top Views" on page 349.

The Create New View Mapping and Edit View Mapping dialog boxes display the UI elements listed in the following table.

UI Element (A-Z)	Description
Event Category Pattern	Regular expression that matches all or part of the event category name that you want to use to filter the displayed views, for example: DBStorage, or Tablespace. Note: Event category pattern can contain a maximum of 255 characters.
ID	Unique identification number for internal purposes only (Edit only).
Mapping Description	A short explanation of the application of the mapping.

UI Element (A-Z)	Description
Precedence	The view with the highest precedence is shown in the Health Top View as default. The precedence of inherited view mappings is also taken into account. The valid Precedence range is to 1000.
View	Name of the view that you want to map to the CI type selected in the CI Types pane, for example: ConfigurationItem Note: Created view is read-only in the Edit dialog box and cannot be changed. Create a new view and delete the old one.

Select a View Dialog Box

The Select a View dialog box enables you to choose the view you want to map to the selected configuration item.

To access	Select Admin > Operations Management > Design Operations Content > View Mappings In the View Mappings manager, click the  button to open the Create New View Mapping dialog box. Open the Select a View (...) dialog box.
Relevant tasks	To configure view mapping rules, see: <ul style="list-style-type: none"> ▶ "How to Map a View to a Configuration Item Type" on page 354. ▶ "How to Test a View Mapping" on page 356.
See also	For more information about configuring view mappings rules, see: <ul style="list-style-type: none"> ▶ "View Mappings Manager" on page 348. ▶ "Health Top View Management" on page 348. ▶ "Mapping Health Top Views" on page 349.

The Select a View dialog box displays the UI elements listed in the following table.

UI Element (A-Z)	Description
	Refreshes the list of views.
	Go to Modeling Studio: Opens the Modeling Studio.
	Collapse Others: Collapses all open branches except for the selected branch.
	Expand Selection: Expands the list to display items belonging to the selected group.

Troubleshooting and Limitations

This section provides the following help on troubleshooting problems with the View Mappings manager:

- "No Content in the View Mappings Pane" on page 366
- "Select a View Dialog Box Does not Contain Desired View" on page 366

No Content in the View Mappings Pane

No configuration item type is selected. Select a configuration item type in the CI Types pane of the View Mappings manager.

Select a View Dialog Box Does not Contain Desired View

- The desired view does not contain a reference to the configuration item type to which you want to map a view. Either add the configuration item type to the view using RTSM tools, or map a view to another configuration item type.
- No, or incorrectly defined, event category is specified in the Event Category Pattern box. If necessary, modify the string (or regular expression) specified in the Event Category Pattern box when configuring the view mapping definition. Remember to explicitly save the modified definition.

14

Correlation Rules

Note: To be able to use the event correlation functionality of Operations Management, the Event Management Foundation and Correlation licenses are required. For detailed information on licensing, see the *the HP Business Service Management Deployment Guide* PDF.

This chapter includes:

Concepts

- Correlation Rules Manager Basics on page 369
- Topology-Based Event Correlation on page 370
- Correlation Rules on page 371
- Cross-Domain Event Correlation on page 371
- Event Correlation Rule Topology on page 372
- Correlation Rule Symptoms and Causes on page 374

Tasks

- How to Configure Topology-based Event Correlation Rules on page 376
- How to Create Event Correlation Rules on page 378
- How to Select Topology Views on page 380
- How to Define the Rule Topology on page 381
- How to Specify Correlation Rule Symptoms on page 383
- How to Specify Correlation Rule Causes on page 384

- ▶ How to Set the Correlation Time Limit on page 385
- ▶ How to Set the Correlation Auto-Extend Time on page 386

Reference

- ▶ Correlation Rules User Interface on page 387

Troubleshooting and Limitations on page 405

Concepts

Correlation Rules Manager Basics

This chapter introduces the concept of topology-based event correlation. The information in this chapter explains how to configure correlation rules and apply them to the indicators that are assigned to the configuration item types you are monitoring with Operations Management. You can use topology-based event correlation to help you better understand, monitor, and manage the problems that can have an effect on the objects in your IT environment.

The Correlation Rules manager enables you to define and deploy rules that use indicators to correlate the events occurring in the different domains throughout the managed IT environment. You can use the Correlation Rules manager to perform the following tasks:

- ▶ Define and manage correlation rules
- ▶ Visualize the topology of correlation rules
- ▶ View cause and symptoms events
- ▶ Manage indicators and their states
- ▶ Browse the hierarchy of cross-domain correlation rules

Note: You can use user roles to restrict access to the Correlation Rules manager. For more information about user authorization, see "User Management" on page 629.

To access the Correlation Rules manager, select the following menu option:

Admin > Operations Management > Design Operations Content > Correlation Rules

Topology-Based Event Correlation

You can define rules that use indicators to correlate or link related events occurring in the different domains of the managed IT environment. Correlating events that are either generated by or related to the same object greatly reduces the number of events displayed in the Event Browser. The reduced number of events in the Event Browser helps operators to locate the cause of the problems more quickly and efficiently.

The correlation process determines the cause of an event. An overview of all events affected by the correlation process is available separately in the Related Events tab of the Details pane. The overview enables you to drill down the correlation history and browse through all correlated events.

The event correlation process uses the topology-based views stored in the RTSM to specify which configuration item types can be considered for inclusion in a correlation rule. The topology-based views improve the correlation process by adding path-related constraints to the correlation rule. Topology-based event correlation requires that a relationship exist between the configuration items specified in the correlation rule.

Note: The view used to define the configuration item types in a correlation rule must also demonstrate that a relationship exists between the configuration item types specified in the rule.

A time limit exists for the processing of the correlation rules you define with the Correlation Rules manager. All the events specified in the correlation rule must occur within a defined period of time. By default, the time limit is set to 960 seconds. If individual symptom or cause events occur outside of the defined time limit, they appear in the Event Browser as normal, uncorrelated events. For more information about the time setting, see "How to Set the Correlation Time Limit" on page 385.

Correlation Rules

Use the Correlation Rules manager to view, define, and apply correlation rules. Correlation rules associate selected configuration item types with defined indicator states to trigger a correlation process. The correlation process results in the highlighting of one or more configuration items as causes.

Correlation rules require a combination of symptoms and causes. Both symptoms and causes are defined by selecting configuration item types. Each configuration item type (such as a DB2 database) that you specify as a potential symptom requires one or more indicators (for example, *Run State*, or *Availability*) to be defined for it. Each indicator must have a state (for example, *up*, *down*, or *offline*). Configuration item types you choose as causes also require an indicator and a state.

For example, the information in the following table defines a simple correlation rule for a database instance. Operations Management displays cause events in the Event Browser and the symptom events in the Related Events tab of the Message Details pane.

Rule Type	CI Type	Event Type Indicator	Event Type Indicator State
Symptom	DB2	Network Availability	Offline
Symptom	DB2	Buffer Hit Ratio	Low
Symptom	Process	Run state	Down
Cause	DB Table Space	Buffer Performance	Slow

Cross-Domain Event Correlation

The Correlation Rules manager enables you to set up rules that correlate indicators for configuration item types in multiple and different domains, for example, database, storage, and web application. Cross-domain correlation connects a chain of rules that are defined in different domains. The correlation process can use the *symptom* of one rule as the *cause* of the next rule in the chain, or vice versa.

The link between correlation rules in different domains is the *same* indicator state assigned to the *same* configuration item type. In one rule, you can define an indicator state as a symptom for a specific configuration item type. In another rule for a different domain, you can define the *same* indicator state as a cause for the *same* configuration item type. If all the events occur in the different domains as expected and trigger correlation rules, the correlation process displays in the Event Browser only the cause event from the last rule in the event correlation chain.

Note: Cross-domain correlation rules must share at least one identical combination of configuration item type and indicator state.

For example, if all the necessary correlation rules are defined for the database, storage, and web application domains, and the necessary indicator states are being monitored for a shared configuration item, the Correlation Rules manager can determine that a problem with physical disk utilization in the storage domain is the cause of the problem concerning the availability of the web server.

The Correlation Rules pane in the Correlation Rules manager incorporates a list of correlation rules containing symptoms or states that also feature in rules defined for a different domain. In cross-domain rules, indicator states configured as a symptom in one rule are also defined as a cause in a rule defined in another domain. You can choose whether to view rules that determine the symptom or the cause of an event and expand the item to see if the rule is part of a chain.

Event Correlation Rule Topology

It is easier to understand the context in which a correlation rule exists and how the rule works if you can see the topology of the configuration item types that are included in the rule. Operations Management uses the Rule Topology pane in the Correlation Rules manager to graphically represent the correlation rule you are designing or modifying. The configuration item types that you include in the correlation rule are highlighted in the topology of the view to which they belong.

Labels indicate the type of objects in the correlation rule and the relationship between the objects. For example, correlation rules can include relationships such as Contains, Depends on, or Member.

Note: You cannot change or modify the type of relationship displayed in the Rule Topology pane. The relationship is defined in the view. Use the Modeling Studio to set up new views and new relationships.

You use the Rule Topology pane to specify which parts of the view topology to consider for the correlation rule you are configuring. In the Rule Topology pane, you select the configuration item types and select the relationship between them. These relationships are defined in the RTSM. The Correlation Rules manager checks that the rule you define indicates both the configuration item types to consider in the event correlation process and their relationship. If the rule does not indicate the relationship between configuration item types, the Correlation Rules manager does not permit you to save it.

The rule topology shows the relationships between all the configuration item types in the chosen view. If only one topological path exists between the configuration item types in your correlation rule, Operations Management automatically highlights the path for you. If more than one path exists, you must manually select the path between the configuration item types specified as symptoms and cause in the correlation rule.

If you configured multiple correlation rules in a chain, where a cause in one rule is a symptom in another, Operations Management displays useful information about the indicator states used in the correlation rule and enables you to navigate between the rules following the correlation chain.

For more information about the contents of the Rule Topology pane, see "Rule Topology Pane" on page 392. For more information about configuring rule topology, see "How to Define the Rule Topology" on page 381.

Correlation Rule Symptoms and Causes

In Operations Management, a correlation rule defines events as either causes or symptoms. If one or more of the events specified as symptoms occurs within a defined period of time, the triggered rule highlights the cause event in the Event Browser and creates a subgroup containing the symptom events.

Note: The Event Browser uses icons to distinguish between events that are configured as the cause in a correlation rule and events that are configured as symptoms. For more information about icons in the Event Browser, see "Event Browser Icons, Buttons, and Context Menus" on page 71.

Every rule that Operations Management uses to correlate events must have at least one symptom and one cause. Multiple cause indicators can be specified as long as they are specified for the same CI type. In the context of Operations Management correlation rules, symptoms and causes are defined as follows:

► Symptom

Symptoms in a correlation rule are events that occur as a result of another event. Symptom events are mapped to individual indicator states used to monitor the objects in your IT environment, for example, Database:Unavailable or Application response:Slow.

You can map a symptom event to more than one indicator state, for example, Database:Down or unavailable. In this way, the event can contribute to more than one rule.

► Cause

Causes in a correlation rule are the events that are reporting problems and are the underlying reasons that other symptom events occur. In a correlation rule, cause events are mapped to an indicator state used to monitor the objects in your IT environment, for example: Network:Unreachable.

Note: If multiple rules correlate the same symptoms at the same time but specify a different event as the cause, the event specified as the cause in the first rule triggered takes precedence and subsequent rules are ignored.

You can configure a chain of rules that correlate events across multiple domains. In cross-domain event correlation, an event can be configured as a symptom in one rule and as a cause in another rule. Similarly, an event configured as a cause in one correlation rule can be configured as a symptom in another rule. Rules that correlate events occurring in different domains require at least one common configuration item type and one indicator state. The common configuration item type and indicator state is the link between the rules defined for the different domains.

The contents of the panes are linked both conceptually and graphically. If you select a configuration item type in the Rule Topology pane, the Indicators Pane displays all indicators that could be assigned as cause or symptom for the current configuration item.

Tasks

How to Configure Topology-based Event Correlation Rules

This task describes how to configure a topology-based event correlation rule. A correlation rule uses multiple indicator states to determine which events are symptoms of a problem and which events are the causes.

This task includes the following steps:

- "Prerequisites" on page 376
- "Create the Event Correlation Rule" on page 377
- "Select a Topology View" on page 377
- "Define the Rule Topology" on page 377
- "Specify Event Correlation Rule Symptoms" on page 377
- "Specify Correlation Rule Cause" on page 377

1 Prerequisites

To create correlation rules and policies, you need the following:

- Access to Operations Management Administration
- Good understanding of the principles of event correlation
- Detailed knowledge of the objects and events that you want to create rules to correlate
- Working knowledge of configuration item types, indicators, and indicator states
- Understanding of how events relate to each other in terms of cause and effect. For example, the availability of an email server depends on reliable hardware, responsive software, and a functioning network.

2 Create the Event Correlation Rule

In this step, you create a correlation rule to help you solve problems more quickly by distinguishing between events that are the symptoms of a problem and events that are the cause. For more information, see "How to Create Event Correlation Rules" on page 378.

3 Select a Topology View

In this step, you select a view that specifies the configuration item types you want to use in a correlation rule. Topology views reduce and refine the number of configuration item types that you can use in the correlation rule to a more manageable level. For more information, see "How to Select Topology Views" on page 380.

4 Define the Rule Topology

In this step, you define the topology of the correlation rule. Topology is the relationships and dependencies between the configuration item types in the correlation rule. For more information, see "How to Define the Rule Topology" on page 381.

5 Specify Event Correlation Rule Symptoms

In this step, you specify one or more events as symptoms in a correlation rule. You define the symptoms of a correlation rule by specifying one or more indicator states used to monitor particular events in your IT environment, for example: `Database:Unavailable` or `Service:Slow`. For more information, see "How to Specify Correlation Rule Symptoms" on page 383.

6 Specify Correlation Rule Cause

In this step, you specify the event that you want to define as the cause in a correlation rule. You define the cause of a correlation rule by specifying an indicator state used to monitor a particular event in your IT environment, for example, `Network:Unreachable`. For more information, see "How to Specify Correlation Rule Causes" on page 384.

How to Create Event Correlation Rules

In this task, you learn how to create a correlation rule. Correlation rules enable you to understand more quickly how to solve problems by distinguishing between events that are the symptoms of a problem and events that are causes.

Note: You can also manually relate events, assigning one event as a cause event and the other logically-related events as symptom events. For further information, see "How to Relate Events Manually" on page 54.

Manually-related events can also be used as the basis for creating new or enhancing existing correlation rules. For further information, see "How to Create Correlation Rules from Manually-Related Events" on page 56.

To create a correlation rule:

1 Open the Correlation Rules manager:

Admin > Operations Management > Design Operations Content > Correlation Rules

2 In the Correlation Rules pane, click the  button. The Create New Correlation Rule dialog box opens.

Note: For information on button actions, see "Correlation Rules User Interface" on page 387.

3 Type a name, display name, and description for the new correlation rule.

4 Select a topology view to determine which configuration item types are available for inclusion in the new correlation rule. For more information about selecting topology views in correlation rules, see "How to Select Topology Views" on page 380.

5 Select **Active** to enable the rule during runtime. By default it is disabled.

Inactive rules are identified with diagonal black line through their icons in the Correlation Rules pane.

- 6** *Optional:* Specify a configuration time window. Select the check box and set the time period for the correlation rule you are creating. The range is from 0 to 9999 seconds. By default it is not enabled and the global value is used. 0 seconds also mean it is not enabled and the global setting is used.

Correlation Time Window sets the period of time in seconds that correlation rules wait for all required events to occur before reporting the cause event and emptying the correlation rule cache.

Cause and symptom events must arrive within that time frame in the correlation engine to be considered for correlation. A time window starts when a first cause or symptom event arrives that cannot be correlated with any other event.

Default value is 960 seconds (6 minutes). You can change this global value. For details, see "Topology-Based Event Correlation Settings" on page 717.

- 7** Select **OK** to start creating the correlation rule.
- 8** In the Finish Creating Correlation Rule pane, specify a valid the Rule Topology with cause and symptoms. For more information about selecting topology views in correlation rules, see "How to Define the Rule Topology" on page 381.
- 9** Click the  button to save the correlation rule.

How to Select Topology Views

In this task, you learn how to use a topology view to specify which configuration item types you want to use in a correlation rule. Topology views reduce and refine the number configuration item types that you can use in the correlation rule to a more manageable level.

Note: For information on button actions, see "Correlation Rules User Interface" on page 387.

To select a topology view for a correlation rule:

- 1 Open the Correlation Rules manager:

Admin > Operations Management > Design Operations Content > Correlation Rules

- 2 In the Rule Topology pane, use the **View** list to choose a topology view. The view you choose specifies the configuration item types that you want to use in the new correlation rule as well as the topological relationships between the configuration item types.

Note: When you create a rule, the View list displays all known views. After you select a view, the View list displays only those views that refer to any of the configuration item types present in the selected view.

- 3 If the rule you want to use is not present in the View list, use the Modeling Studio to configure the view.

For more information about topology views in correlation rules, see "Event Correlation Rule Topology" on page 372 and "Rule Topology Pane" on page 392.

How to Define the Rule Topology

In this task, you use the Rule Topology pane to specify the configuration item types that you want to include in a correlation rule and what relationships and dependencies exist between the configuration item types. A relationship must exist between the configuration item types in a rule. The Correlation Rules manager does not permit you to save an invalid rule.

Note: For information on button actions, see "Correlation Rules User Interface" on page 387.

To define the topology of a correlation rule:

- 1 Open the Correlation Rules manager:
Admin > Operations Management > Design Operations Content > Correlation Rules
- 2 In the Rule Topology pane, use the **View** list to choose a topology view. The view you choose must contain the configuration item types that you want to use in the new correlation rule.
- 3 Specify the topology of the correlation rule by highlighting the path between the configuration item types that you want to associate in the correlation rule. The rule topology shows the relationships between all the configuration item types in the chosen view. If there is more than one path between the configuration item types specified as symptoms and cause in the correlation rule, the shortest path is taken. If you want to use an alternative one, you must make the selection manually.

When creating or modifying rules, it may not always be obvious when a rule is correctly specified. To guide you through correlation rule creation, short explanations are provided at the top of the pane.

Information presented in red indicates that there is an error or omission in the correlation rule. Follow the guidance to correct the error. If it proves difficult to create an error-free rule, use the Rebind button to create a binding between the cause and the symptoms. The rebind automatically removes all bindings and adds the shortest path between the cause and the symptoms.

Information presented in blue indicates that the rule is correctly specified and serves as a reminder to save the modified rule.

Note: You select a path by clicking the links and objects in the chosen path. Active links are colored blue, inactive links are colored grey.

For more information about rule-topology views in correlation rules, see "Event Correlation Rule Topology" on page 372 and "Rule Topology Pane" on page 392.

How to Specify Correlation Rule Symptoms

In this task, you learn how to specify one or more events as symptoms in a correlation rule. You define the symptoms of a correlation rule by specifying one or more indicator states used to monitor particular events in your IT environment, for example, *Database:Unavailable* or *Service:Slow*.

Note: For information on button actions, see "Correlation Rules User Interface" on page 387.

To specify symptoms for a correlation rule:

- 1 Open the Correlation Rules manager:
Admin > Operations Management > Design Operations Content > Correlation Rules
- 2 Create a (or open an existing) correlation rule. For more information about creating correlation rules, see "How to Create Event Correlation Rules" on page 378.
- 3 In the Rule Topology pane, select the configuration item type, the indicator state of which you want to use as a symptom in the selected correlation rule.
- 4 In the Indicators pane, expand the indicator containing the indicator state you want to specify as a symptom in the selected correlation rule.
- 5 Right-click the indicator state you want to use as a symptom in the correlation rule, and select **Add as a Symptom** from the context menu.

The selected indicator state should appear in the list of symptoms and causes in the Symptoms and Causes pane.

How to Specify Correlation Rule Causes

In this task, you learn how to specify the event that you want to define as the *cause* in a correlation rule. You define the cause of a correlation rule by specifying an indicator state used to monitor a particular event in your IT environment, for example: Network:*Unreachable*.

Note: For information on button actions, see "Correlation Rules User Interface" on page 387.

To specify causes in a correlation rule:

- 1 Open the Correlation Rules manager:
Admin > Operations Management > Design Operations Content > Correlation Rules
- 2 Create a (or open an existing) correlation rule. For more information about creating correlation rules, see "How to Create Event Correlation Rules" on page 378.
- 3 In the Rule Topology pane, select the configuration item type for which you want to select the cause.
- 4 In the Indicators pane, right-click the indicator state you want to use as a cause in the correlation rule, and select **Add as a Cause** from the context menu.

The selected indicator state should appear in the list of symptoms and causes in the Symptoms and Causes pane.

How to Set the Correlation Time Limit

In this task, you learn how to set the period of time that correlation rules wait for all required events to occur before reporting the cause event and emptying the correlation rule cache.

Note: For information on button actions, see "Correlation Rules User Interface" on page 387.

To set the time limit for correlation rules:

- 1 Open the Infrastructure Settings manager:
Admin > Platform > Setup and Maintenance > Infrastructure Settings
- 2 In the **Applications** list, set the context to **Operations Management**.
- 3 In the Topology-Based Event Correlation Settings section, click the  button for the entry: Correlation Time Window.
- 4 In the Edit Setting dialog box, enter the time limit (in seconds) you want to set in the Value box. The default is 960 seconds.
- 5 Select **Save** to apply the new time setting immediately.

How to Set the Correlation Auto-Extend Time

In this task, you learn how to set event correlation to automatically extend the correlation time window whenever an additional symptom is correlated to the same cause. Each time that an event is correlated with a problem, the time period set in the correlation time window is restarted to help enable the correlation of a greater proportion of symptoms associated with the original event.

Note: For information on button actions, see "Correlation Rules User Interface" on page 387.

To set Auto-Extend for correlation rules:

- 1 Open the Infrastructure Settings manager:
Admin > Platform > Setup and Maintenance > Infrastructure Settings
- 2 In the **Applications** list, set the context to **Operations Management**.
- 3 In the Topology-Based Event Correlation Settings section, click the  button for the entry: Auto-Extend Time Window Mode.
- 4 In the Edit Setting dialog box, set the Value to **true**.
- 5 Select **Save** to apply the new time setting immediately.

Reference

Correlation Rules User Interface

This section describes in detail the information displayed in the Correlation Rules manager. The information in this section describes the buttons, icons, labels, and menu options that you use to create the correlation rules that help users manage the events that occur in your IT environment.

This section also includes:

- Correlation Rules Pane on page 388
- View Correlation Rule Pane on page 390
- Rule Topology Pane on page 392
- Correlation Rule Indicators Pane on page 395
- Correlation Rule Symptoms and Causes Pane on page 397
- Create New Correlation Rule Dialog Box on page 399
- Edit Properties for Correlation Rule Dialog Box on page 401
- Matching CIs for Correlation Rule Dialog Box on page 403

Correlation Rules Pane

The Correlation Rules pane in the Correlation Rules manager displays a list of all available correlation rules. The list includes rules from the out-of-the-box content packs and any rules that you defined and saved.

In addition, the Correlation Rules pane includes information about correlation rules, the symptoms and causes of which overlap to form parent-child relationships. Parent-child relationships contain symptoms or causes that feature in a chain of rules defined for multiple domains.

To access	Select Admin > Operations Management > Design Operations Content > Correlation Rules
Relevant tasks	To configure correlation rules, see: <ul style="list-style-type: none"> ➤ "How to Configure Topology-based Event Correlation Rules" on page 376. ➤ "How to Create Event Correlation Rules" on page 378.
See also	For more information about configuring correlation rules, see: <ul style="list-style-type: none"> ➤ "Correlation Rules Manager Basics" on page 369. ➤ "Topology-Based Event Correlation" on page 370. ➤ "Correlation Rules" on page 371. ➤ "Event Correlation Rule Topology" on page 372. ➤ "Correlation Rule Symptoms and Causes" on page 374.

The Correlation Rules pane displays the UI elements listed in the following table.

UI Element (A-Z)	Description
	Refreshes the contents of the Correlation Rules list. Use if new rules becomes available while you are working.
	New Item: Opens the Create New Correlation Rule dialog box, which you use to define the details of a new (or modify an existing) correlation rule. For more information, see "How to Create Event Correlation Rules" on page 378.
	Duplicate Item: Creates a duplicate of the selected correlation rule. The name of a correlation rule is for internal use only and must be unique.
	Delete Item: Deletes the selected correlation rule from the database.
	Toggle Display of Cross Rule Relations: Toggles between a flat list of correlation rules and a tree that shows how each rule is linked to other rules.
	Toggle Sorting by Cause CI Type: Toggles between a correlation rule list sorted alphabetically and a list sorted by the cause CI type name.
	Expand: Expands the list to display items belonging to the selected group.
	Collapse: Collapses all open branches except for the selected branch.
	Find Matching CIs: Show all CIs that match the topology specified in the rule and enables the sending of test events to test the correlation rule.
	Edit Properties: Opens the basic properties of the selected correlation rule in the Edit Properties for Correlation Rule dialog box. For more information, see "Edit Properties for Correlation Rule Dialog Box" on page 401.

UI Element (A-Z)	Description
	<p>Save Item: Completes the new correlation rule creation or saves the modifications you made to an existing correlation rule.</p> <p>Note: A correlation rule must be made active before it can be used.</p>
	<p>Cancel Edit or Create: Discards all modifications made while creating or editing the rule topology of the selected correlation rule. When editing, the saved version of the selected correlation rule is reloaded from the database.</p>

View Correlation Rule Pane

The View Correlation Rule pane in the Correlation Rules manager is also used during the creation of new Correlation Rules when it is labelled Finish Creating Correlation Rule.

To access	Select Admin > Operations Management > Design Operations Content > Correlation Rules
Relevant tasks	<p>To configure correlation rules, see:</p> <ul style="list-style-type: none"> ▶ "How to Configure Topology-based Event Correlation Rules" on page 376. ▶ "How to Create Event Correlation Rules" on page 378.
See also	<p>For more information about configuring correlation rules, see:</p> <ul style="list-style-type: none"> ▶ "Correlation Rules Manager Basics" on page 369. ▶ "Topology-Based Event Correlation" on page 370. ▶ "Correlation Rules" on page 371. ▶ "Event Correlation Rule Topology" on page 372. ▶ "Correlation Rule Symptoms and Causes" on page 374.

The View Correlation Rule pane in the Correlation Rules manager contains the following panes:

- "Rule Topology Pane" on page 392
- "Correlation Rule Indicators Pane" on page 395
- "Correlation Rule Symptoms and Causes Pane" on page 397.

The View Correlation Rules pane displays the UI elements listed in the following table.

UI Element (A-Z)	Description
	Binds one or more symptoms to the cause by taking the shortest path. All other bindings are removed.
	<p>Toggle Display of Node Details: Opens the Details window for the selected Rule Topology. The Details window displays:</p> <ul style="list-style-type: none"> ➤ Symptoms and Causes Symptoms or causes mapped to the selected CI type. ➤ Cross Rule Navigation Shows rules where the selected symptom is a cause or the selected cause is a symptom.

When creating or modifying rules, it may not always be obvious when a rule is correctly specified. To guide you through correlation rule creation, short explanations are provided at the top of the pane.

Information presented in red indicates that there is an error or omission in the correlation rule. Follow the guidance to correct the error. If it proves difficult to create an error-free rule, delete bindings and use the Rebind button to create a binding between the cause and the symptom. The rebind automatically uses the shortest path between the cause and the symptom.

Information presented in blue indicates that the rule is correctly specified and serves as a reminder to save the modified rule.

Rule Topology Pane

The Rule Topology pane in the Correlation Rules manager displays a graphical representation of the selected correlation rule, including all the configuration item types configured in the rule as well as any relationships between the included configuration item types and other correlation rules that use the same indicator states. The Correlation Rules manager uses color to indicate the role of a configuration item type in a correlation rule, for example, to show if a configuration item is configured as a symptom (blue) or a cause (orange).

Configuration item types are only displayed in the Rule Topology pane if you select a rule or apply a view from the View list.

To access	Select Admin > Operations Management > Design Operations Content > Correlation Rules
Relevant tasks	To configure correlation rules, see: <ul style="list-style-type: none"> ➤ "How to Configure Topology-based Event Correlation Rules" on page 376. ➤ "How to Create Event Correlation Rules" on page 378.
See also	For more information about configuring correlation rules, see: <ul style="list-style-type: none"> ➤ "Correlation Rules Manager Basics" on page 369. ➤ "Topology-Based Event Correlation" on page 370. ➤ "Correlation Rules" on page 371. ➤ "Event Correlation Rule Topology" on page 372. ➤ "Correlation Rule Symptoms and Causes" on page 374.

The Rule Topology pane displays the UI elements listed in the following table. In the table, unlabeled UI elements are shown in angle brackets (<>).

UI Element (A-Z)	Description
	<p>Indicates that the configuration item type has an indicator state that is configured as a symptom in the selected correlation rule.</p> <p>Tip: To see which indicator states are configured in the correlation rule. Select Toggle Display of Node Details  button which opens the Details window for the selected Rule Topology.</p>
	<p>Indicates that the configuration item type has an indicator state that is configured as a cause in the selected correlation rule.</p>
	<p>Indicates that the configuration item type has an indicator state that is configured not only as a <i>cause</i> in the selected correlation rule, but also as a symptom in another rule. The name of the other correlation rule is displayed as a hyperlink above the configuration item symbol.</p>
	<p>Indicates that the configuration item type has an indicator state that is configured not only as a symptom in the selected correlation rule, but also as a cause in another rule. The name of the other correlation rule is displayed as a hyperlink below the configuration item symbol.</p>
	<p>Adds the highlighted link (constraint) to the correlation rule. Adding a link enables the path between the linked objects in the context of the correlation rule, which is a requirement for topology-based event correlation. It does not change the View model in any way.</p>
	<p>Removes the highlighted link (constraint) from the correlation rule you are editing. The link between the two objects is no longer recognized in the context of the correlation rule, and any rule that relies on this link no longer works. Removing a link from a correlation rule does not change the View model in any way.</p>

UI Element (A-Z)	Description
<Dark blue background>	Symptom CI type.
<Light blue background>	Not cause or symptom CI type, but CI type is part of rule topology.
<Orange background>	Cause CI type.
<Pink frame>	Selected CI type.
<No background color>	CI type is not part of the rule.
Layout	Selects alternative ways of viewing the Rule Topology diagram. There are three options to chose from: Hierarchical, Circular, and Concentric Radial.
Levels	Selects the depth of topology levels displayed in the Rule Topology diagram.
View	Displays the views you can use to define which configuration item types are available for inclusion in the selected correlation rule. All views are available in the list before you select a view. After you select a view, the views displayed in the list are restricted to those which contain any of the configuration item types in the selected correlation rule. If the Rules Topology pane is empty, see "Rules Topology Pane is Empty" on page 405.
Visible CI Types	States the number of CI types displayed and the total number of CI types included in the correlation rule. Format: number of CI types displayed/total number of CI types in correlation rule, for example, 3/4.
Zoom	Controls the size of the displayed Rule Topology diagram.

Correlation Rule Indicators Pane

The Indicators pane in the Correlation Rules manager displays a list of the indicators assigned to the configuration item type selected in the Rule Topology pane. You can select states from any of the listed indicators for use in the correlation rule you are designing.

To access	Select Admin > Operations Management > Design Operations Content > Correlation Rules
Important information	If you need to add or modify indicators, you must do this in the Indicators manager.
Relevant tasks	To configure correlation rules, see: <ul style="list-style-type: none"> ▶ "How to Configure Topology-based Event Correlation Rules" on page 376. ▶ "How to Create Event Correlation Rules" on page 378.
See also	For more information about configuring correlation rules, see: <ul style="list-style-type: none"> ▶ "Correlation Rules Manager Basics" on page 369. ▶ "Topology-Based Event Correlation" on page 370. ▶ "Correlation Rules" on page 371. ▶ "Event Correlation Rule Topology" on page 372. ▶ "Correlation Rule Symptoms and Causes" on page 374.

The Correlation Rule Indicators pane displays the UI elements listed in the following table.

UI Element (A-Z)	Description
	Refreshes the contents of the Indicators list. Use if new indicators becomes available while you are working.
	Go to the Indicator Manager: Opens the Indicators manager.
	Group Indicator by Type: Toggles between a list containing all indicators and a list divided into HIs and event type indicators.

UI Element (A-Z)	Description
	<p>Add as a Symptom: Adds the selected indicator state as a symptom for the configuration item type selected in the Rule Topology pane.</p>
	<p>Add as a Cause: Sets the selected indicator state as a cause for the configuration item type selected in the Rule Topology pane.</p>

Correlation Rule Symptoms and Causes Pane

The Symptoms and Causes pane in the Correlation Rules manager displays a list of the indicators and states configured for the configuration types of the correlation rule. These configuration types are displayed in the Rules Topology pane and indicates if the state is a cause or a symptom in the selected rule. Selecting a symptom or the cause in Rule Topology pane highlights the indicator state in the Indicators pane.

You can also add new event indicator states to the displayed list.

To access	Select Admin > Operations Management > Design Operations Content > Correlation Rules
Important information	To add an indicator state to a correlation rule as a symptom or a cause, either right-click the state and use the options displayed in the popup menu.
Relevant tasks	To configure correlation rules, see: <ul style="list-style-type: none"> ➤ "How to Configure Topology-based Event Correlation Rules" on page 376. ➤ "How to Create Event Correlation Rules" on page 378.
See also	For more information about configuring correlation rules, see: <ul style="list-style-type: none"> ➤ "Correlation Rules Manager Basics" on page 369. ➤ "Topology-Based Event Correlation" on page 370. ➤ "Correlation Rules" on page 371. ➤ "Event Correlation Rule Topology" on page 372. ➤ "Correlation Rule Symptoms and Causes" on page 374.

The Correlation Rule Symptoms and Causes pane displays the UI elements listed in the following table.

UI Element (A-Z)	Description
	Delete Item: Deletes the selected indicator from the list of indicators included in the correlation rule as either a symptom or a cause.
CI Type	Name of the configuration item type to which the listed indicator is assigned.
Indicator	Name of the indicator referenced in the selected correlation rule.
Indicator State	Name of the indicator state referenced in the selected correlation rule.
Type	Indicates if the indicator is defined as a symptom or a cause in the selected correlation rule.

Create New Correlation Rule Dialog Box

You use the New Correlation Rule dialog box to define the properties of a new correlation rule, for example, name, and description.

To access	Select Admin > Operations Management > Design Operations Content > Correlation Rules In the Correlation Rules pane, click the * button.
Relevant tasks	To configure correlation rules, see: <ul style="list-style-type: none"> ▶ "How to Configure Topology-based Event Correlation Rules" on page 376. ▶ "How to Create Event Correlation Rules" on page 378.
See also	For more information about configuring correlation rules, see: <ul style="list-style-type: none"> ▶ "Correlation Rules Manager Basics" on page 369. ▶ "Topology-Based Event Correlation" on page 370. ▶ "Correlation Rules" on page 371. ▶ "Event Correlation Rule Topology" on page 372. ▶ "Correlation Rule Symptoms and Causes" on page 374.

The Create New Correlation Rule dialog box displays the UI elements listed in the following table.

UI Element (A-Z)	Description
Active	Used to enable or disable the rule during runtime. By default it is disabled.
Base on View	Selects the view that you want to use as the basis for the correlation rule topology. By selecting a view, the Rule Topology pane displays only those configuration item types that are included in the view.
Display Name	Display name of the selected correlation rule used in the graphical user interface.
Description	Brief description of the correlation rule.

UI Element (A-Z)	Description
Name	<p>Internal name of the selected correlation rule.</p> <p>Automatically generated from the Display Name value. The first character must be a letter (A-Z, a-z) or an underscore (_). All other characters can be a letter (A-Z, a-z), a number (0-9), or an underscore (_). Can be manually overwritten.</p> <p>Note: Maybe disabled for certain locales (for example ja_JP, zh_CN, ko_KR).</p>
Time Window	<p>Specifies a specific time period for the selected correlation rule. By default it is not enabled and the global value is used. 0 seconds also mean it is not enabled and the global setting is used.</p> <p>The range is from 0 to 9999 seconds.</p> <p>For information about setting the default, see "Operations Management Infrastructure Settings Manager" on page 686.</p>

Edit Properties for Correlation Rule Dialog Box

You use the Edit Properties for Correlation Rule dialog box to modify the properties of an existing correlation rule, for example, name and description.

To access	Select Admin > Operations Management > Design Operations Content > Correlation Rules Click the  button to open the Edit Properties for Correlation Rule dialog box.
Important information	The View Correlation Rule pane in the Correlation Rules manager is also used during the creation of new Correlation Rules when it is labelled Finish creating Correlation Rule.
Relevant tasks	To configure correlation rules, see: <ul style="list-style-type: none"> ▶ "How to Configure Topology-based Event Correlation Rules" on page 376. ▶ "How to Create Event Correlation Rules" on page 378.
See also	For more information about configuring correlation rules, see: <ul style="list-style-type: none"> ▶ "Correlation Rules Manager Basics" on page 369. ▶ "Topology-Based Event Correlation" on page 370. ▶ "Correlation Rules" on page 371. ▶ "Event Correlation Rule Topology" on page 372. ▶ "Correlation Rule Symptoms and Causes" on page 374.

The Edit Properties for Correlation Rule dialog box displays the UI elements listed in the following table.

UI Element (A-Z)	Description
Active	Used to enable or disable the rule during runtime. By default it is disabled.
Description	Brief description of the correlation rule.
Display Name	Display name of the selected correlation rule used in the graphical user interface.

UI Element (A-Z)	Description
ID	Internal location of Correlation Rule (internal, read-only).
Name	<p>Internal name of the selected correlation rule.</p> <p>Automatically generated from the Display Name value. The first character must be a letter (A-Z, a-z) or an underscore (_). All other characters can be a letter (A-Z, a-z), a number (0-9), or an underscore (_). Can be manually overwritten.</p> <p>Note: Maybe disabled for certain locales (for example ja_JP, zh_CN, ko_KR).</p>
Time Window	<p>Specifies a specific time period for the selected correlation rule. By default it is not enabled and the global value is used. 0 seconds also mean it is not enabled and the global setting is used.</p> <p>The range is from 0 to 9999 seconds.</p>

Matching CIs for Correlation Rule Dialog Box

You use the Matching CIs for Correlation Rule dialog box to view all configuration items that match the selected correlation rule in the Correlation Rules pane.

To access	Select Admin > Operations Management > Design Operations Content > Correlation Rules To display the Matching CIs for Correlation Rule dialog box for a specific correlation rule, correlation rule and click the  button in the Correlation Rules pane of the Correlation Rules manager.
Relevant tasks	To configure correlation rules, see: <ul style="list-style-type: none"> ▶ "How to Configure Topology-based Event Correlation Rules" on page 376. ▶ "How to Create Event Correlation Rules" on page 378.
See also	For more information about configuring correlation rules, see: <ul style="list-style-type: none"> ▶ "Correlation Rules Manager Basics" on page 369. ▶ "Topology-Based Event Correlation" on page 370. ▶ "Correlation Rules" on page 371. ▶ "Event Correlation Rule Topology" on page 372. ▶ "Correlation Rule Symptoms and Causes" on page 374.

The Matching CIs for Correlation Rule dialog box displays the UI elements listed in the following table.

UI Element (A-Z)	Description
Cause CI	Display name of the configuration item, the indicator states of which are configured as a cause in the selected correlation rule.
CI Type	Name of the configuration item type to which the indicator referenced in the selected correlation rule is assigned.
Configuration Item	Name of the configuration item.

UI Element (A-Z)	Description
Constraint Type	Role that the selected indicator state plays in the correlation rule (symptom or cause).
Indicator	Display name of the indicator, the state of which is referenced in the correlation rule.
Indicator State	Display name of the indicator state used in the correlation process.
Send Test Event	Sends a sample event to Operations Management to test the correlation rule.

Troubleshooting and Limitations

This section provides the following help for those people who are troubleshooting problems relating to event correlation, including creating, modifying, and enabling events.

- "Rules Topology Pane is Empty" on page 405
- "Indicators List is Empty" on page 405
- "Rules Topology Pane is Empty" on page 405

Rules Topology Pane is Empty

- No rule is selected in the Correlation Rules pane
- No view is active in the Rules Topology pane

Indicators List is Empty

- No configuration item type is selected in the Rules Topology pane
- No indicator is defined for the selected CI type

Cannot Save Correlation Rule

The rule is invalid or incomplete, for example:

- The rule does not have at least one *symptom* event
- The rule does not have a *cause* event
- The topology path is invalid
- The rule refers to a configuration item that is not resolvable

15

Connecting Servers

This chapter includes:

Concepts

- ▶ Introduction to Connecting Servers on page 408

Tasks

- ▶ How to Create a Connection to another OMi Instance on page 411
- ▶ How to Create a Connection to an HPOM Server on page 413
- ▶ How to Create a Connection to an External Event Processing Server on page 417
- ▶ How to Create a Connection to an Integration Adapter Server on page 420
- ▶ How to Create and Associate an Alias to a Connected Server on page 422
- ▶ How to Edit a Server Connection on page 424
- ▶ How to Delete a Server Connection on page 425
- ▶ How to Establish a Trust Relationship for a Server Connection on page 426
- ▶ How to Verify the Trusted Relationship on page 429

Reference

- ▶ Connected Servers User Interface on page 430
- ▶ Connecting Servers Manager Command-Line Interface on page 449

Troubleshooting and Limitations on page 459

Concepts

Introduction to Connecting Servers

The Connected Servers manager enables you to specify HP Operations Manager servers, external event processing servers, servers connected using the Integration Adapter, and other Operations Management (BSM) servers as event forwarding targets.

The Connected Servers manager also enables you to specify the web service credentials of the HPOM servers that are used for Tool and Action execution or to retrieve Instructions.

Connected servers are used in conjunction with event forwarding rules to redirect selected events to specific servers. For event forwarding to be possible, the following prerequisites must be met:

- ▶ For OMi and HPOM servers, the two servers need to trust each other. To set up a valid certificated trust, follow the steps on "How to Establish a Trust Relationship for a Server Connection" on page 426.
- ▶ A trust relationship also needs to be set up for Integration Adapter connections. This is described in the Integration Adapter online help section entitled *Connect HP BSM Integration Adapter to HP Business Service Management*.
- ▶ All target servers must be configured as Connected Servers. To configure servers connected to Operations Management, see "How to Create a Connection to another OMi Instance" on page 411, "How to Create a Connection to an HPOM Server" on page 413, and "How to Create a Connection to an External Event Processing Server" on page 417.

You can also create an alias for a connected server, making it easier to create content (configurations and customizations), for example, event forwarding rules, notifications, and user group assignments, on a development installation, and import them to a production installation. As a connected server configuration (hostname and logon credentials) on a development installation is very unlikely to be relevant to a connected server configuration on a different installation, for different users, it is not

appropriate to export and import connected server configurations between installations. For example, when exporting an event forwarding rule, the connected server name is also exported from the sources installation. On import to a target installation, if a connected server is found with the same name, it is assigned to the rule. If no matching connected server is found, a server alias is created for the event forwarding rule. This must be associated with an existing connected server on the target installation for the rule to be completed.

Manager of Manager Configurations

Operations Management event attributes such as Priority or Lifecycle State are synchronized between Operations Management servers using CMAs which are then mapped back to the associated event attribute. Other servers, such as HPOM servers, do not send Operations Management event attributes and are not generally sent updates for of these Operations Management event attributes. The following Operations Management event attributes are sent to HPOM servers:

- ▶ LifecycleState
- ▶ Priority
- ▶ Description
- ▶ Solution
- ▶ SubCategory
- ▶ CauseEventId

All other special Operations Management event attributes are just sent if the target server is an Operations Management server.

Similarly, special CMAs that are sent from HPOM servers are ignored by Operations Management servers.

- ▶ All servers that are part of the Operations Management Manager of Managers setup must be configured as Connected Servers in Operations Management.
- ▶ For HPOM servers, the credentials that are specified in Connected Servers are used to execute actions, fetch instructions, and to set the integration user as the event owner in HPOM.

- ▶ The Connected Server information is used by Operations Management servers, to determine if additional event information is sent to the target server.

To configure a server alias, see "How to Create and Associate an Alias to a Connected Server" on page 422.

Tasks

How to Create a Connection to another OMi Instance

This task shows you how to create a server connection used to forward events to another Operations Manager *i* instance.

Note: To use Operations Management Administration areas, you must be granted permission to work with these or a subset of these. For details, see "How to Set Operations Management User or Group Permissions" on page 637.

To create a server connection to another Operations Manager *i* instance:

- 1** Open the Connected Servers manager from Operations Management Administration:
Admin > Operations Management > Tune Operations Management > Connected Servers
- 2** In the Connected Servers pane, click the  button to open the Create New Server Connection dialog box.
- 3** Enter a display name, a unique internal name, if you want to replace the automatically generated name, and (optional) a description of the connection being specified.
- 4** Select **Active**, if you want to enable the server connection immediately.
- 5** Click **Next** to open the Server Type page.
- 6** Select the **Operations Manager *i*** server type.
- 7** Click **Next** to open the Server Properties page.
- 8** Enter the fully qualified DNS name of the host system of the Operations Manager *i* instance.

If there are multiple servers, or if HP Business Service Management is deployed in a distributed architecture, specify the load balancer or the BSM Gateway Server hosting the Operations Management application, as required.

- 9 Specify if you want to forward topology information from the Operations Manager *i* instance to which you are logged on, to the Operations Manager *i* instance that you are currently configuring.
- 10 Click **Test Connection** to check that the specified connection attributes are correct. If an error link is displayed, check the error message, correct the connection information, and re-test the connection.
- 11 Select **Finish**.

How to Create a Connection to an HPOM Server

This task shows you how to create a server connection to an HPOM server. Operations Management can forward events, run actions and tools on, and retrieve instructions from an HPOM server. Credentials for the HPOM web service are required for this processing.

For Server Pooling environments, configure the virtual interface as the main connected server. Specify the integration user and password for the Outgoing Connection. For all physical servers in the server pooling environment, add them as connected servers and specify the virtual interface server as the server to use for the Outgoing Connection.

Note: To use Operations Management Administration areas, you must be granted permission to work with these or a subset of these. For details, see "How to Set Operations Management User or Group Permissions" on page 637.

To create a server connection to an HPOM server:

- 1 Open the Connected Servers manager from Operations Management Administration:
Admin > Operations Management > Tune Operations Management > Connected Servers
- 2 In the Connected Servers pane, click the  button to open the Create New Server Connection dialog box.
- 3 Enter a display name, a unique internal name, if you want to replace the automatically generated name, and (optional) a description of the connection being specified.
- 4 Select **Active**, if you want to enable the server connection immediately.
- 5 Click **Next** to open the Server Type page.
- 6 Select the **HP Operations Manager** server type.
- 7 Click **Next** to open the Server Properties page.

- 8 Enter the fully qualified DNS name of the host system of the HPOM management server.

If the host system is a high-availability cluster, enter the fully qualified DNS name of the cluster package where the HPOM server is installed.

If HPOM is installed in a server pooling environment, add the virtual interface as the first HPOM management server. Add all physical pool servers separately as connected servers.

- 9 Enter the Integration User name used to log on to the HPOM management server.

Note: All messages forwarded from HPOM systems are treated as allowing read and write. Any changes made to these events result in a back synchronization to the originating HPOM server.

- 10 Specify if you want to forward dynamic topology information from the Operations Manager *i* instance to which you are logged on, to the HP Operations Manager instance that you are currently configuring.

Note: If you change the status of the **Forward Topology Data** check box for a configured server, you must restart the WDE process on all gateway servers.

- 11 Select the HPOM product type. The options include:
 - HP Operations Manager for UNIX
 - HP Operations Manager for Windows
- 12 Click **Test Connection** to check that the specified connection attributes are correct. If an error link is displayed, check the error message, correct the connection information, and re-test the connection.
- 13 Click **Next** to open the Outgoing Connection page.

The outgoing connection is used to receive instructions, and execute tools and actions on external nodes.

- 14** If you are using an alternative server, select **Use other Server**, and select a server from the list. For the physical servers in a server pooling environment, select the virtual interface connected server.

Alternatively, if using this server that you are configuring for receiving instructions, and executing tools and actions on external nodes, enter the password for the integration user and the port required to access the server for receiving instructions, and executing tools and actions. The default port value is automatically inserted and can be restored using **Set default port**.

Note: For HP Operations Manager for Windows, the selected user must have at least PowerUser rights and must be a member of HP-OVE-Admins group and the local administrators group.

For HP Operations Manager for UNIX, the Integration User must have the responsibility for all Events that are forwarded to Operations Management and permissions to run the available tools. Topology synchronization requires administrator rights.

- 15** *Optional:* If you are using secure communication (default), make sure that the **Use Secure HTTP** option is selected, and apply a certificate using one of the following methods.

Note: Secure communication is necessary for Server Pooling Environments. However, do not use the **Import from file** or **Retrieve from server** options. Set up a trusted relationship between all HPOM and BSM servers as described in "How to Establish a Trust Relationship for a Server Connection" on page 426.

- ▶ **Import from file** — Opens the file browser and enables you to navigate to and specify a Base64 Encoded X.509 certificate file for the server connection.
- ▶ **Retrieve from server** — Retrieve a certificate from the host system specified in this server connection.

Alternatively, if you want actions to be run from an alternative server, select **Use Other Server** and select an HPOM server from the list of configured servers.

Note: Avoid selecting an alternative action execution server which creates a loop and results in specifying the connected server as the action execution server. Select an alternative action execution server or use the **Use this Server** option.

- 16** Click **Test Connection** to check that the specified connection attributes are correct. If an error link is displayed, check the error message, correct the connection information, and re-test the connection.
- 17** Select **Finish**.

Note: In a clustered HP Operations Manager for Windows environment, IIS on all cluster nodes must have the same certificate. If different, valid certificates are used, problems such as tools execution may be experienced after switching to a node with a different certificate.

How to Create a Connection to an External Event Processing Server

This task shows you how to create a server connection to an external event processing server.

Note: To use Operations Management Administration areas, you must be granted permission to work with these or a subset of these. For details, see "How to Set Operations Management User or Group Permissions" on page 637.

Note: HP Service Manager 9.20 does not support Notify and Notify and Update as forwarding types.

To create a server connection to an external event processing server:

1 Open the Connected Servers manager from Operations Management Administration:

Admin > Operations Management > Tune Operations Management > Connected Servers

2 In the Connected Servers pane, click the  button to open the Create New Server Connection dialog box.

3 Enter a display name, a unique internal name, if you want to replace the automatically generated name, and (optional) a description of the connection being specified.

4 Select **Active**, if you want to enable the server connection immediately.

5 Click **Next** to open the Server Type page.

6 Select the **External Event Processing** server type.

7 Click **Next** to open the Server Properties page.

- 8 Enter the fully qualified DNS name of the host system of the external event processing server.
- 9 Select **Supports Synchronize and Transfer Control** if the external server supports transfer control and back synchronization of changes to events.
- 10 Click **Next** to open the Integration Type page.
- 11 Select an Integration Type used to establish the connection with the external server type and provide the requested information.

The options include:

Call Groovy Script Adapter

Integrating an external server using Groovy scripts requires some steps that are described in the *Operations Manager i Extensibility Guide* PDF.

- a Select an external event processing type.
- b Select the Groovy script required by the selected external event processing type.
- c *Optional:* Specify Groovy script classpaths.
- d Specify a time limit for the execution of the script.

Call External Event Web Service

Enter the URL Path for the external Event web service.

- 12 Click **Next** to open the Outgoing Connection page.
- 13 For event forwarding, enter the user credentials (User name and Password) and the port number required to access the external server.

Optional: If you are using secure communication (default), make sure that the **Use Secure HTTP** option is selected, and apply a certificate using one of the following methods:

- ▶ **Import from file** — Opens the file browser and enables you to navigate to and specify a Base64 Encoded X.509 certificate file for the server connection.
 - ▶ **Retrieve from server** — Retrieve a certificate from the host system specified in this server connection.
- 14 To be able to transfer responsibility to the external event processing server, select the **Supports Synchronize and Transfer Control** option.

- 15** Click **Test Connection** to check that the specified connection attributes are correct. If an error link is displayed, check the error message, correct the connection information, and re-test the connection.
- 16** Click **Next** to open the Event Drilldown page.
- 17** Enter the fully qualified DNS name of the host system of the external event processing server and the port number used for drilldown.
- 18** *Optional:* For secure communication, select the **Use Secure HTTP** option.
- 19** Enter the URL Path to complete the URL.
The combined URL is displayed in the URL field.
- 20** Click **Next** to open the Incoming Connection page.
- 21** Specify the credentials for the Operations Management user used to access and update events.
- 22** Select **Finish**.

How to Create a Connection to an Integration Adapter Server

This task shows you how to create a server connection to an Integration Adapter server.

Note: To use Operations Management Administration areas, you must be granted permission to work with these or a subset of these. For details, see "How to Set Operations Management User or Group Permissions" on page 637.

To create a server connection to an Integration Adapter server:

- 1 Open the Connected Servers manager from Operations Management Administration:
Admin > Operations Management > Tune Operations Management > Connected Servers
- 2 In the Connected Servers pane, click the  button to open the Create New Server Connection dialog box.
- 3 Enter a display name, a unique internal name, if you want to replace the automatically generated name, and (optional) a description of the connection being specified.
- 4 Select **Active**, if you want to enable the server connection immediately.
- 5 Click **Next** to open the Server Type page.
- 6 Select the **Integration Adapter** server type.
- 7 Click **Next** to open the Server Properties page.
- 8 Enter the fully qualified DNS name of the host system of the Integration Adapter server.
- 9 Click **Test Connection** to check that the specified connection attributes are correct. If an error link is displayed, check the error message, correct the connection information, and re-test the connection.
- 10 Click **Next** to open the Policy Management page.

- 11** Set the port to be used to open Policy Management on the Integration Adapter server. The default port value is automatically inserted and can be restored using **Set default port**.
- 12** *Optional:* To open Policy Management, click the Launch Policy Management  button.

Using the Policy Editor, make the changes to the associated policies as required and save your changes before returning to the Create New Server Connection dialog box and continuing with the current configuration.
- 13** Click **Next** to open the Event Drilldown page if required or click **Finish**.
- 14** *Optional:* If drilldown is required:
 - a** Enter the fully qualified DNS name of the host system of the source manager and the port number used for drilldown.
 - b** Enter the URL Path to complete the URL.

The combined URL is displayed in the URL field.
 - c** For secure communication, select the **Use Secure HTTP** option.
- 15** Select **Finish**.

How to Create and Associate an Alias to a Connected Server

This task shows you how to use an alias to connect to a configured connected server.

Note: To use Operations Management Administration areas, you must be granted permission to work with these or a subset of these. For details, see "How to Set Operations Management User or Group Permissions" on page 637.

Note: When exporting an event forwarding rule, the connected server name is also exported from the sources installation. On import to a target installation, if a connected server is found with the same name, it is assigned to the rule. If no matching connected server is found, an server alias is created for the event forwarding rule. This must be associated with an existing connected server on the target installation for the rule to be completed.

To create a server alias for connected servers:

- 1** Open the Connected Servers manager from Operations Management Administration:
Admin > Operations Management > Tune Operations Management > Connected Servers
- 2** In the Connected Servers pane, click the  button to open the Create New Server Connection dialog box.
- 3** Enter a display name, a unique internal name, if you want to replace the automatically generated name, and (optional) a description of the connection being specified.
- 4** Select **Active**, if you want to enable the server connection immediately.

Note: A server alias can be enabled only if a server is associated with this server alias.

- 5** Click **Next** to open the Server Type page.
- 6** Select the **Alias** server type.
- 7** Click **Next** to open the Server Properties page.
- 8** *Optional:* To associate a connected server with this alias, select an existing connected server. This association can also be done at a later point in time.
- 9** Select **Finish**.

How to Edit a Server Connection

This task shows you how to edit an existing connection.

To edit an existing server connection:

- 1 Open the Connected Servers manager from Operations Management Administration:

Admin > Operations Management > Tune Operations Management > Connected Servers

- 2 Select the server that you want to edit.
- 3 In the Connected Servers pane, click the  button to open the Edit Server Connection dialog box.
- 4 Make the required changes to the selected server.

Navigate between the pages using the tabs.

Note: If you change the status of the **Forward Topology Data** check box, you must restart the WDE process on all gateway servers.

For single system installation: stop and restart the WDE process using the following commands:

```
<HPBSM_Root_Dir>/opr/support/opr-support-utils.bat -stop wde  
<HPBSM_Root_Dir>/opr/support/opr-support-utils.bat -start wde
```

For multi-system installation, stop and restart the WDE process using the following commands on the Gateway server:

```
<HPBSM_Root_Dir>/opr/support/opr-support-utils.bat -stop wde  
<HPBSM_Root_Dir>/opr/support/opr-support-utils.bat -start wde
```

- 5 Select **Finish**.

How to Delete a Server Connection

This task shows you how to delete an existing connection.

To delete an existing server connection:

- 1** Open the Connected Servers manager from Operations Management Administration:

Admin > Operations Management > Tune Operations Management > Connected Servers

- 2** Select the server connection settings that you want to delete.
- 3** In the Connected Servers pane, click the  button.

The selected server connection is deleted from the list of connected servers.

How to Establish a Trust Relationship for a Server Connection

For connection and communication between BSM and external servers such as HPOM hosts, other BSM hosts where Operations Management is running, or a BSM Server with an event channel license, you must establish a trust relationship between the systems.

In Server Pooling, the virtual server must have a certificate which is trusted by all HPOM hosts in the server pool and by all BSM hosts where Operations Management is running.

Certificate exchange between Gateway Servers and Data Processing Servers is part of the initial installation and is described in the *HP Business Service Management Deployment Guide*.

Note: Generally, certificates must be exchanged on all nodes (Data Processing Servers, Gateway Servers, manager of manager configurations, and Load balancers. However, some Load Balancer technologies include a by-pass or pass-through functionality for incoming encrypted messages to its pool members. When using such technologies, certificate exchange on the Load Balancer node is not required.

To establish a trust relationship between the Data Processing Servers and external servers:

1 *HPOM servers only:*

a Locate the following files on the BSM Data Processing Server:

<HPBSM root directory>/opr/lib/cli/opr-cli.jar

<HPBSM root directory>/opr/bin/BBCTrustServer.bat

<HPBSM root directory>/opr/bin/BBCTrustServer.sh

b *HPOM for Windows only:* Copy the files to the computer that is running the HPOM for Windows management server:

Copy **opr-cli.jar** to **%OvInstallDir%\java\opr-cli.jar**.

Copy **BBCTrustServer.bat** to `%OvBinDir%\BBCTrustServer.bat`.

Note: Starting with patches OMW_00121 (32-bit) and OMW_00122 (64-bit), the **BBCTrustServer** tool is installed to the folder `%OvInstallDir%\contrib\OVOW` on the HPOM for Windows management server.

- c** *HPOM for UNIX or Linux only:* Copy the files to the computer that is running the HPOM for UNIX or Linux management server:

Copy **opr-cli.jar** to `/opt/OV/java/opr-cli.jar`.

Copy **BBCTrustServer.sh** to `/opt/OV/bin/BBCTrustServer.sh`.

Change the permissions of the **BBCTrustServer** tool by typing the following command:

```
chmod 555 /opt/OV/bin/BBCTrustServer.sh
```

- 2** On the BSM Data Processing Server, execute the following command:

```
BBCTrustServer[.bat|sh] <external_server>
```

Replace `<external_server>` with the DNS name of the external system (for example, `ommgmtsv`).

When asked whether to add the certificate to the trust store, type **y**.

The tool informs you if a trusted certificate already exists and asks you whether to overwrite the existing certificate. Type **y** to replace the existing certificate with the new one.

- 3** On the external server, execute the following command:

```
BBCTrustServer.[bat|sh]
<man-in-the-middle_or_single_gateway_server>
```

When asked whether to add the certificate to the trust store, type **y**.

The tool informs you if a trusted certificate already exists and asks you whether to overwrite the existing certificate. Type **y** to replace the existing certificate with the new one.

- 4 Update new trusts on the Gateway Servers, with the command:
ovcert -updatetrusted

Note: During deployment, certificates for Gateway Servers are requested and granted for each Gateway Server. For details, see the *HP Business Service Management Deployment Guide* PDF.

- 5 If you are using a virtual interface for server pooling, where your data sources are not communicating directly with the BSM Gateway Server, perform the following task.
 - a Request server and client certificates from your Certificate Authority for the virtual interface.

If you do not have a Certificate Authority, you can issue a certificate from the BSM Data Processing server with the following command:

```
ovcm -issue -file <certificate file> -name <Fully Qualified Domain Name of Virtual Interface> [ -pass <passphrase>]
```
 - b Import these certificates to the virtual interface.
- 6 Check the connection between the servers. For details, see "How to Verify the Trusted Relationship" on page 429.

How to Verify the Trusted Relationship

After establishing a trust relationship between the BSM Data Processing Server and external systems, check the connection between the two systems.

To check the connection between the BSM Data Processing Server and an external system:

- 1 From the external host, verify that communication to the BSM installation is possible (the return value should be `eServiceOk`) by executing the following command on the Gateway Server for single Gateway Server deployments or the Load Balancer for multiple Gateway Server deployments:

```
bbcutil -ping https://<HP BSM load_balancer or  
single_gateway_server>
```

Example of the command result:

```
https://<HP BSM servername>: status=eServiceOK  
coreID=7c66bf42-d06b-752e-0e93-e82d1644cef8 bbcV=06.10.105  
appN=ovbbccb appV=06.10.105 conn=1 time=1094 ms
```

- 2 From the HP BSM Data Processing Server host, verify that communication with the external server host is possible (the return value should be `eServiceOk`) by executing the following command:

```
bbcutil -ping https://<external_server_hostname>
```

Example of the command result:

```
https://<HP BSM servername>: status=eServiceOK  
coreID=0c43c032-5c94-7535-064a-f7654a86f2d3 bbcV=06.10.070  
appN=ovbbccb appV=06.10.070 conn=7 time=140 ms
```

Reference

Connected Servers User Interface

The Connected Servers manager enables you to create and manage connections to Operations Management, HPOM, external event processing servers, Integration Adapter servers, and virtual servers.

This section includes:

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- ▶ [Connecting Servers Manager Command-Line Interface on page 449](#)

Connected Servers Pane

To access	Select Admin > Operations Management > Tune Operations Management > Connected Servers
Relevant tasks	To configure connected servers, see: <ul style="list-style-type: none"> ➤ "How to Create a Connection to another OMi Instance" on page 411. ➤ "How to Create a Connection to an HPOM Server" on page 413. ➤ "How to Create a Connection to an External Event Processing Server" on page 417. ➤ "How to Create a Connection to an Integration Adapter Server" on page 420. ➤ "How to Create and Associate an Alias to a Connected Server" on page 422.
See also	For more information about connected servers, see "Introduction to Connecting Servers" on page 408.

The Connected Servers pane displays the UI elements listed in the following table.

UI Element (A-Z)	Description
	Reloads the connected servers list.
	New Item: Opens the Create New Server Connection dialog box to create a server connection. For more information about creating server connections, see "How to Create a Connection to an HPOM Server" on page 413.
	Edit Item: Opens the Edit Server Connection dialog box to edit an existing server connection. For more information about editing server connections, see "How to Edit a Server Connection" on page 424.
	Delete Item: Deletes the currently selected server connection. For more information about deleting server connections, see "How to Delete a Server Connection" on page 425.

UI Element (A-Z)	Description
	Activate/Deactivate Item: Toggles between enabling and disabling the selected Connected Server.
	Expand All: Expands the list to display details for all the specified servers.
	Collapse All: Collapses all open server details panes.
Active	Indicates whether the associated server connection is currently enabled.
Description	Brief description of the server connection.
Display Name	Display name of the selected server connection.
External Event Processing Type	Integration type of external applications.
Forward Dynamic Topology	Specifies if the HP Operations Manager server is a target for topology synchronization. Note: If you change the status of the Forward Topology Data check box for a configured server, you must restart the WDE process on all gateway servers. For details, see "How to Edit a Server Connection" on page 424.
Fully Qualified DNS Name	The fully qualified Domain Name System name of the system hosting the selected server. For example: myhost.example.com. For Operations Manager <i>i</i> installations, if there are multiple servers, or if HP Business Service Management is deployed in a distributed architecture, specify the load balancer or Gateway Server, as required. Note: It is not possible to specify the Gateway Server for Data Collectors as a connected server for the BSM installation to which they belong.
	Launch Policy Editor: Opens the Policy Management UI in a new window.
Name	Name of the selected server connection used by the database.

UI Element (A-Z)	Description
Port	The port used to communicate with the selected server. Note: For information about checking and changing ports, see the documentation of your web server product.
(Server) Type	Server type of the connected server. The options include: <ul style="list-style-type: none"> ➤ Operations Manager i ➤ HP Operations Manager for UNIX ➤ HP Operations Manager for Windows ➤ External Event Processing ➤ Integration Adapter ➤ Alias

General Tab

To access	Select Admin > Operations Management > Tune Operations Management > Connected Servers Double-click the selected connected server and select the General tab (if necessary).
Relevant tasks	To configure connected servers, see: <ul style="list-style-type: none"> ➤ "How to Create a Connection to another OMi Instance" on page 411. ➤ "How to Create a Connection to an HPOM Server" on page 413. ➤ "How to Create a Connection to an External Event Processing Server" on page 417. ➤ "How to Create a Connection to an Integration Adapter Server" on page 420. ➤ "How to Create and Associate an Alias to a Connected Server" on page 422.
See also	For more information about connected servers, see "Introduction to Connecting Servers" on page 408.

The General tab displays the UI elements listed in the following table.

UI Element (A-Z)	Description
Active	Indicates whether the associated server connection is currently enabled.
Description	Brief description of the server connection.
Display Name	Display name of the selected server connection.
Name	<p>Internal name of the selected server connection.</p> <p>Automatically generated from the Display Name value. The first character must be a letter (A-Z, a-z) or an underscore (_). All other characters can be a letter (A-Z, a-z), a number (0-9), or an underscore (_). Can be manually overwritten.</p> <p>Note: Maybe disabled for certain locales (for example ja_JP, zh_CN, ko_KR).</p>
Type (Edit only)	<p>External Event Processing — Integrations to external applications.</p> <p>Operations Manager — HP Operations Manager for Windows or UNIX applications.</p> <p>Operations Manager i — Integrations into other Operations Manager <i>i</i> applications.</p> <p>Integration Adapter — Integrations to external event source managers for forwarding events to Operations Manager <i>i</i>.</p> <p>Alias — Link to a physical system, enabling rules to be more easily ported to other systems.</p>



Server Types

To access	Select Admin > Operations Management > Tune Operations Management > Connected Servers Double-click the selected connected server and select the Server Types tab.
Relevant tasks	To configure connected servers, see: <ul style="list-style-type: none"> ➤ "How to Create a Connection to another OMi Instance" on page 411. ➤ "How to Create a Connection to an HPOM Server" on page 413. ➤ "How to Create a Connection to an External Event Processing Server" on page 417. ➤ "How to Create a Connection to an Integration Adapter Server" on page 420. ➤ "How to Create and Associate an Alias to a Connected Server" on page 422.
See also	For more information about connected servers, see "Introduction to Connecting Servers" on page 408.

The Server Type tab displays the UI elements for the available applications listed in the following table.

UI Element (A-Z)	Description
Alias	Select for specifying an alias which can be linked to a physical system, enabling rules to be more easily ported to other systems. The concept of Alias servers provides the mechanism to permit you to more easily define, import configurations and customizations (for example, event forwarding rules, notifications, and user group assignments) and transfer them from one system to another, for example, from a test system to production systems.
External Event Processing	Select for integrations to external applications.

UI Element (A-Z)	Description
Integration Adapter	Select for integrations to external event source managers for forwarding events to Operations Manager <i>i</i> .
Operations Manager	Select for HPOM for Windows or UNIX applications.
Operations Manager <i>i</i>	Select for integrations into other Operations Manager <i>i</i> applications.

Server Properties

The Server Properties tab displays the UI elements listed in the following table.

To access	Select Admin > Operations Management > Tune Operations Management > Connected Servers Double-click the selected connected server and select the Server Properties tab.
Relevant tasks	To configure connected servers, see: <ul style="list-style-type: none"> ➤ "How to Create a Connection to another OMi Instance" on page 411. ➤ "How to Create a Connection to an HPOM Server" on page 413. ➤ "How to Create a Connection to an External Event Processing Server" on page 417. ➤ "How to Create a Connection to an Integration Adapter Server" on page 420. ➤ "How to Create and Associate an Alias to a Connected Server" on page 422.
See also	For more information about connected servers, see "Introduction to Connecting Servers" on page 408.

UI elements displayed on the Server Properties page is dependent upon the type of server being configured.

UI Element (A-Z)	Description
Forward Dynamic Topology	<p>Select if you want to forward dynamic topology information from the Operations Manager <i>i</i> instance to which you are logged on, to the HP Operations Manager instance that you are currently configuring.</p> <p>Note: If you change the status of the Forward Topology Data check box for a configured server, you must restart the WDE process on all gateway servers. For details, see "How to Edit a Server Connection" on page 424.</p>
Fully Qualified DNS Name	<p>The fully qualified Domain Name System name of the system hosting the selected server. For example: myhost.example.com.</p>

UI Element (A-Z)	Description
Integration User	<p>The HPOM user used to update event in HPOM with information from Operations Manager <i>i</i>.</p> <p>For HPOM for Windows servers, specify both the domain to which the host system belongs and the user name as follows:</p> <p><DOMAIN>\<user name></p> <p>If the host system is not part of a domain, replace <Domain> with the hostname of the system. The user name alone is not sufficient to identify the user specified.</p> <p>NOTE: it is recommended to use a dedicated user so that it is clear which events are owned by and being worked on in Operations Manager <i>i</i>.</p> <p>For HP Operations Manager for Windows, the user must have at least PowerUser rights and must be a member of HP-OVE-Admins group and the local administrators group.</p> <p>For HP Operations Manager for UNIX, the Integration User must have the responsibility for all Events that are forwarded to Operations Management and permissions to run the available tools. Topology synchronization requires administrator rights.</p> <p>NOTE: All messages forwarded from HPOM systems are treated as allowing read and write. Any changes made to these events result in a back synchronization to the originating HPOM server.</p>
Operations Manager Type (HPOM only)	<p>Server type of the connected HPOM server. The options include:.</p> <ul style="list-style-type: none"> ▶ HP Operations Manager for UNIX ▶ HP Operations Manager for Windows
Test Connection	<p>Checks that the specified connection attributes are correct. If an error link is displayed, check the error message, correct the connection information, and re-test the connection.</p>
Use Server	<p>Sets the connected server to be used as the target for the server alias in a virtual server.</p>

Integration Type

To access	Select Admin > Operations Management > Tune Operations Management > Connected Servers Double-click the selected connected server and select the Integration Types tab.
Relevant tasks	To configure connected servers, see: <ul style="list-style-type: none"> ▶ "How to Create a Connection to another OMi Instance" on page 411. ▶ "How to Create a Connection to an HPOM Server" on page 413. ▶ "How to Create a Connection to an External Event Processing Server" on page 417. ▶ "How to Create a Connection to an Integration Adapter Server" on page 420. ▶ "How to Create and Associate an Alias to a Connected Server" on page 422.
See also	For more information about connected servers, see "Introduction to Connecting Servers" on page 408.

The Integration Type tab displays the UI elements listed in the following table.

UI Element (A-Z)	Description
Call External Event Web Service	Integration Type used to establish the connection with the external server type and provide the requested information.
Call Groovy Script Adapter	Integration Type used to establish the connection with the external server type and provide the requested information. Integrating an external server using Groovy scripts requires some steps that are described in the the <i>Operations Manager i Extensibility Guide</i> PDF.
External Event Processing Type	Selects an available external event processing type from the list.

UI Element (A-Z)	Description
Groovy Script Classpath	<i>Optional:</i> Specifies Groovy script classpaths.
Groovy Script File Name	Selects the Groovy script required by the selected external event processing type from the list.
Maximum Transaction Time	Specifies a time limit for the execution of the script.
URL Path	<p>Specifies the URL Path for the external event web service. The server and port used is automatically taken from the server properties. Specify only the path of the required external event web service call. For example:</p> <p><i>/<urlPath></i></p> <p>The URL path can be empty or must start with a slash (/). White spaces and a trailing slash (/) are not allowed.</p>

Outgoing Connection

To access	Select Admin > Operations Management > Tune Operations Management > Connected Servers Double-click the selected connected server and select the Outgoing Connections tab.
Relevant tasks	To configure connected servers, see: <ul style="list-style-type: none"> ➤ "How to Create a Connection to another OMi Instance" on page 411. ➤ "How to Create a Connection to an HPOM Server" on page 413. ➤ "How to Create a Connection to an External Event Processing Server" on page 417. ➤ "How to Create a Connection to an Integration Adapter Server" on page 420. ➤ "How to Create and Associate an Alias to a Connected Server" on page 422.
See also	For more information about connected servers, see "Introduction to Connecting Servers" on page 408.

The Outgoing Connection tab displays the UI elements listed in the following table.

UI Element (A-Z)	Description
Event Forwarding	Credentials and port used for event forwarding to an External Event Processing server.
Import from file	Opens the file browser and enables you to navigate to and specify a certificate file for the server connection. Certificates must meet the Base64 Encoded X.509 format.

UI Element (A-Z)	Description
<p>Integration User</p>	<p>The HPOM user used to update event in HPOM with information from Operations Manager <i>i</i>. This user is also used to run actions and tool on HPOM nodes and retrieve instruction text from HPOM.</p> <p>NOTE: it is recommended to use a dedicated user so that it is clear which events are owned by and being worked on in Operations Manager <i>i</i>.</p> <p>For HP Operations Manager for Windows, the user must have at least PowerUser rights and must be a member of HP-OVE-Admins group and the local administrators group.</p> <p>For HP Operations Manager for UNIX, the Integration User must have the responsibility for all Events that are forwarded to Operations Management and permissions to run the available tools. Topology synchronization requires administrator rights.</p> <p>NOTE: All messages forwarded from HPOM systems are treated as allowing read and write. Any changes made to these events result in a back synchronization to the originating HPOM server.</p>
<p>Manage certificate</p>	<p>Opens the Certificate Details dialog box, which displays details about the current certificate, and contains links to replace the certificate from the host or from a file.</p>
<p>Password</p>	<p>Password for the user account on the external server.</p> <p>For an HPOM server, used for receiving instructions, and executing tools and actions.</p> <p>For an External Event Processing server, used for event forwarding.</p>

UI Element (A-Z)	Description
Port	<p>Communication port on the external server.</p> <p>For an HPOM server, used for receiving instructions, and executing tools and actions.</p> <p>For an External Event Processing server, used for event forwarding.</p> <p>Set default port specifies the default port used by HPOM.</p> <p>Note: For information about checking and changing ports, see the documentation of your web server product.</p>
Remove certificate	Removes the installed certificate.
Retrieve from server	Retrieve a certificate from the host system specified in this server connection.
Server ID	Enables the selection of an alternative, configured HPOM server for receiving instructions, and executing tools and actions.
Supports Synchronize and Transfer Control	Selects the Supports Synchronize and Transfer Control option to enables the transfer responsibility to the external event processing server.
Use Other Server	Specifies that an alternative, configured HPOM server is to be used for receiving instructions, and executing tools and actions.
Use this Server	Use the currently enabled server HPOM for receiving instructions, and executing tools and actions.
User Name	<p>Name of the user account on the external server.</p> <p>For an HPOM server, used for receiving instructions, and executing tools and actions.</p> <p>For an External Event Processing server, used for event forwarding.</p>
Use Secure HTTP	Selects the Use Secure HTTP option for secure communication.

Certificate Details

To access	Select Admin > Operations Management > Tune Operations Management > Connected Servers Double-click the selected connected server and select the Certificate Details tab.
Relevant tasks	To configure certificates for connected servers, see: <ul style="list-style-type: none"> ➤ "How to Establish a Trust Relationship for a Server Connection" on page 426. ➤ "How to Verify the Trusted Relationship" on page 429.
See also	For more information about connected servers, see "Introduction to Connecting Servers" on page 408.

The Certificate Details dialog box displays the UI elements listed in the following table.

UI Element (A-Z)	Description
Common Name (CN)	Name or identifier of the certificate authority issuing the certificate or of the recipient of the certificate.
Import from file	Opens the file browser and enables you to navigate to and specify a certificate file for the server connection. Certificates must meet the Base64 Encoded X.509 format.
Issued by	Details about the issuer of the certificate.
Issued to	Details about the recipient of the certificate.
Location (L)	Name of the resource location in the digital certificate hierarchy to which the certificate belongs or from which it was issued.
Organization (O)	Name of the organization in the digital certificate hierarchy to which the certificate belongs or from which it was issued.
Organization Unit (OU)	Name of the organizational unit in the digital certificate hierarchy to which the certificate belongs or from which it was issued.

UI Element (A-Z)	Description
Retrieve from server	Retrieve a certificate from the host for a server connection.
Valid from	Earliest date from which the current certificate is valid.
Valid to	Last date on which the current certificate is valid.

Policy Management

To access	Select Admin > Operations Management > Tune Operations Management > Connected Servers Double-click the selected connected server and select the Policy Management tab.
Relevant tasks	To configure an Integration Adapter connected server, see "How to Create a Connection to an Integration Adapter Server" on page 420.
See also	For more information about connected servers, see "Introduction to Connecting Servers" on page 408.

The Policy Management tab displays the UI elements listed in the following table.

UI Element (A-Z)	Description
	Launch Policy Editor: Opens the Policy Management UI in a new window.
Port	Port used to open Policy Management on the Integration Adapter server.
Set default port	Default port value is automatically inserted into the Port field.



Event Drilldown

To access	Select Admin > Operations Management > Tune Operations Management > Connected Servers Double-click the selected connected server and select the Event Drilldown tab.
Relevant tasks	To configure connected servers, see: <ul style="list-style-type: none"> ➤ "How to Create a Connection to another OMi Instance" on page 411. ➤ "How to Create a Connection to an HPOM Server" on page 413. ➤ "How to Create a Connection to an External Event Processing Server" on page 417. ➤ "How to Create a Connection to an Integration Adapter Server" on page 420. ➤ "How to Create and Associate an Alias to a Connected Server" on page 422.
See also	For more information about connected servers, see "Introduction to Connecting Servers" on page 408.

The Event Drilldown tab displays the UI elements listed in the following table.

UI Element (A-Z)	Description
Fully Qualified DNS Name	Fully qualified Domain Name System name of the system hosting the External Event Processing server. For example: myhost.example.com.
Port	Communication port on the External Event Processing server, used for event drilldown.
Set default port	Default port value is automatically inserted into the Port field.

UI Element (A-Z)	Description
URL	<p>The complete URL used for drilldown to a source manager. It is a combination of the Fully qualified Domain Name System name, the Port, and the URL Path.</p> <p>For example:</p> <p>Server.example.com/80/ opr-policy-management?\${sourcedFrom.externalId}</p>
URL Path	<p>Relative URL Path used for drilldown to a source manager.</p> <p>Tip: Variable to access the event on the source manager is:</p> <p>\${sourcedFrom.externalId}</p> <p>This variable is replaced at runtime using the context of an event to get the External ID.</p>
Use Secure HTTP	<p>Selects the Use Secure HTTP option for secure communication.</p>

Incoming Connection

To access	Select Admin > Operations Management > Tune Operations Management > Connected Servers Double-click the selected connected server and select the Incoming Connection tab.
Relevant tasks	To configure connected servers, see: <ul style="list-style-type: none"> ➤ "How to Create a Connection to another OMi Instance" on page 411. ➤ "How to Create a Connection to an HPOM Server" on page 413. ➤ "How to Create a Connection to an External Event Processing Server" on page 417. ➤ "How to Create a Connection to an Integration Adapter Server" on page 420. ➤ "How to Create and Associate an Alias to a Connected Server" on page 422.
See also	For more information about connected servers, see "Introduction to Connecting Servers" on page 408.

The Incoming Connection tab displays the UI elements listed in the following table.

UI Element (A-Z)	Description
Event Backsync	Credentials of the Operations Management user used by the External Event Processing server to update events on the BSM server from which the event was forwarded.
Password	Password for the automatically-generated user account used to receive updates from the external server.
User Name	Automatically-generated user account used by the External Event Processing server to update events on the server from which the event was forwarded.

Connecting Servers Manager Command-Line Interface

This section describes the options and parameters available in the **ConnectedServers** command-line interface.

The **ConnectedServers** command-line interface is located in:

<BSM_Root_Directory>/opr/bin

The **ConnectedServers** command requires the following syntax:

ConnectedServer <<BSMOPTS>> <<ACTION>>

Where:

<<BSMOPTS>>: -username <login name> -password <password>
 [[-port <port>]
 [-server <server>] [-ssl] | [-url <url>]]

<<ACTION>>: -add <<OPTIONS>> | -delete <identifier> | -list |
 -show <identifier> |
 -update <identifier> <<OPTIONS>>

The valid arguments for <<OPTIONS>> are:

-name <name> -label <label> -dns <DNS name> -type <type> -active <yes/no>
 -issl <yes/no> [-certificatefile <file> | -certificate] [-fwddns <yes/no>]
 [-integrationuser <user>] [-integrationpw <pw>] [-integrationport <port>]
 [-oserver <id>]
 [-scripttype <type>] [-scriptfile <file>] [-scriptcp <cp>] |
 [-wsrooturl <url>] [-maxtimeout <time>]
 [-drilldns <DNS name> -drillport <port> [-drillssl <yes/no>]]
 [-toc yes -backsyncpw <pw> | -toc no]
 [-backsync yes -backsyncpw <pw> | -backsync no] |
 [-help | -version]

Note: <<BSMOPTS>> is required for all commands except for the options -help and -version.

The following table gives more information about the arguments recognized by the **ConnectedServers** command:

Option	Description
-a,-add	Adds a new server. Any unspecified optional options are set to their default values.
-active <yes/no>	Enables or disables the server. Default value is <i>yes</i> , except for Alias servers for which the associated server is not set.
-bs,-backsync <yes/no>	Enables or disables backsync. Default value is: <i>no</i> . If enabled, requires the -backsyncpw option.
-bspw,-backsyncpw <pw>	Sets the Backsync password.
-certificate	Certificate of the HPOM system will be saved.
-certificatefile <file>	Loads the certificate from the specified file.
-d,-delete <identifier>	Deletes the server specified by the ID or the name of the server.
-ddns,-drilldns <dns name>	Sets the DNS name of event drilldown system.
-desc <description>	Description of the server.
-dns <dns name>	Sets the DNS name of the connected server being specified.
-dport,-drillport <port>	Sets the port of event drilldown system.
-dssl,-drillssl <yes/no>	Enables or disables HTTPS for event drilldown. Default value is: <i>no</i> .
-ft,-fwdtopo <yes/no>	Enables or disables forward dynamic topology. Default value is: <i>no</i> .
-h,-help	Displays a summary of the command options and exits.

Option	Description
-iport,-integrationport <port>	Sets the integration port. Default values for the supported server types are: <ul style="list-style-type: none"> ▶ External Process: 80 ▶ HPOM for Windows: 443 ▶ HPOM for UNIX: 8444 ▶ Integration Adapter: 8443 (secure) or 8081 (insecure)
-ipw,-integrationpw <pw>	Sets the integration user password. Note: When updating a server that already has the integration user password set, you must enter -ipw <your_password> as a parameter, for example: If you created a server and set the integration user password and want to update the label of the server, enter the command: ConnectedServer <<BSMOPTS>> -label <label text> -ipw <password>
-issl <yes/no>	Enables or disables HTTPS for integration. Default value is: yes.
-iuser,-integrationuser <user>	Sets the integration user.
-l,-list	Lists the key properties of all configured connected servers.
-label <label>	Sets the label of the server.
-mto,-maxtimeout <max timeout>	Sets the maximum timeout. Default value is: 60 seconds.
-name <name>	Sets the name of the server.
-os,-oserver <id>	Sets an alternative server to execute action, tools, and instructions.
-p,-port <port>	Sets the port of the BSM server. Default value is: 80 (HTTP) or 443 (HTTPS).
-pw,-password <pw>	Sets the password of the BSM user.

Option	Description
-s,-show <identifier>	Shows the properties of the server specified by the ID or the name of the server.
-scp,-scriptcp <classpath>	Sets the script class path. Default is empty.
-server <server>	Sets the hostname or IP address of the BSM server. Default value is: mambo3.mambo.net.
-sfile,-scriptfile <file>	Specifies a script file.
-ssl	Specifies the networking protocol (HTTP or HTTPS) used to connect to the BSM server. Default value is: HTTP.
-stype,-scripttype <type>	Sets the script type.
-toc <yes/no>	Enables or disables transfer control to external server. Default value is: no. If enabled, requires the -backsyncpw option.
-type <type>	Sets the type of server. The supported types are: <ul style="list-style-type: none"> ➤ OMI ➤ OMW (HPOM for Windows) ➤ OMU (HPOM for UNIX) ➤ EXTERNAL_PROCESS ➤ INTEGRATION_ADAPTER ➤ ALIAS
-u,-update <identifier>	Updates the properties of the server specified by the ID or the name of the server.
-url <URL>	Sets the URL of the BSM server. Default value is: http://mambo3.mambo.net:80/opr-admin-server Do not use in conjunction with the options -ssl , -server , or -port .
-user,-username <login name>	Sets the name of the BSM user.
-version	Shows the version of the Connected Server CLI.

Option	Description
<code>-wsrooturl <url></code>	Sets the root URL of the web service. Default value is empty.

The **ConnectedServer** command displays the following values to indicate the exit status of the requested operation:

Exit Status	Description
0	Successful completion
1	Failure of requested operation
300-399	HTTP Redirection (300-399)
400-499	HTTP Client Error (400-499)
500-599	HTTP Internal Server Error (500-599)

The exit status numbers (300-599) reflect a standard HTTP-status category (and number), for example: **Redirection (300-399)**. For more information about a specific HTTP error status, for example: **307**, which signifies a temporary HTTP re-direct, see the publicly available HTTP documentation.

General example command syntax and command option and arguments for adding and updating specific server types are summarized in the following sections:

- "Example Commands for All Server Types" on page 454
- "OMI Server Configuration" on page 454
- "HPOM Configuration" on page 454
- "External Process Configuration" on page 455
- "Integration Adapter Configuration" on page 455
- "Alias Server Configuration" on page 456

Example Commands for All Server Types

List servers:

```
ConnectedServer <<BSMOPTS>> -list
```

Delete server:

```
ConnectedServer <<BSMOPTS>> -delete <identifier>
```

Show server:

```
ConnectedServer <<BSMOPTS>> -show <identifier>
```

OMI Server Configuration

Adding a server of type OMI:

```
ConnectedServer <<BSMOPTS>> -add -label <label> -name <name>  
-dns <dnsname> -type OMI [-active <yes/no>] [-fwdtopo <yes/no>]
```

Updating a server of type OMI:

```
ConnectedServer <<BSMOPTS>> -update [-label <label>] [-name <name>]  
[-dns <dnsname>] [-active <yes/no>] [-fwdtopo <yes/no>]
```

HPOM Configuration

Adding a server of type HPOM for Windows or HPOM for UNIX:

```
ConnectedServer <<BSMOPTS>> -add -label <label> -name <name>  
-dns <dnsname> -type <OMW/OMU> [-active <yes/no>] -iuser <user>  
[-fwdtopo <yes/no>] [[-integrationpw <pw>] [-integrationport <port>]  
[-issl <yes/no>] > [-certificatefile <file> | -certificate]] | [-oserver <id>]]
```

Updating a server of type HPOM for Windows or HPOM for UNIX:

```
ConnectedServer <<BSMOPTS>> -update <identifier> [-label <label>] [-name  
<name>] [-dns <dnsname>] [-active <yes/no>] [-iuser <user>]  
[-fwdtopo <yes/no>] [[-integrationpw <pw>] [-integrationport <port>] [-issl <yes/  
no>] [-certificatefile <file> | -certificate]] | [-oserver <id>]]
```

External Process Configuration

Adding a server of type External Processing:

```
ConnectedServer <<BSMOPTS>> -add -label <label> -name <name>
-dns <dnsname> -type EXTERNAL_PROCESS [-active <yes/no>]
(-scripttype <type> -scriptfile <file> [-scriptcp <classpath>] | [-wsrooturl <url>])
[-maxtimeout <max timeout>] [-iuser <user>] [-integrationpw <pw>]
[-integrationport <port>] [-issl <yes/no>] [-drilldns <dnsname> -drillport <port>
[-drillssl <yes/no>]] [-toc no] [[-backsync no] | -backsync yes -backsyncpw <pw>]
| -toc yes [-backsync yes] -backsyncpw <pw>]
```

Updating a server of type External Processing:

```
ConnectedServer <<BSMOPTS>> -update <identifier> [-label <label>]
[-name <name>] [-dns <dnsname>] [-active <yes/no>]
(-scripttype <type> -scriptfile <file> [-scriptcp <classpath>] | [-wsrooturl <url>])
[-maxtimeout <max timeout>] [-iuser <user>] [-integrationpw <pw>]
[-integrationport <port>] [-issl <yes/no>] [-drilldns <dnsname> -drillport <port>
[-drillssl <yes/no>]] [[-toc no] [[-backsync no] | -backsync yes -backsyncpw <pw>]
| -toc yes [-backsync yes] -backsyncpw <pw>]
```

Integration Adapter Configuration

Adding a server of type Integration Adapter:

```
ConnectedServer <<BSMOPTS>> -add -label <label> -name <name>
-dns <dnsname> -type INTEGRATION_ADAPTER [-active <yes/no>]
[-integrationport <port>] [-issl <yes/no>] [-drilldns <dnsname> -drillport <port>
[-drillssl <yes/no>] [-wsrooturl <url>]]
```

Updating a server of type Integration Adapter:

```
ConnectedServer <<BSMOPTS>> -update <identifier> [-label <label>]
[-name <name>] [-dns <dnsname>] [-active <yes/no>] [-integrationport <port>]
[-issl <yes/no>] [-drilldns <dnsname> -drillport <port> [-drillssl <yes/no>]
[-wsrooturl <url>]]
```

Alias Server Configuration

Adding a server of type Alias:

```
ConnectedServer <<BSMOPTS>> -add -label <label> -name <name>  
-type ALIAS [-active <yes/no>] [-oserver <id>]
```

Updating a server of type Alias:

```
ConnectedServer <<BSMOPTS>> -update <identifier> [-label <label>]  
[-name <name>] [-active <yes/no>] [-oserver <id>]
```

BBC Trust Server Command-Line Interface

This section describes the options and parameters available in the **BBCTrustServer** command-line interface.

The **BBCTrustServer** command-line interface is located in:

<BSM_Root_Directory>/opr/bin

The **BBCTrustServer** command requires the following syntax:

```
BBCTrustServer ([-h | -help] | -version) |
    (<server> [-i | -import] [-o | -overwrite] [-p | -proxy])
```

The following table gives more information about the arguments recognized by the **BBCTrustServer** command:

Option	Description
<server>	DNS name of the external server with the CA certificate to be trusted.
-h, -help	Displays a summary of the command options and exits.
-i, -import	Imports the trusted certificate to the certificate store without prompting for user confirmation.
-o, -overwrite	Overwrites existing trusted certificate with the same common name without prompting for user confirmation.
-p, -proxy	Specifies an HTTP proxy. Format: <i><hostname>:<port></i> Default port: 8080
-version	Shows the version of the BBCTrustserver CLI.

The **BBTrustServer** command displays the following values to indicate the exit status of the requested operation:

Exit Status	Description
0	Successful completion
1	Failure of requested operation

Troubleshooting and Limitations

This section provides help for those people who are troubleshooting problems relating to connected servers.

- "Events Indicating that a Server is not Reachable" on page 459

Events Indicating that a Server is not Reachable

If a forwarding request fails, it is put back into the queue to be retried, and a corresponding event is generated. The frequency that these events are created for a particular request can be control via the infrastructure setting **Retry Notify Interval** (see "Event Forwarding Settings" on page 702).

For example, if an Event Forwarding Gateway server `gateway.example.com` is unable to reach an external server called `external_server`, and the following event is displayed:

Event Forwarding Gateway server `gateway.example.com` is unable to reach server `external_server` due to the following error:

```
'java.net.UnknownHostException: external_server.example.com'
```

The event '*<event name>*' (`6c632780-aeb7-4407-af43-724b73a49f9c`) cannot be delivered at this time. The request will be retried continuously until the forward request expires. According to the current Operations Management Event Forwarding Expiration infrastructure setting of 12 hour(s), this request is currently estimated to expire in 10 hour(s) and 6 minute(s). Currently the queue this request is on has 40 request(s) in the backlog.

The Operations Management Event Forwarding Expiration infrastructure setting value and the time remaining before event forwarding is to be terminated is specified. In addition, the number of events that are in the queue to be forwarded to the unreachable server is also specified.

16

Event Forwarding to External Servers

This chapter includes:

Concepts

- ▶ Introduction to Event Forwarding Rules on page 462

Tasks

- ▶ How to Create an Event Forwarding Rule on page 465
- ▶ How to Edit an Event Forwarding Rule on page 468
- ▶ How to Duplicate an Event Forwarding Rule on page 469
- ▶ How to Delete an Event Forwarding Rule on page 470

Reference

- ▶ Event Forwarding User Interface on page 471

Troubleshooting and Limitations on page 474

Concepts

Introduction to Event Forwarding Rules

The Event Forwarding manager enables you to set up rules to select and forward events to external event managers such as another Operations Manager *i* instance, HP Operations Manager and or a Help desk application. These external managers are also referred to as event forwarding targets.

Event forwarding rules are used in conjunction with server connections to redirect selected events to specific event managers. Events can be forwarded for information or as a result of an escalation where the ownership of the problem is transferred to a more specialized group of experts.

Note: Policies configured in HP Operations Manager can set trouble ticket and notification flags. If these flags are set, the following custom attributes in Operations Management are generated:

- ▶ ForwardToTroubleTicket (value= true)
- ▶ NotifyUser (value= true)

Using appropriately configured event filters, events including these custom attributes with value of true can be automatically forwarded to an external manager using Forwarding Rules or notifications sent using Notification Rules.

Note: Forwarding rules are not re-scheduled if a matching event still matches the rule condition after that rule was executed.

To schedule another rule execution, an event must first change in such a way that it no longer matches the rule condition and later change so that it matches again.

Only the transition from not-matching or new, to matching a rule condition triggers scheduling a rule execution.

Events to be forwarded are held in a queue. A server is selected and an attempt is made to send the first request to this server. If the server is available, all other pending requests for this server are also sent in series. This procedure is repeated for all other forwarding requests and servers. If a server is not available, the next server is selected and the events destined for this server are sent. After all possible events are sent, servers that could not be reached are retried until forwarding of events in the queue is complete or queued events are older than time period set in the Event Forwarding Expiration setting, at which time they are deleted from the queue. For details about this setting, see "Event Forwarding Settings" on page 702.

The following forwarding rule is provided with Operations Management. This rule is disabled by default.

Automatically Forward to Trouble Ticket System — Forwards all events for which the custom attribute `ForwardToTroubleTicket` value is true to the trouble ticket system.

The `ForwardToTroubleTicket` flag is set in HP Operations Manager policies, which creates the `ForwardToTroubleTicket (value= true)` custom attribute in Operations Management.

Note: The system is specified as an alias server. Configure the Trouble Ticket Server alias server to connect to the physical trouble ticket server system. For details, see "How to Create and Associate an Alias to a Connected Server" on page 422.

Tasks

How to Create an Event Forwarding Rule

This task shows you how to create an event forwarding rule.

Note: To use Operations Management Administration areas, you must be granted permission to work with these or a subset of these. For details, see "How to Set Operations Management User or Group Permissions" on page 637.

To create an event forwarding rule:

- 1** Open the Event Forwarding manager from Operations Management Administration:
Admin > Operations Management > Tune Operations Management > Forwarding Rules
- 2** In the Event Forwarding Rules pane, click the  button to open the Create New Event Forwarding Rules dialog box.
- 3** Enter a display name, and (optional) a description of the event forwarding rule being specified.
- 4** Select **Active**, if you want to make the event forwarding rule active immediately.
- 5** Select an event filter for the event forwarding rule from the **Events Filter** list. The filter determines which events to consider for forwarding.
If no appropriate filter is already configured, click the Browse (...) button, which opens the Select an Event Filter dialog box. Create a filter or edit an existing one. For information about filters, see "How to Define Simple Event Filters" on page 221.

- 6 Select one or more target servers to which the events selected by this rule should be forwarded. For each target server, add it to the rule using the  button.

If no target servers are configured, configure the required target servers first. For details, see "How to Create a Connection to an HPOM Server" on page 413.

Note: An actual connected server configuration cannot be exported, as these configurations are installation-specific. Importing an event forwarding rule creates a virtual server for each specified target server. These virtual servers must be associated with physical connected servers to enable the rule.

- 7 If you have an Operations Management license, for each target server that you added to the event forwarding rule, specify a forwarding type.

The options include:

- ▶ Notify
- ▶ Notify and Update
- ▶ Synchronize
- ▶ Synchronize and Transfer Control (External Event Processing Server only)

If you do not have such a license and are using the BSM Event Channel, the forwarding type is set to **Notify** and no notification options are shown.

Note: An Automatic forwarding rule that is configured to transfer control of an event to a Connected Server may fail if the event has already been transferred to another server. In this case the following is done:

- The event is forwarded to the specified connected server as Notify and Update and not as Synchronize and Transfer Control.
 - A log file entry is made to the log/opr-backend/opr-backend.log file.
 - An annotation is made to the event with the log message. The author of the annotation is System:Forwarding.
-

8 Select **OK**.

How to Edit an Event Forwarding Rule

This task shows you how to edit an existing event forwarding rule.

To edit an existing event forwarding rule:

- 1** Open the Event Forwarding manager from Operations Management Administration:

Admin > Operations Management > Tune Operations Management > Forwarding Rules

- 2** Select the event forwarding rule that you want to edit.
- 3** In the Event Forwarding Rules pane, click the  button to open the Edit Event Forwarding Rule dialog box.

Alternatively, double-click a section in the Details pane to open the appropriate tab in the Edit Event Forwarding Rule dialog box.

- 4** Make the required changes to the selected event forwarding rule.
- 5** Select **OK**.

How to Duplicate an Event Forwarding Rule

This task shows you how to duplicate an existing event forwarding rule to use as the basis for a new event forwarding rule.

To duplicate an existing event forwarding rule:

- 1** Open the Event Forwarding manager from Operations Management Administration:

Admin > Operations Management > Tune Operations Management > Forwarding Rules

- 2** Select the event forwarding rule that you want to duplicate.

- 3** In the event forwarding rules pane, click the  button.

The Create New Event Forwarding Rule dialog box opens with a duplicate of the selected rule.

- 4** Edit the duplicate event forwarding rule to suit the new event forwarding rule.

For details about editing, see "How to Edit an Event Forwarding Rule" on page 468.

How to Delete an Event Forwarding Rule

This task shows you how to delete an existing event forwarding rule.

To delete an existing event forwarding rule:

- 1** Open the Event Forwarding manager from Operations Management Administration:

Admin > Operations Management > Tune Operations Management > Forwarding Rules

- 2** Select the event forwarding rule that you want to delete.
- 3** In the Event Forwarding Rules pane, click the  button.

The selected event forwarding rule is deleted from the list of event forwarding rules.

Reference

Event Forwarding User Interface

The Event Forwarding manager enables you to create and manage rules to forward events to Operations Management, HPOM and external event processing servers.

To access	Select Admin > Operations Management > Tune Operations Management > Forwarding Rules
Relevant tasks	To configure event forwarding rules, see "How to Create an Event Forwarding Rule" on page 465.
See also	For more information about event forwarding rules, see "Introduction to Event Forwarding Rules" on page 462.

The Event Forwarding pane displays the UI elements listed in the following table.

UI Element (A-Z)	Description
	Reloads the event forwarding rules list.
	New Item: Opens the Create New Event Forwarding Rule dialog box to create an event forwarding rule. For more information about creating event forwarding rules, see "How to Create an Event Forwarding Rule" on page 465.
	Duplicate Item: Creates a copy of the selected event forwarding rule. For more information about duplicating event forwarding rules, see "How to Duplicate an Event Forwarding Rule" on page 469.

UI Element (A-Z)	Description
	<p>Edit Item: Opens the Edit Event Forwarding Rule dialog box to edit an existing event forwarding rule.</p> <p>Alternatively, double-click a section in the Details pane to open the appropriate tab in the Edit Event Forwarding Rule dialog box.</p> <p>For more information about editing event forwarding rules, see "How to Edit an Event Forwarding Rule" on page 468.</p>
	<p>Delete Item: Deletes the selected event forwarding rule.</p> <p>For more information about deleting event forwarding rules, see "How to Delete an Event Forwarding Rule" on page 470.</p>
	<p>Activate/Deactivate Item: Toggles between enabling and disabling the selected Event Forwarding Rules.</p> <p>Disabled rules appear dimmed in the list of rules.</p>
	<p>Opens the Connected Servers manager.</p>
	<p>Opens the Manage Event Filters dialog box, enabling you to select the event filter that you want to apply.</p> <p>From the Select an Event Filter dialog box, you can also open the Filter Configuration dialog box to create an event filter, edit or delete an existing event filter.</p> <p>For information about defining filters, see "Filtering Events" on page 211.</p>
<p>Active</p>	<p>Indicates whether the associated event forwarding rule is active.</p>
<p>Description</p>	<p>Brief description of the event forwarding rule.</p>
<p>Display Name</p>	<p>Display name of the selected event forwarding rule.</p>
<p>Event Filter</p>	<p>Filter used to select events to forward.</p>

UI Element (A-Z)	Description
Forwarding Type	<p>Specifies how an event forwarded to a certain server is handled. The options include:</p> <ul style="list-style-type: none"> ▶ Notify — Target server receives original events but no further updates ▶ Notify and Update — Target server receives original events and all further updates ▶ Synchronize — Target server receives original events and all further updates and sends back all updates ▶ Synchronize and Transfer Control — Target server receives original events and updates and sends back all updates. Ownership of the event is transferred to the other server. <p>Note: If you do not have an Operations Management license and are using the BSM Event Channel, the forwarding type is set to Notify and no notification options are shown.</p>
Target Servers	Servers selected as event forwarding targets for the selected event forwarding rule.

Troubleshooting and Limitations

This section provides the following help in troubleshooting problems relating to forwarding events:

- ▶ "Events are Being Forwarded to a Disabled Target System" on page 474
- ▶ "Event Forward Request to a Connected Server Fails" on page 474

Events are Being Forwarded to a Disabled Target System

A target server is disabled by clearing the **Active** flag in the associated connected server list entry event forwarding continues.

Instead of disabling the server, disable the forwarding rule for this server:

From the Forwarding Rules manager, select all rules using this connected server and disable these rule. Disabling a rule also disables forwarding to other targets using this rule.

Event Forward Request to a Connected Server Fails

If the request to forward an event to a particular connected server fails, the request is deleted from the forwarding queue and the event makes an internal note that the delivery to the target server has failed. The event maintains information about the failed request to the specified connected server. Any further forwarding rule matches on this event for this connected server is ignored. If the forwarding type was set to Synchronize and Transfer Control, a standard event annotation is also added to the event, otherwise no event annotation is made.

Failure to deliver can occur for retry timeouts, or a catastrophic delivery error. A catastrophic delivery error is a situation where it does not make sense to retry the request, for example, a mis-configuration (authentication fails), or a programming error is encountered in an External Process groovy adapter (NullPointerException). These cases require manual intervention before retrying.

To manually retry failed requests to a particular connected server, from the Event Browser, manually transfer control of an event that has previously failed delivery to a particular server.

17

Time-Based Event Automation

This chapter includes:

Concepts

- ▶ Introduction to Time-Based Event Automation on page 476

Tasks

- ▶ How to Create a Time-Based Event Automation Rule on page 478
- ▶ How to Specify Actions for Time-Based Event Automation Rules on page 480
- ▶ How to Enable and Disable Time-Based Event Automation Rule on page 484
- ▶ How to Edit a Time-Based Event Automation Rule on page 485
- ▶ How to Duplicate a Time-Based Event Automation Rule on page 486
- ▶ How to Delete a Time-Based Event Automation Rule on page 487

Reference

- ▶ Time-Based Event Automation User Interface on page 488

Troubleshooting and Limitations on page 502

Concepts

Introduction to Time-Based Event Automation

Time-based event automation rules enable administrators to configure actions to be executed on events matching a user-defined set of criteria after a specified time.

Time-based event automation rules can be very helpful in the following situations:

- ▶ If an automatic action for a message fails, you can configure a restart of the automatic action after a short delay. If it repeatedly fails, after a predefined number of retries, further retries are stopped and the event is escalated.
- ▶ If an event is not being worked on after a predefined period in time, you can configure a change to give it higher priority, for example by increasing its severity, or be assigned to a more expert group.
- ▶ You can configure the closing of an event that is older than a predefined period of time.
- ▶ You can configure transferring control for events based on time. For example, escalate if an event remains in browser for longer than 2 days, close if message remains for longer than 7 days (despite the escalation after 2 days).

Each time-based event automation rule consists of three main elements:

- ▶ Filter defining the events to which time-based event automation rules are to be applied.
- ▶ Time period defining the duration an event has to continuously match the rule's filter to execute the rule's actions on that event.
- ▶ List of actions to be executed on matching events. Available actions are re-running automatic actions on events, modifying event attributes, forwarding events to external servers, assigning events to users and groups, executing scripts, and executing Run Books.

Automating the execution of actions on events results in increased operator efficiency and usability. With time-based event automation, many recurring tasks can be automated, leaving operators more time to work on the important task.

Note: Time-based automation rules, are not re-scheduled if a matching event still matches the rule condition after that rule had been executed.

To schedule another time-based automation rule execution, an event must first change in such a way that it no longer matches the rule condition and later change so that it matches again.

Only the transition from not-matching or new, to matching a rule condition triggers a rule re-execution.

The following time-based automation rules are provided with Operations Management. These are disabled by default.

- ▶ **Close Old Events** — Sets lifecycle state of all not closed events older than one week to closed.
 - ▶ **Forward To Trouble Ticket System** — Forwards all unresolved events older than one day to the trouble ticket system.
-

Note: The system is specified as an alias server. Configure the Trouble Ticket Server alias server to connect to the physical trouble ticket server system. For details, see "How to Create and Associate an Alias to a Connected Server" on page 422.

- ▶ **Increase Severity And Priority** — Increments the severity and priority by one of all events that have been in lifecycle state open for longer than one hour.
- ▶ **Restart Failed Automatic Action** — Restarts any failed automatic actions after a delay of 1 minute, with a maximum of 3 retries.

Tasks

How to Create a Time-Based Event Automation Rule

This task shows you how to create a time-based event automation rule.

Note: To use Operations Management Administration areas, you must be granted permission to work with these or a subset of these. For details, see "How to Set Operations Management User or Group Permissions" on page 637.

To create a time-based event automation rule:

- 1** Open the Time-Based Event Automation Rules manager from Operations Management Administration:

Admin > Operations Management > Tune Operations Management > Time-Based Event Automation

- 2** In the Time-Based Event Automation Rules pane, click the * button to open the Create New Time-Based Event Automation Rule dialog box.
- 3** Enter a Display Name and description for the rule being specified.
- 4** Select an event filter for the rule from the **Events Filter** list. The filter determines which events to consider in the rule.

If no appropriate filter is already configured, click the Browse (...) button, which opens the Select an Event Filter dialog box. Create a filter or edit an existing one. For information about filters, see "How to Define Simple Event Filters" on page 221.

- 5** Set the match time period for the rule. The specified actions are executed on the event if the rule remains matched for the specified time period after the event started matching the rule's filter.

- 6** *Optional:* Set the number of execution attempts to limit the number of executions of this rule on the same event, if that event matches the filter repeatedly for the configured time period.
- 7** Select **Activate rule after creation**, if you want to make the rule active immediately.
- 8** Click **Next** to open the Actions page.
- 9** Specify the actions that you want to include in this rule as follows:
 - a** Click the  button and select an action.
 - b** Enter the required information in the associated dialog box. For further information on specifying actions, see "How to Specify Actions for Time-Based Event Automation Rules" on page 480.
 - c** Repeat for all other actions that you want to specify.
- 10** If necessary, change the order of action execution for the rule using the up  and down  buttons.
- 11** Select **Finish**.

How to Specify Actions for Time-Based Event Automation Rules

This section shows you how to specify the actions for a time-based event automation rule.

Note: To use Operations Management Administration areas, you must be granted permission to work with these or a subset of these. For details, see "How to Set Operations Management User or Group Permissions" on page 637.

To specify actions for a time-based event automation rule:

- 1** Open the Actions page of the Time-Based Event Automation Rules manager. For detailed instructions, see "How to Create a Time-Based Event Automation Rule" on page 478.
- 2** Click the  button and select an action.
The associated dialog box opens.
- 3** Enter the required information in the associated dialog box. The following sections provide further information on specifying the available actions.
 - "Re-running Automatic Actions" on page 481
 - "Modifying Events and Custom Attributes" on page 481
 - "Forwarding Events" on page 482
 - "Assigning Events to Users and Groups" on page 482
 - "Running Scripts" on page 483
 - "Running Run Books" on page 483

Re-running Automatic Actions

If you want the automatic action associated with a matching event to run as part of the time-based event automation rule being configured, click the * button and select **Re-run Automatic Action** to include Re-run automatic action in the Actions list.

Modifying Events and Custom Attributes

If you want to modify event attributes and custom attributes for matching events, click * and select **Modify Event** to open the Modify Event Attributes dialog box and specify attributes and custom attributes as described in the following procedure.

If you want to modify event attributes for matching events, complete steps 1 to 3. Otherwise, go to step 4.

- 1** To modify an event attribute, click * from the Attributes table menu and select an attribute from the list.

The Create New Event Attribute Modification dialog box opens appropriate for the selected attribute.

- 2** Specify how the attribute is to be changed when the time-based event automation rule is executed and click **OK**.
- 3** Repeat steps 1 and 2 for all other attributes that should be modified by this rule.

If you want to modify custom attributes for matching events, complete steps 5 to 7. Otherwise, go to step 8.

- 4** To modify a custom attribute, click * from the Custom Attributes table menu.

The Create New Event Attribute Modification dialog box opens.

- 5** Enter the name of the custom attribute.
- 6** Enter the value that the custom attribute should take when the time-based event automation rule is executed and click **OK**.
- 7** Repeat steps 5 and 6 for all other custom attributes that should be modified by this rule.
- 8** In the Modify Event Attributes dialog box, click **OK**.

Forwarding Events

If you want to forward matching events, click * and select **Forward Event** to open the Forward Event dialog box. Specify the forwarding rule as follows:

- 1 Select the Target Server to which you want to forward the event.
- 2 Select the forwarding type and click **OK**.

Note: For a TBEA rule that was created with the understanding that the associated connected server has the Synchronize and Transfer Control forwarding type enabled, and the connected server configuration is later changed to disable Synchronize and Transfer Control, the Synchronize forwarding type is used.

TBEA rules are not automatically modified when connected server configurations are changed.

Assigning Events to Users and Groups

If you want to assign events to users or groups on matching events, click * and select **Assign Event** to open the Assignment dialog box and specify how events are to be assigned to users or groups as follows:

- 1 Select a User group.
- 2 Select a User.

Note: Leaving user or group empty clears that assignment. <unknown> is displayed if the user or group is not available. If <unknown> is displayed, select an available user or group.

Running Scripts

If you want to run scripts defined using the Managing Scripts dialog box on matching events, click * and select **Run Script** to open the Run Script dialog box and specify the Event Processing Script that should be run from the list and click **OK**.

To create and edit scripts, open the Event Automation Configuration dialog box, using the **Manage Scripts** link. For information about defining scripts, see "Event Automation Script Configuration" on page 519.

Running Run Books

If you want to run Run Books on matching events, click * and select **Launch Run Books** to open the Run Books dialog box.

Specify the Run Books that should be run for the selected CI types as follows:

- 1 Click * from the Run Books dialog box.

The Select Run Books dialog box opens.

- 2 Select a CI type from the Select a CI Type pane.

- 3 Select a Run Book mapping for the selected CI type and click **OK**.

The new Run Book automation mapping is added to the list of selected Run Books.

- 4 Repeat steps 2 and 3 for all other Run Books that you want to configure.

- 5 In the Run Books dialog box, click **OK**.

How to Enable and Disable Time-Based Event Automation Rule

This task shows you how to enable and disable time-based event automation rules.

To enable or disable time-based event automation rules:

- 1** Open the Time-Based Event Automation Rules manager from Operations Management Administration:
Admin > Operations Management > Tune Operations Management > Time-Based Event Automation
- 2** Select the time-based event automation rules that you want to enable or disable.
- 3** In the Time-Based Event Automation Rules pane, click the  button to enable the selected rules or the  button to disable the selected rules.

How to Edit a Time-Based Event Automation Rule

This task shows you how to edit a time-based event automation rule.

To edit a time-based event automation rule:

- 1** Open the Time-Based Event Automation Rules manager from Operations Management Administration:

Admin > Operations Management > Tune Operations Management > Time-Based Event Automation

- 2** Select the time-based event automation rule that you want to edit.

- 3** In the Time-Based Event Automation Rules pane, click the  button to open the Edit Time-Based Event Automation dialog box.

Alternatively, double-click a section in the Details pane to open the appropriate tab in the Edit Time-Based Event Automation dialog box.

- 4** Make the required changes to the selected time-based event automation rule.
- 5** Select **OK**.

How to Duplicate a Time-Based Event Automation Rule

This task shows you how to duplicate a time-based event automation rule.

To duplicate a time-based event automation rule:

- 1** Open the Time-Based Event Automation Rules manager from Operations Management Administration:

Admin > Operations Management > Tune Operations Management > Time-Based Event Automation

- 2** Select the time-based event automation rule that you want to duplicate.

- 3** In the Time-Based Event Automation Rules pane, click the  button.

A copy of the selected event automation rule is created and is available for selection from the Time-Based Event Automation Rules pane.

- 4** Select the copy event automation rule and click the  button to open the Edit Time-Based Event Automation dialog box.

- 5** Make the required changes to the selected event automation rule.

- 6** Select **OK**.

How to Delete a Time-Based Event Automation Rule

This task shows you how to delete a time-based event automation rule.

To delete a time-based event automation rule:

1 Open the Time-Based Event Automation Rules manager from Operations Management Administration:

Admin > Operations Management > Tune Operations Management > Time-Based Event Automation

2 Select the time-based event automation rule that you want to delete.

3 In the Time-Based Event Automation Rules pane, click the  button.

4 Confirm the deletion by clicking **Yes**.

The selected event automation rule is deleted from the list of time-based event automation rules.

Reference

Time-Based Event Automation User Interface

The Time-Based Event Automation manager enables you to create and manage rules to automatically run available actions on the related CI of events. You can specify any number of actions to be executed if the event remains matched for the specified time period.

This section includes:

- ▶ Time-Based Event Automation Rules User Interface on page 489
- ▶ Time-Based Event Automation Rules Details User Interface on page 491
- ▶ General Tab — Create New and Edit Time-Based Event Automation Rule Dialog Box on page 492
- ▶ Actions Tab — Create New and Edit Time-Based Event Automation Rule Dialog Box on page 494
- ▶ Modify Event Attributes Dialog Box on page 495
- ▶ Forward Event Dialog Box on page 496
- ▶ Assignment Dialog Box on page 498
- ▶ Run Script Dialog Box on page 499
- ▶ Run Books Dialog Box on page 500
- ▶ Select Run Books Dialog Box on page 501

Time-Based Event Automation Rules User Interface

The Time-Based Event Automation Rules pane lists the specified rules. The Time-Based Event Automation Rules pane enables you to create and manage time-based event automation rules.

To access	Select Admin > Operations Management > Tune Operations Management > Time-Based Event Automation
Relevant tasks	To configure time-based event automation rules, see: <ul style="list-style-type: none"> ▶ "How to Create a Time-Based Event Automation Rule" on page 478. ▶ "How to Specify Actions for Time-Based Event Automation Rules" on page 480.
See also	For more information about time-based event automation, see "Introduction to Time-Based Event Automation" on page 476.

The Time-Based Event Automation Rules pane displays the UI elements listed in the following table.

UI Element (A-Z)	Description
	Reloads the time-based event automation rule list.
	New Item: Opens the Create New Time-Based Event Automation Rule dialog box to create a new rule. For more information about creating time-based event automation rules, see "How to Create a Time-Based Event Automation Rule" on page 478.
	Duplicate Item: Creates a duplicate of the selected automation rule.

UI Element (A-Z)	Description
	<p>Edit Item: Opens the Edit Time-Based Event Automation Rule dialog box to edit an existing rule.</p> <p>Alternatively, double-click a section in the Details pane to open the appropriate tab in the Edit Time-Based Event Automation dialog box.</p> <p>For more information about creating time-based event automation rules, see "How to Create a Time-Based Event Automation Rule" on page 478.</p>
	<p>Delete Item: Deletes the selected Time-Based Event Automation Rule.</p>
	<p>Activate/Deactivate item: Toggles between enabling and disabling the selected Time-Based Event Automation rules.</p> <p>Disabled rules appear dimmed in the list of rules.</p>
	<p>Manage Scripts: Opens the Event Automation Configuration interface in a new window.</p> <p>For details managing event automation scripts, see "Event Automation Script Configuration" on page 519.</p>
	<p>Manage Event Filters: Opens the Manage Named Filters dialog box for adding, editing, and managing filters.</p> <p>For information about defining filters, see "Filtering Events" on page 211.</p>

Time-Based Event Automation Rules Details User Interface

The Time-Based Event Automation Rules Details pane displays a summary of the selected time-based event automation rule.

To access	Select Admin > Operations Management > Tune Operations Management > Time-Based Event Automation
Relevant tasks	To configure time-based event automation rules, see: <ul style="list-style-type: none"> ▶ "How to Create a Time-Based Event Automation Rule" on page 478. ▶ "How to Specify Actions for Time-Based Event Automation Rules" on page 480.
See also	For more information about time-based event automation, see "Introduction to Time-Based Event Automation" on page 476.

The Time-Based Event Automation Rules Details page displays the UI elements listed in the following table.

UI Element (A-Z)	Description
Actions	Lists, in order of execution, the specified actions in the time-based event automation rule.
Active	Indicates whether the associated time-based event automation rule is active.
Description	Description of the time-based event automation rule.
Display Name	Name of the time-based event automation rule.
Event Filter	Filter specified to select events to be processed by this time-based event automation rule.

UI Element (A-Z)	Description
Execute, if filter matches for	Set the match time period for the rule. The specified actions are executed on the event if the rule remains matched for the specified time period after the event was received.
Limit number of executions per event to	Set the number of execution attempts to limit the number of executions of this rule on the same event, if that event matches the filter repeatedly for the configured time period.

General Tab — Create New and Edit Time-Based Event Automation Rule Dialog Box

To access	Select Admin > Operations Management > Tune Operations Management > Time-Based Event Automation Double-click a time-based automation rule and select the General tab (if necessary).
Relevant tasks	To configure time-based event automation rules, see: <ul style="list-style-type: none"> ➤ "How to Create a Time-Based Event Automation Rule" on page 478. ➤ "How to Specify Actions for Time-Based Event Automation Rules" on page 480.
See also	For more information about time-based event automation, see "Introduction to Time-Based Event Automation" on page 476.

The General Tab displays the UI elements listed in the following table.

UI Element (A-Z)	Description
Activate Rule after creation (Create New wizard only)	Indicates whether the associated time-based event automation rule is active.
Description	Description of the time-based event automation rule.
Display Name	Name of the time-based event automation rule.
Event Filter	Filter specified to select events to be processed by this time-based event automation rule.
Execute, if filter matches for	Sets the execution time period for the rule. The specified actions are executed on the related CI of the event if the rule remains matched for the specified time period after the event was received.
Limit number of executions per event to	Sets the number of execution attempts for the actions specified in the rule. If an action fails, it is retried indefinitely unless a value is specified for the total number of executions.

Actions Tab — Create New and Edit Time-Based Event Automation Rule Dialog Box

To access	Select Admin > Operations Management > Tune Operations Management > Time-Based Event Automation Double-click a time-based automation rule and select the Actions tab (if necessary).
Relevant tasks	To configure time-based event automation rules, see: <ul style="list-style-type: none"> ▶ "How to Create a Time-Based Event Automation Rule" on page 478. ▶ "How to Specify Actions for Time-Based Event Automation Rules" on page 480.
See also	For more information about time-based event automation, see "Introduction to Time-Based Event Automation" on page 476.

The Actions Tab displays the UI elements listed in the following table.

UI Element (A-Z)	Description
	New Item: Opens the lists of automatic actions.
	Edit Item: Opens the dialog box for editing the selected time-based automation rule.
	Delete Item: Delete the selected time-based automation rule.
	Moves the selected time-based event automation rules down to a later execution position.
	Moves the selected time-based event automation rules up to an earlier execution position.
	Expands the list to display details for all the specified actions.
	Collapses all open action details panes.

Modify Event Attributes Dialog Box

To access	<p>Select Admin > Operations Management > Tune Operations Management > Time-Based Event Automation</p> <p>In the Time-Based Event Automation Rules pane, click the  button to open the Create New Time-Based Event Automation Rule dialog box.</p> <p>Go to the Actions page, click the  button, and select Modify Event.</p>
Relevant tasks	<p>To configure time-based event automation rules, see:</p> <ul style="list-style-type: none"> ▶ "How to Create a Time-Based Event Automation Rule" on page 478. ▶ "How to Specify Actions for Time-Based Event Automation Rules" on page 480.
See also	<p>For more information about time-based event automation, see "Introduction to Time-Based Event Automation" on page 476.</p>

The Modify Event Attributes Dialog Box displays the UI elements listed in the following table.

UI Element (A-Z)	Description
	New Item: Opens the Modify Custom Attribute dialog box for the selected attribute.
	Edit Item: Opens the dialog box for editing the selected attribute modification configuration.
	Delete Item: Delete the selected attribute modification configuration.
Attribute	Attribute to be modified by the selected rule.
Custom Attribute	Custom attribute to be modified by the selected rule.
Decrease value	Increases the severity of the event by one level when an event is modified.

UI Element (A-Z)	Description
Increase value	Decreases the severity of the event by one level when an event is modified.
Name	Name of the attribute or custom attribute.
Set value to	Severity or lifecycle state value selected from list to be used to modify event.
Value	Value of the associated attribute or custom attribute.

Forward Event Dialog Box

To access	<p>Select Admin > Operations Management > Tune Operations Management > Time-Based Event Automation</p> <p>In the Time-Based Event Automation Rules pane, click the * button to open the Create New Time-Based Event Automation Rule dialog box.</p> <p>Go to the Actions page, click the * button, and select Forward Event.</p>
Relevant tasks	<p>To configure time-based event automation rules, see:</p> <ul style="list-style-type: none"> ▶ "How to Create a Time-Based Event Automation Rule" on page 478. ▶ "How to Specify Actions for Time-Based Event Automation Rules" on page 480.
See also	<p>For more information about time-based event automation, see "Introduction to Time-Based Event Automation" on page 476.</p>

The Forward Event Dialog Box displays the UI elements listed in the following table.

UI Element (A-Z)	Description
Forwarding Type	<p>Specifies how an event forwarded to a certain server is handled. The options include:</p> <ul style="list-style-type: none"> ▶ Notify — Target server receives original events but no further updates ▶ Notify and Update — Target server receives original events and all further updates ▶ Synchronize — Target server receives original events and all further updates and sends back all updates ▶ Synchronize and Transfer Control — Target server receives original events and updates and sends back all updates. Ownership of the event is transferred to the other server. <p>This option is available only if Supports Synchronize and Transfer Control is enabled on the selected connected server.</p> <p>Note: For a TBEA rule that was created with the understanding that the associated connected server has the Synchronize and Transfer Control forwarding type enabled, and the connected server configuration is later changed to disable Synchronize and Transfer Control, the Synchronize forwarding type is used.</p> <p>TBEA rules are not automatically modified when connected server configurations are changed.</p>
Target Server	Name of connected server name to which events are forwarded.

Assignment Dialog Box

To access	<p>Select Admin > Operations Management > Tune Operations Management > Time-Based Event Automation</p> <p>In the Time-Based Event Automation Rules pane, click the * button to open the Create New Time-Based Event Automation Rule dialog box.</p> <p>Go to the Actions page, click the * button, and select Assign Event.</p>
Relevant tasks	<p>To configure time-based event automation rules, see:</p> <ul style="list-style-type: none"> ▶ "How to Create a Time-Based Event Automation Rule" on page 478. ▶ "How to Specify Actions for Time-Based Event Automation Rules" on page 480.
See also	<p>For more information about time-based event automation, see "Introduction to Time-Based Event Automation" on page 476.</p>

The Assignment Dialog Box displays the UI elements listed in the following table.

UI Element (A-Z)	Description
Select Group	<p>Specifies the User Group to which events are assigned.</p> <p>Note: Leaving Group empty clears that assignment. <unknown> is displayed if the Group is not available. If <unknown> is displayed, select an available Group.</p>
Select User	<p>Specifies the User to which events are assigned.</p> <p>Note: Leaving User empty clears that assignment. <unknown> is displayed if the User is not available. If <unknown> is displayed, select an available User.</p>

Run Script Dialog Box

To access	<p>Select Admin > Operations Management > Tune Operations Management > Time-Based Event Automation</p> <p>In the Time-Based Event Automation Rules pane, click the * button to open the Create New Time-Based Event Automation Rule dialog box.</p> <p>Go to the Actions page, click the * button, and select Run Script.</p>
Relevant tasks	<p>To configure time-based event automation rules, see:</p> <ul style="list-style-type: none"> ▶ "How to Create a Time-Based Event Automation Rule" on page 478. ▶ "How to Specify Actions for Time-Based Event Automation Rules" on page 480.
See also	<p>For more information about time-based event automation, see "Introduction to Time-Based Event Automation" on page 476.</p>

The Run Script Dialog Box displays the UI elements listed in the following table.

UI Element (A-Z)	Description
Manage Script	<p>Opens the Event Automation Configuration interface in a new window.</p> <p>For details managing event automation scripts, see "Event Automation Script Configuration" on page 519.</p>
Script	<p>Specifies the Event Processing Script that is run.</p> <p>Note: Time-based event automation scripts can only be deleted if they are not referenced in any time-based event automation rule.</p>

Run Books Dialog Box

To access	<p>Select Admin > Operations Management > Tune Operations Management > Time-Based Event Automation</p> <p>In the Time-Based Event Automation Rules pane, click the  button to open the Create New Time-Based Event Automation Rule dialog box.</p> <p>Go to the Actions page, click the  button, and select Launch Run Books.</p>
Relevant tasks	<p>To configure time-based event automation rules, see:</p> <ul style="list-style-type: none"> ▶ "How to Create a Time-Based Event Automation Rule" on page 478. ▶ "How to Specify Actions for Time-Based Event Automation Rules" on page 480.
See also	<p>For more information about time-based event automation, see "Introduction to Time-Based Event Automation" on page 476.</p>

The Run Books Dialog Box displays the UI elements listed in the following table.

UI Element (A-Z)	Description
	New Item: Opens the Select Run Books dialog box for configuring Run Book automation mapping.
	Delete Item: Delete the selected Run Book automation mapping.
CI Type	CI type associated with the corresponding Run Book in the Run Book automation rule.
Run Book Name	Run Book mapped to the corresponding CI Type.

Select Run Books Dialog Box

To access	<p>Select Admin > Operations Management > Tune Operations Management > Time-Based Event Automation</p> <p>In the Time-Based Event Automation Rules pane, click the  button to open the Create New Time-Based Event Automation Rule dialog box.</p> <p>Go to the Actions page, click the  button, select Launch Run Books, and click the  button from the Run Books page.</p>
Relevant tasks	<p>To configure time-based event automation rules, see:</p> <ul style="list-style-type: none"> ▶ "How to Create a Time-Based Event Automation Rule" on page 478. ▶ "How to Specify Actions for Time-Based Event Automation Rules" on page 480.
See also	<p>For more information about time-based event automation, see "Introduction to Time-Based Event Automation" on page 476.</p>

The Select Run Books dialog box displays the UI elements listed in the following table.

UI Element (A-Z)	Description
	Reloads the Run Books list.
Select a CI Type	CI type to be mapped to a Run Book in the Run Book automation rule.
Select Run Books	Run Book to be mapped to the corresponding CI Type.

Troubleshooting and Limitations

This section provides help in troubleshooting problems relating to time-based event automation.

- ▶ **Synchronize Forwarding Type is used if Server does not Support Transfer Control** on page 502

Synchronize Forwarding Type is used if Server does not Support Transfer Control

For a TBEA rule that was created with the understanding that the associated connected server has the Synchronize and Transfer Control forwarding type enabled, and the connected server configuration is later changed to disable Synchronize and Transfer Control, the Synchronize forwarding type is used.

Note: TBEA rules are not automatically modified when connected server configurations are changed.

18

Launching Run Books Automatically

This chapter includes:

Concepts

- ▶ Introduction to Run Book Automation on page 504

Tasks

- ▶ How to Create a Run Book Automation Rule on page 505
- ▶ How to Edit a Run Book Automation Rule on page 507
- ▶ How to Duplicate a Run Book Automation Rule on page 508
- ▶ How to Delete a Run Book Automation Rule on page 509

Reference

- ▶ Run Book Rules User Interface on page 510

Troubleshooting and Limitations on page 517

Concepts

Introduction to Run Book Automation

In addition to manually launching Run Books in HP Operations Orchestration in the context of an event (from the Action Panel, or directly from the context menu of an event), it is also possible to configure rules to automatically run a Run Book or a series of Run Books in the context of an event.

Run Books are related to CI types in BSM. As events are received or changed, those matching a filter used in a Run Book automation rule, trigger the associated Run Books on the CI related to the event. The Run Book Automation manager is used to configure Run Book automation rules that include an event filter, a CI type and a list of Run Books.

Note: Permissions to use the Run Book Automation manager must be configured for appropriate users under:

Admin > Platform > Users and Permissions > User Management

Tasks

How to Create a Run Book Automation Rule

This task shows you how to create a Run Book automation rule.

Note: To use Operations Management Administration areas, you must be granted permission to work with these or a subset of these. For details, see "How to Set Operations Management User or Group Permissions" on page 637.

To create a Run Book automation rule:

- 1 Open the Automatic Run Book Rules manager from Operations Management Administration:
Admin > Operations Management > Tune Operations Management > Automatic Run Book Rules
- 2 In the Run Book Rules pane, click the  button to open the Create New Run Book Automation Rule dialog box.
- 3 Enter a Display Name and description for the rule being specified.
- 4 Select an event filter for the automation rule from the **Events Filter** list. The filter determines which events to consider in the rule.

If no appropriate filter is already configured, click the Browse (...) button, which opens the Select an Event Filter dialog box. Create a filter or edit an existing one. For information about filters, see "How to Define Simple Event Filters" on page 221.
- 5 Select **Activate rule after creation**, if you want to make the rule active immediately.
- 6 Click **Next** to open the Run Books page.
- 7 In the Run Books pane, click the  button to open the Select Run Books dialog box.

8 Select a CI type from the Select a CI Type pane.

9 Select a Run Book to be mapped to the selected CI type and click **OK**.

The new Run Book automation mapping is added to the list of selected Run Books.

10 Repeat steps 7 and 8 for all other Run Books that you want to configure.

11 Select **Next** to display the Summary page.

12 Select **Finish**.

How to Edit a Run Book Automation Rule

This task shows you how to edit a Run Book automation rule.

To edit a Run Book automation rule:

- 1** Open the Automatic Run Book Rules manager from Operations Management Administration:
Admin > Operations Management > Tune Operations Management > Automatic Run Book Rules
- 2** Select the Run Book automation rule that you want to edit.
- 3** In the Run Book Rules pane, click the  button to open the Edit Time Based Automation dialog box.

Alternatively, double-click a section in the Details pane to open the appropriate tab in the Edit Time Based Automation dialog box.
- 4** Make the required changes to the selected Run Book automation rule.
- 5** Select **OK**.

How to Duplicate a Run Book Automation Rule

This task shows you how to duplicate a Run Book automation rule.

To duplicate a Run Book automation rule:

- 1** Open the Automatic Run Book Rules manager from Operations Management Administration:
Admin > Operations Management > Tune Operations Management > Automatic Run Book Rules
- 2** Select the Run Book automation rule that you want to duplicate.
- 3** In the Run Book Rules pane, click the  button.
A copy of the selected Run Book automation rule is created and is available for selection from the Run Book Rules pane.
- 4** Select the copy of the Run Book automation rule and click the  button to open the Edit Time Based Automation dialog box.
- 5** Make the required changes to the selected Run Book automation rule.
- 6** Select **OK**.

How to Delete a Run Book Automation Rule

This task shows you how to delete a Run Book automation rule.

To delete a Run Book automation rule:

1 Open the Automatic Run Book Rules manager from Operations Management Administration:

Admin > Operations Management > Tune Operations Management > Automatic Run Book Rules

2 Select the Run Book automation rule that you want to delete.

3 In the Run Book Rules pane, click the  button.

4 Confirm the deletion by clicking **Yes**.

The selected Run Book automation rule is deleted from the list of Run Book Rules.

Reference

Run Book Rules User Interface

The Automatic Run Book Rules manager enables you to create and manage rules to automatically launch Run Books on the related CI of events. You can specify any number of Run Books.

This section includes:

- ▶ Run Book Rules Pane on page 510
- ▶ Run Book Automation Rules Details User Interface on page 512
- ▶ General Tab — Create New and Edit Automatic Run Book Launch Rule Dialog Box on page 513
- ▶ Run Books Tab — Create New and Edit Run Book Automation Rule Dialog Box on page 514
- ▶ Select Run Books Dialog Box on page 515

Run Book Rules Pane

The Run Book Rules pane lists the specified rules and enables you to create and manage Run Book Rules.

To access	Select Admin > Operations Management > Tune Operations Management > Automatic Run Book Rules
Relevant tasks	To configure automatic Run Book rules, see "How to Create a Run Book Automation Rule" on page 505.
See also	For more information about Run Book rules, see "Introduction to Run Book Automation" on page 504.

The Run Book Rules pane displays the UI elements listed in the following table.

UI Element (A-Z)	Description
	Reloads the Run Book Rule list.
	<p>New Item: Opens the Create New Run Book Automation Rule dialog box to create a new rule.</p> <p>For more information about creating Run Book automation rules, see "How to Create a Run Book Automation Rule" on page 505.</p>
	<p>Duplicate Item: Creates a duplicate of the selected Run Book automation rule.</p>
	<p>Edit Item: Opens the Edit Run Book Automation Rule dialog box to edit an existing rule.</p> <p>Alternatively, double-click a section in the Details pane to open the appropriate tab in the Edit Time Based Automation dialog box.</p> <p>For more information about creating Run Book automation rules, see "How to Create a Run Book Automation Rule" on page 505.</p>
	<p>Delete Item: Deletes the selected Run Book Automation Rule.</p>
	<p>Activate/Deactivate Item: Toggles between enabling and disabling the selected rules.</p> <p>Disabled rules appear dimmed in the list of rules.</p>
	<p>Manage Event Filters: Opens the Manage Named Filters dialog box for adding, editing, and managing filters.</p> <p>For information about defining filters, see "Filtering Events" on page 211.</p>

Run Book Automation Rules Details User Interface

The Run Book Automation Rules Details pane displays a summary of the selected Run Book Automation Rule.

To access	Select Admin > Operations Management > Tune Operations Management > Automatic Run Book Rules
Relevant tasks	To configure automatic Run Book rules, see "How to Create a Run Book Automation Rule" on page 505.
See also	For more information about Run Book rules, see "Introduction to Run Book Automation" on page 504.

The Run Book Automation Rules Details page displays the UI elements listed in the following table.

UI Element (A-Z)	Description
Active	Indicates whether the associated Run Book Automation Rule is active.
CI Type	CI type associated with a Run Book in the Run Book automation rule.
Description	Description of the Run Book Automation Rule.
Display Name	Name of the Run Book Automation Rule.
Event Filter	Filter specified to select events to be processed by this Run Book Automation Rule.
Run Book Name	Run Book specified in the Run Book automation rule and associated with the corresponding CI type. For more information about creating Run Book automation rules, see "How to Create a Run Book Automation Rule" on page 505.

General Tab — Create New and Edit Automatic Run Book Launch Rule Dialog Box

To access	Select Admin > Operations Management > Tune Operations Management > Automatic Run Book Rules
Relevant tasks	To configure automatic Run Book rules, see "How to Create a Run Book Automation Rule" on page 505.
See also	For more information about Run Book rules, see "Introduction to Run Book Automation" on page 504.

The General Tab displays the UI elements listed in the following table.

UI Element (A-Z)	Description
Activate rule after creation	Indicates whether the associated Run Book automation rule is enabled.
Description	Description of the Run Book automation rule.
Display Name	Name of the Run Book automation rule.
Event Filter	Filter specified to select events to be processed by this Run Book automation rule.

Run Books Tab — Create New and Edit Run Book Automation Rule Dialog Box

To access	Select Admin > Operations Management > Tune Operations Management > Automatic Run Book Rules
Relevant tasks	To configure automatic Run Book rules, see "How to Create a Run Book Automation Rule" on page 505.
See also	For more information about Run Book rules, see "Introduction to Run Book Automation" on page 504.

The Advanced Tab displays the UI elements listed in the following table.

UI Element (A-Z)	Description
	New Item: Opens the Select Run Books dialog box for configuring Run Book automation mapping. For more information about creating Run Book automation rules, see "How to Create a Run Book Automation Rule" on page 505. For more information about creating time-based event automation rules, see "How to Create a Time-Based Event Automation Rule" on page 478.
	Delete Item: Delete the selected Run Book automation mapping.
CI Type	CI type associated with the corresponding Run Book in the Run Book automation rule.
Run Book Name	Run Book mapped to the corresponding CI Type.

Select Run Books Dialog Box

To access	Select Admin > Operations Management > Tune Operations Management > Automatic Run Book Rules
Relevant tasks	To configure automatic Run Book rules, see "How to Create a Run Book Automation Rule" on page 505.
See also	For more information about Run Book rules, see "Introduction to Run Book Automation" on page 504.

The Select Run Books dialog box displays the UI elements listed in the following table.

UI Element (A-Z)	Description
	Reloads the Run Books list.
	Expand Selection: Expands the list to display items belonging to the selected group.
	Collapse Others: Collapses all open branches except for the selected branch.
	Entering a string with more than 2 characters in the search field locates the first instance of the string in the CI Tree. Clicking the search button finds the next occurrence of the string for which you are searching. For more information about searching, see "How to Search and Filter CI Types" on page 275.
	Collapses the Filter pane.
	Expands the Filter pane for use.

UI Element (A-Z)	Description
CI Types	<p>CI type to be mapped to a Run Book in the Run Book automation rule.</p> <p>Hierarchical list representing the configuration item types in your IT environment. To display the required CI Type, browse to and select the item of interest. The Run Books associated with the CI Type are displayed.</p> <p>If the CI Types list is filtered, (filtered) is displayed next to the CI Types title.</p> <p>When CI types and their children have no Run Books assigned, their entries appear dimmed.</p> <p>When CI types have children with assigned Run Books, their entries appear in normal text.</p> <p>When Run Books are directly assigned to a CI type, their entries appear bold.</p>
Filter	<p>Used to search for CI types with assigned Run Books.</p> <p>For more information about searching and filtering, see "How to Search and Filter CI Types" on page 275.</p>
Select Run Books	<p>Run Book to be mapped to the corresponding CI Type.</p>

Troubleshooting and Limitations

This section provides help for those people who are troubleshooting problems relating to Operations Management Automatic Run Book Rules.

- "Importing Runbook Rules" on page 517
- "Automatic Runbook Rules Manager" on page 518

Importing Runbook Rules

When you import a Run Book rule with the Content Manager, a check is made to assess whether it is possible to execute the Run Book. If the check fails, the Run Book rule is disabled and a warning is displayed.

If a warning is displayed during the import of a content pack that contains Automatic Run Book rules, check the following:

- The connection to an Operations Orchestration system set up correctly. For details, see "HP Operations Orchestration Integration".
- The expected Run Book Mappings are available in the BSM Operations Orchestration integration interface (**Admin > Integrations > Operations Orchestration**).
- After ensuring that all required configurations are correct, activate the rule in the Automatic Run Book Rules manager (**Admin > Operations Management > Tune Operations Management > Automatic Run Book Rules**)

Automatic Runbook Rules Manager

When you enter the Automatic Runbook Rules Manager (**Admin > Operations Management > Tune Operations Management > Automatic Run Book Rules**) and select a defined Runbook Rule, it can happen that instead of the name, the following is displayed:

<Run Book Mapping unknown or incomplete>

In this case check the following:

- ▶ The connection to an Operations Orchestration system set up correctly. For details, see "HP Operations Orchestration Integration".
- ▶ The expected Run Book Mappings are available in the BSM Operations Orchestration integration interface (**Admin > Integrations > Operations Orchestration**).

19

Event Automation Script Configuration

This chapter includes:

Concepts

- ▶ Introduction to Scripts for Event Automation on page 520

Tasks

- ▶ How to Create an Event Automation Script on page 521
- ▶ How to Edit an Event Automation Script on page 523
- ▶ How to Duplicate an Event Automation Script on page 524
- ▶ How to Delete an Event Automation Script on page 525

Reference

- ▶ Event Automation Scripts User Interface on page 526

Concepts

Introduction to Scripts for Event Automation

The Event Automation Configuration dialog box enables you to set up scripts that can be used in Time-based Event Automation. For example, you can add a text string to certain events to make them easier to identify in the Event Browser.

Event automation scripts must be specified in Groovy scripts. For information about writing scripts, see the *Operations Manager i Extensibility Guide*.

Event automation scripts are listed in alphabetical order. The selected event automation script is launched in the context of the CI associated with the selected event. A history entry is added for the automation rule launched within Time-based Event Automation.

Permissions to launch event automation script can be set for each user. For information on configuring access to event automation scripts, see "How to Set Operations Management User or Group Permissions" on page 637.

Event automation scripts can be defined in content packs, which are then used to distribute the event automation scripts to additional Operations Management installations.

Tasks

How to Create an Event Automation Script

Note: To use Operations Management Administration areas, you must be granted permission to work with these or a subset of these. For details, see "How to Set Operations Management User or Group Permissions" on page 637.

This task shows you how to create an event automation script.

To create an event automation script:

- 1** Open the Event Automation Configuration dialog box from Operations Management Administration:
Admin > Operations Management > Tune Operations Management > Time-Based Automation Rules
- 2** In the Time-Based Automation Rules pane, click the  button to open the Create New Time-Based Automation Rule dialog box.
- 3** In the General page, enter a display name, and (optional) a description of the script being specified.
- 4** Click **Next** to open the Actions page.
- 5** In the Actions pane, click the  button and select **Run Script** to open the Run Script dialog box.
- 6** Select **Manage Scripts** to open the Event Automation Configuration dialog box.
- 7** In the Scripts pane, click the  button to open the Create New Script dialog box.
- 8** In the General tab, enter a display name, and (optional) a description of the script being specified.

- 9 In the Script field, add the script text.
- 10 Click **Next** to open the Advanced tab.
- 11 In the Classpath pane, add and order any JAR files required by the script.
The ordering of the JAR files is used by the classpath during execution.
For example:
Jar file A contains a class x.y.z.
Jar file B contains a class x.y.z.
The ordering of the JAR files A and B dictates which class of which JAR file is loaded.
- 12 Specify a timeout value for the script. If the script execution has not completed within the specified time, the result of the script is ignored.
- 13 Select Read-Only for scripts that must not alter the event.

Note: If a script that is labelled as read-only attempts to alter the event, the script is not executed and an error message is written to the ctxm logfile.

- 14 Select **Finish**.

How to Edit an Event Automation Script

This task shows you how to edit an existing event automation script.

To edit an existing event automation script:

- 1** Open the Event Automation Configuration dialog box from Operations Management Administration:
Admin > Operations Management > Tune Operations Management > Time-Based Automation Rules
- 2** In the Time-Based Automation Rules pane, click the  button to open the Create New Time-Based Automation Rule dialog box.
- 3** In the General page, enter a display name, and (optional) a description of the script being specified.
- 4** Click **Next** to open the Actions page.
- 5** In the Actions pane, click the  button and select **Run Script** to open the Run Script dialog box.
- 6** Select **Manage Scripts** to open the Event Automation Configuration dialog box.
- 7** In the Scripts pane, select the event automation script that you want to edit and click the  button.
The Edit Script dialog box opens.
- 8** Make the required changes to the selected event automation script.
- 9** Select **OK**.

How to Duplicate an Event Automation Script

This task shows you how to duplicate an existing event automation script to use as the basis for a new event automation script.

To duplicate an existing event automation script:

- 1 Open the Event Automation Configuration dialog box from Operations Management Administration:
Admin > Operations Management > Tune Operations Management > Time-Based Automation Rules
- 2 In the Time-Based Automation Rules pane, click the  button to open the Create New Time-Based Automation Rule dialog box.
- 3 In the General page, enter a display name, and (optional) a description of the script being specified.
- 4 Click **Next** to open the Actions page.
- 5 In the Actions pane, click the  button and select **Run Script** to open the Run Script dialog box.
- 6 Select **Manage Scripts** to open the Event Automation Configuration dialog box.
- 7 Select the event automation script that you want to duplicate.
- 8 In the Scripts pane, click the  button.
The selected event automation script is duplicated and added to the list of event automation scripts.
- 9 Edit the duplicate event automation script to suit the new event automation script.
For details about editing, see "How to Edit an Event Automation Script" on page 523.

How to Delete an Event Automation Script

This task shows you how to delete an existing event automation script.

To delete an existing event automation script:

- 1** Open the Event Automation Configuration dialog box from Operations Management Administration:
Admin > Operations Management > Tune Operations Management > Time-Based Automation Rules
- 2** In the Time-Based Automation Rules pane, click the  button to open the Create New Time-Based Automation Rule dialog box.
- 3** In the General page, enter a display name, and (optional) a description of the script being specified.
- 4** Click **Next** to open the Actions page.
- 5** In the Actions pane, click the  button and select **Run Script** to open the Run Script dialog box.
- 6** Select **Manage Scripts** to open the Event Automation Configuration dialog box.
- 7** In the Scripts pane, select the event automation script that you want to delete.
- 8** In the Scripts pane, click the  button.

The selected event automation script is deleted from the list of event automation scripts.

Note: Time-based event automation scripts can only be deleted if they are not referenced in any time-based event automation rule.

Reference

Event Automation Scripts User Interface

The Event Automation Scripts user interface enables you to create and manage event automation scripts to modify events.

This section includes:

- ▶ Event Automation Configuration Dialog Box on page 526
- ▶ Event Automation Scripts Details User Interface on page 528
- ▶ General Tab — Add New and Edit Script Dialog Box on page 529
- ▶ Advanced Tab — Add New and Edit Script Dialog Box on page 530

Event Automation Configuration Dialog Box

To access	Select Admin > Operations Management > Tune Operations Management > Time-Based Automation Rules
Relevant tasks	For more information about configuring the Event Automation Scripts, see "How to Create an Event Automation Script" on page 521.
See also	For more information about the Event Automation, see: <ul style="list-style-type: none"> ▶ "Event Automation Scripts Details User Interface" on page 528. ▶ "General Tab — Add New and Edit Script Dialog Box" on page 529. ▶ "Advanced Tab — Add New and Edit Script Dialog Box" on page 530.

The Scripts pane displays the UI elements listed in the following table.

UI Element (A-Z)	Description
	Refresh: Reloads the scripts list.
	New Item: Opens the Add New Script dialog box to create an event automation script. For more information about creating event automation scripts, see "How to Create an Event Automation Script" on page 521.
	Duplicate Item: Creates a copy of the selected event automation script. For more information about duplicating event automation scripts, see "How to Duplicate an Event Automation Script" on page 524.
	Edit Item: Opens the Edit Script dialog box to edit an existing event automation script. For more information about editing event automation scripts, see "How to Edit an Event Automation Script" on page 523.
	Delete Item: Deletes the selected event automation script. For more information about deleting event automation scripts, see "How to Delete an Event Automation Script" on page 525.

Event Automation Scripts Details User Interface

The Event Automation Configuration dialog box enables you to create and manage event automation scripts to modify events and take actions as a result of executing Time-based Event Automation rules.

To access	Select Admin > Operations Management > Tune Operations Management > Time-Based Automation Rules
Relevant tasks	For more information about configuring the Event Automation Scripts, see "How to Create an Event Automation Script" on page 521.
See also	For more information about the Event Automation, see: <ul style="list-style-type: none"> ▶ "Event Automation Scripts User Interface" on page 526. ▶ "General Tab — Add New and Edit Script Dialog Box" on page 529. ▶ "Advanced Tab — Add New and Edit Script Dialog Box" on page 530.

The Details pane displays the UI elements listed in the following table.

UI Element (A-Z)	Description
Classpath	List of JAR files required by the script.
Description	Brief description of the event automation script.
Name	Display name of the selected event automation script.
Read-Only	Select Read-Only for a script that must not alter the event. If a script that is labelled as read-only attempts to alter the eventuate script is not executed and an error message is written to the ctxm logfile.

UI Element (A-Z)	Description
Script	Groovy script used to specify the event automation script.
Timeout	Timeout value for the script. If the script execution has not completed within the specified time, the result of the script is ignored. The default timeout value is 0 and the maximum timeout value is 10000 ms.

General Tab — Add New and Edit Script Dialog Box

To access	Select Admin > Operations Management > Tune Operations Management > Time-Based Automation Rules
Relevant tasks	For more information about configuring the Event Automation Scripts, see "How to Create an Event Automation Script" on page 521.
See also	For more information about the Event Automation, see: <ul style="list-style-type: none"> ▶ "Event Automation Scripts User Interface" on page 526. ▶ "Event Automation Scripts Details User Interface" on page 528. ▶ "Advanced Tab — Add New and Edit Script Dialog Box" on page 530.

The General Tab displays the UI elements listed in the following table.

UI Element (A-Z)	Description
Description	Brief description of the event automation script.
Name	Name of the event automation script.
Script	Text of the event automation script.

Advanced Tab — Add New and Edit Script Dialog Box

To access	Select Admin > Operations Management > Tune Operations Management > Time-Based Automation Rules
Relevant tasks	For more information about configuring the Event Automation Scripts, see "How to Create an Event Automation Script" on page 521.
See also	For more information about the Event Automation, see: <ul style="list-style-type: none"> ▶ "Event Automation Scripts User Interface" on page 526. ▶ "Event Automation Scripts Details User Interface" on page 528. ▶ "General Tab — Add New and Edit Script Dialog Box" on page 529.

The Advanced Tab displays the UI elements listed in the following table.

UI Element (A-Z)	Description
	Opens the Select Files browser dialog box to locate and add JAR files to the script configuration.
	Deletes the selected JAR file from the classpath.
	Moves the selected JAR file later in the order of execution.
	Moves the selected JAR file early in the order of execution.
Class Path	Specifies the names and locations of user-defined supporting libraries (JAR files).

UI Element (A-Z)	Description
Read-Only	<p>Select Read-Only for a script that must not alter the event.</p> <p>If a script that is labelled as read-only attempts to alter the event, the script is not executed and an error message is written to the ctxm logfile.</p>
Timeout	<p>Specifies the timeout value for the event automation script. If the script execution has not completed within the specified time, the script is ignored.</p> <p>The default timeout value is 0 and the maximum timeout value is 10000 ms.</p>

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Notifications

This chapter includes:

Concepts

- ▶ Introduction to Notifications on page 534

Tasks

- ▶ How to Create a Notification Rule on page 535
- ▶ How to Create and Edit Notification Templates on page 537
- ▶ How to Edit a Notification Rule on page 539
- ▶ How to Duplicate a Notification Rule on page 540
- ▶ How to Delete a Notification Rule on page 541

Reference

- ▶ Notifications User Interface on page 542

Concepts

Introduction to Notifications

You use the Notifications manager to set up rules to notify remotely-located people when events with predefined characteristics are received. Notifications can take the form of Emails, SMSs and Pager messages. Notifications must be sent to recipients set up in the Recipients manager.

Admin > Platform > Recipients > Recipients Management

Note: Policies configured in HP Operations Manager can set trouble ticket and notification flags. If these flags are set, the following custom attributes in Operations Management are generated:

ForwardToTroubleTicket (value= true)

NotifyUser (value= true)

Using appropriately configured event filters, events including these custom attributes with value of true can be automatically forwarded to an external manager using Forwarding Rules or notifications sent using Notification Rules.

Note: Forwarding rules can only be executed once per event.

Tasks

How to Create a Notification Rule

This task shows you how to create a notification.

Note: To use Operations Management Administration areas, you must be granted permission to work with these or a subset of these. For details, see "How to Set Operations Management User or Group Permissions" on page 637.

To create a notification:

- 1 Open the Notification manager from Operations Management Administration:
Admin > Operations Management > Tune Operations Management > Notifications
- 2 In the Notification Rules pane, click the  button to open the Create New Notification Rule dialog box.
- 3 In the General page, enter a display name, and (optional) a description of the notification being specified.
- 4 Select an event filter for the notifications from the **Events Filter** list. The filter determines which events to consider for forwarding.
If no appropriate filter is already configured, click the Browse (...) button, which opens the Select an Event Filter dialog box. Create a filter or edit an existing one. For information about filters, see "How to Define Simple Event Filters" on page 221.
- 5 Select **Activate Rule after creation**, if you want to make the notification active immediately.
- 6 Select **Next**. The Recipients page opens.

- 7 In the Recipients page, select the people to whom you want to send notifications. One recipient must be selected.

If no recipients are already configured, first click the  button to open the Recipients manager and specify the data for the required people before creating the Notification Rule.

- 8 Select **Next**. The Templates page opens.
- 9 In the Templates page, specify an email, SMS and a pager message templates that you want to use as the notification information. Alternatively, select **Default** to apply the default template for the associated message type.

Note: You can open a default template for modifying by selecting **Default**.

You can reset the default template values using **Reset to default template**. The default template is the last saved template.

If no appropriate templates are available, select **Manage Templates** and modify an existing one or a create new one. Specify a template for all types of notifications.

For information about creating notification templates, see "How to Create and Edit Notification Templates" on page 537.

- 10 Select **Finish**.

How to Create and Edit Notification Templates

This task shows you how to create a notification template.

To create or edit a notification template:

- 1 Open the Notification manager from Operations Management Administration:
Admin > Operations Management > Tune Operations Management > Notifications
- 2 In the Notification Rules pane, click the  button to open the Manage Templates dialog box.

Alternatively, if you are creating or editing a notification rule, in the Templates page or tab, select **Manage Templates**.

The Mange Templates dialog box opens.
- 3 Click the  button to open the Create New Notification Template dialog box or select an existing notification template and click the  button to open the Edit Notification Template dialog box.
- 4 For new templates, enter a Display Name.
- 5 Select the type of message template that you want to configure; **Email**, **SMS**, or **Pager**.
- 6 For an email message, modify the default subject or enter a new subject as required.
- 7 Modify the default message content or create new content for the selected Template.

You can specify event attributes in your message text to help make the notification more informative. For example, you can create a message that informs the recipient which system has a problem and what the severity is with the following string:

```
<<event.node.id>> is showing severity <<event.severity>>.
```

To specify event attributes:

- a** Click **Insert** to open the Available Event Attributes dialog box.
 - b** Select an event attribute to be used in your message and click **Insert**.
 - c** Repeat for further event attributes as required.
- 8** Select **OK**.

How to Edit a Notification Rule

This task shows you how to edit an existing notification.

To edit an existing notification:

- 1** Open the Notification manager from Operations Management Administration:
Admin > Operations Management > Tune Operations Management > Notifications
- 2** Select the notification that you want to edit.
- 3** In the Notification Rules pane, click the  button to open the Edit Notifications dialog box.

Alternatively, double-click a section in the Details pane to open the appropriate tab in the Edit Notifications dialog box.
- 4** Make the required changes to the selected notification.

Note: You can reset the template to the last saved values using **Reset to default template**.

- 5** Select **OK**.

How to Duplicate a Notification Rule

This task shows you how to duplicate an existing notification to use as the basis for a new notification.

To duplicate an existing notification:

- 1** Open the Notification manager from Operations Management Administration:

Admin > Operations Management > Tune Operations Management > Notifications

- 2** Select the notification that you want to duplicate.
- 3** In the Notification Rules pane, click the  button.

The selected notification is duplicated and displayed in the Create New Notification wizard.

- 4** Edit the duplicate notification to suit the new notification.

For details about editing, see "How to Edit a Notification Rule" on page 539.

How to Delete a Notification Rule

This task shows you how to delete an existing notification rule.

To delete an existing notification:

- 1** Open the Notification manager from Operations Management Administration:
Admin > Operations Management > Tune Operations Management > Notifications
- 2** Select the notification that you want to delete.
- 3** In the Notification Rules pane, click the  button.

The selected notification is deleted from the list of notifications.

Reference

Notifications User Interface

The Notifications manager enables you to create and manage forwarding notifications to individuals using email, SMS, and pager messaging.

This section includes:

- ▶ Notification Rules and Details Panes on page 542
- ▶ General Page and Tab on page 546
- ▶ Recipients Page and Tab on page 547
- ▶ Templates Page and Tab on page 548
- ▶ Manage Templates User Interface on page 550
- ▶ Available Event Attributes Dialog Box on page 552

Notification Rules and Details Panes

The Notification Rules and Details panes of the Notifications manager displays the configured notifications.

To access	Select Admin > Operations Management > Tune Operations Management > Notifications
Relevant tasks	For more information about configuring notifications, see: <ul style="list-style-type: none"> ▶ "How to Create a Notification Rule" on page 535. ▶ "How to Create and Edit Notification Templates" on page 537.
See also	For more information about notifications, see "Introduction to Notifications" on page 534.

The Notification Rules and Details panes display the UI elements in the listed in the following table.

UI Element (A-Z)	Description
	Reloads the Notification Rules list.
	New Item: Opens the Create New Notifications dialog box to create a notification. For more information about creating notifications, see "How to Create a Notification Rule" on page 535.
	Duplicate Item: Creates a copy of the selected notification. For more information about duplicating notifications, see "How to Duplicate a Notification Rule" on page 540.
	Edit Item: Opens the Edit Notifications dialog box to edit an existing notification. Alternatively, double-click a section in the Details pane to open the appropriate tab in the Edit Notifications dialog box. For more information about editing notifications, see "How to Edit a Notification Rule" on page 539.
	Delete Item: Deletes the selected notification. For more information about deleting notifications, see "How to Delete a Notification Rule" on page 541.
	Activate/Deactivate Item: Toggles between enabling and disabling the selected Notification rules. Disabled rules appear dimmed in the list of rules.
	Go to Recipient Management: Opens the Recipients manager from where you can specify an individual's contact data used to forward notifications.
	Manage Templates: Opens the Manage Templates dialog box, enabling you to create, edit and delete templates.

UI Element (A-Z)	Description
	<p>Manage Event Filters: Opens the Manage Event Filters dialog box, enabling you to select the event filter that you want to apply.</p> <p>From the Select an Event Filter dialog box, you can also open the Filter Configuration dialog box to create an event filter, edit or delete an existing event filter.</p> <p>For information about defining filters, see "Filtering Events" on page 211.</p>
Active	Indicates whether the associated notification is active.
Content	Body text of the email, SMS or Pager template
Description	Brief description of the notification.
Display Name	Display name of the selected notification or the display name of a template of the notification.
Event Filter	Filter used to select events to forward.
Recipients	<p>Specifies to which of the configured recipients an event is forwarded. The following information and status about the recipient is displayed:</p> <ul style="list-style-type: none"> ▶ Name — Name of the target recipient for the notification ▶ Email — Email address of the target recipient configured ▶ SMS — Mobile phone number of the target recipient configured ▶ Pager — Pager number of the target recipient configured
Reset to default template	Resets the template to the last saved values.

UI Element (A-Z)	Description
Subject	Text entry field to specify the title of the email notification template.
Templates	Text entry pages to specify the content and structure of the notification. The notification types are: <ul style="list-style-type: none">▶ Email▶ SMS▶ Pager

General Page and Tab

The General page or tab of the Notifications manager enables you to create, view, and edit notifications.

To access	Select Admin > Operations Management > Tune Operations Management > Notifications
Relevant tasks	For more information about configuring notifications, see: <ul style="list-style-type: none"> ▶ "How to Create a Notification Rule" on page 535. ▶ "How to Create and Edit Notification Templates" on page 537.
See also	For more information about notifications, see "Introduction to Notifications" on page 534.

The General page or tab displays the UI elements listed in the following table.

UI Element (A-Z)	Description
Activate Rule after creation	Select to make the notification active on rule creation (Create New Notification Rule only).
Description	Brief description of the notification.
Display Name	Display name of the notification.
Event Filter	Filter used to select events to forward.

Recipients Page and Tab

The Recipients page or tab of the Notifications manager enables you to select recipients for notifications.

To access	Select Admin > Operations Management > Tune Operations Management > Notifications
Relevant tasks	For more information about configuring notifications, see: <ul style="list-style-type: none"> ▶ "How to Create a Notification Rule" on page 535. ▶ "How to Create and Edit Notification Templates" on page 537.
See also	For more information about notifications, see "Introduction to Notifications" on page 534.

The Recipients page or tab displays the UI elements listed in the following table.

UI Element (A-Z)	Description
Select the Recipients	Specifies using check boxes to which of the configured recipients an event is forwarded. The following information and status about the recipient is displayed: <ul style="list-style-type: none"> ▶ Name — Name of the target recipient for the notification ▶ Email — Email address of the target recipient configured ▶ SMS — Mobile phone number of the target recipient configured ▶ Pager — Pager number of the target recipient configured

Templates Page and Tab

The Templates page or tab of the Notifications manager enables you to choose between the default template and any other defined templates. Templates are defined using the Template Manager. For detail about creating and editing templates, see "How to Create and Edit Notification Templates" on page 537.

To access	Select Admin > Operations Management > Tune Operations Management > Notifications
Relevant tasks	For more information about configuring notifications, see: <ul style="list-style-type: none"> ➤ "How to Create a Notification Rule" on page 535. ➤ "How to Create and Edit Notification Templates" on page 537.
See also	For more information about notifications, see "Introduction to Notifications" on page 534.

The Templates page or tab displays the UI elements in the listed in the following table.

UI Element (A-Z)	Description
<Template lists>	Lists of defined templates available for use with notification rules. The dedicated notification templates are required for the following notification types: <ul style="list-style-type: none"> ➤ Email ➤ SMS ➤ Pager

UI Element (A-Z)	Description
Default	Opens the associated default template for viewing and editing. Note: Default templates are not listed in the Template Manager. This is the only way to view and edit them.
Manage Templates	Opens the Manage Templates dialog box. For detail about creating and editing templates, see "How to Create and Edit Notification Templates" on page 537.

Manage Templates User Interface

The Manage Templates manager enables you to create and manage email, SMS, and pager message templates for use with notifications.

Note: Changes are visible to all users and rules using the default template.

To access	Select Admin > Operations Management > Tune Operations Management > Notifications
Relevant tasks	For more information about configuring notifications, see: <ul style="list-style-type: none"> ▶ "How to Create a Notification Rule" on page 535. ▶ "How to Create and Edit Notification Templates" on page 537.
See also	For more information about notifications, see "Introduction to Notifications" on page 534.

The Manage Templates page displays the UI elements listed in the following table.

UI Element (A-Z)	Description
	Reloads the templates list.
	New Item: Opens the Create New Notification Template dialog box to create a notification template. For more information about creating notifications, see "How to Create and Edit Notification Templates" on page 537.
	Duplicate Item: Creates a copy of the selected notification template.
	Edit Item: Opens the Edit Notification Template dialog box to edit an existing notification template.

UI Element (A-Z)	Description
	Delete Item: Deletes the selected notification template.
Body	Text entry pane to specify the content and structure of the email notification template.
Content	Text entry page to specify the content and structure of the notification template. Note: The email content is divided into Subject and Body .
Display Name	Display name of the selected notification template.
Insert	Opens the Available Event Attributes dialog box, from which you can select event attributes to include in your message text.
Reset to default template	Resets the template to the last saved values for the selected default type.
Subject	Text entry field to specify the title of the email notification template.
Type	Notification template types: <ul style="list-style-type: none"> ➤ Email ➤ SMS ➤ Pager

Available Event Attributes Dialog Box

The Available Event Attributes dialog box enables you to browse a list of available event attributes that are available for the configuration item type associated with the notification template you are creating or modifying. You can add these attributes, one at a time, as part of your message.

To access	Select Admin > Operations Management > Tune Operations Management > Notifications
Relevant tasks	For more information about configuring notifications, see: <ul style="list-style-type: none"> ▶ "How to Create a Notification Rule" on page 535. ▶ "How to Create and Edit Notification Templates" on page 537.
See also	For more information about notifications, see "Introduction to Notifications" on page 534.

The Available Event Attributes dialog box displays the UI elements listed in the following table.

UI Element (A-Z)	Description
Display Name	Name of the event attribute listed for the available configuration item type, for example: Originating Server, HI Value, or Custom Attribute.
Key	Event attribute key used to identify the event attribute. There are two types of attributes: <ul style="list-style-type: none"> ▶ Attribute The attribute that you specify is entered using the syntax: <code><<event.<attribute name>>></code> ▶ Custom Attribute The custom attribute that you specify is entered using the syntax: <code><<event.custom.<custom attribute name>>></code>

21

Downtime Configuration

This chapter includes:

Concepts

- Introduction to Downtime Configuration on page 554

Tasks

- How to Create a Downtime Category on page 557
- How to Edit a Downtime Category on page 559
- How to Delete a Downtime Category on page 560

Reference

- Downtime Behavior User Interface on page 561

Concepts

Introduction to Downtime Configuration

You can define and manage the downtime of CIs (configuration of CIs specifying periods of unavailability due to predetermined maintenance times) using the Downtime Management manager of the BSM platform.

You can access the Downtime Management manager as follows:

Admin > Platform > Downtime Management

A downtime configuration for a CI or a group of CIs primarily specifies the downtime period and the platform behavior (Action) for these CIs during this downtime period. If any other action is selected, for example **Suppress events**, the downtime behavior configured in Operations Management is applied.

For details about configuring downtime, see "Downtime Management" in *Platform Administration*.

For a CI with configured downtime periods, you must consider how to manage events that are related to this CI while it is unavailable. A category is assigned to the downtime configuration for a CI. In Operations Management, downtime strategies for event management are configured using Downtime Categories which define how events related to a CI are handle when received while that CI was in downtime. By default, events for which the related CI is in downtime are closed automatically.

For example, a category may specify that:

- ▶ Lifecycle of the event is set to resolved
- ▶ Steps in the event pipeline are enabled or disabled

In this example, for all CIs that are associated with this category, events received during downtime are set to **Resolved** and are visible in the Event Browser. All events that are related to these events are automatically set to closed and can be viewed from within the History Browser.

The platform provides a predefined list of categories and you can create additional categories using the Infrastructure Settings. Categories are selected and modified using the Categories list in the Downtime Management manager.

Downtime configurations that do not have a corresponding configuration in the Operations Management Downtime Manager use the category Default.

The following Operations Management Infrastructure Setting relate to downtime behavior:

- ▶ **Downtime History Range** — Time period within which past downtime configurations are considered. All downtime periods which have an end time that is before the beginning of the configured downtime history range period are ignored. Events created during such downtimes are treated as events not created during a downtime.
- ▶ **Future Downtime Range** — Time period within which future downtime configurations are considered. All downtime periods which have a start time that is after the end of the configured future downtime range period are ignored. Events created during such downtimes are treated as events not created during a downtime.
- ▶ **Refresh Time Interval** — Maximum time after changes in the maintenance windows configuration are taking effect.

Note: For events that are received from CIs specified in two or more overlapping downtime configurations with different categories, the category configurations are merged, which means:

- ▶ For setting lifecycle states, the most progressed state is selected. **No Change** overrides **Closed**, which in turn overrides **Resolved**.
 - ▶ For active pipeline steps, the more restrictive setting for each option is selected. For example, if **Close Related Events** is not selected for one of the categories, it overrides the setting in the other category.
 - ▶ The confirmation dialog is displayed before launching tools and actions only if it is configured for all categories in the overlapping downtime configurations.
-

Tasks

How to Create a Downtime Category

This task shows you how to create a downtime category.

Note: To use Operations Management Administration areas, you must be granted permission to work with these or a subset of these. For details, see "How to Set Operations Management User or Group Permissions" on page 637.

To create a downtime category:

- 1 Open the Downtime Behavior manager from Operations Management Administration:

Admin > Operations Management > Tune Operations Management > Downtime Behavior

- 2 In the Categories pane, click the * button to open the Add New Downtime Category dialog box.
- 3 Select a category from the Category Name list.

A category is associated with each downtime configuration. When an event is received from a CI while in downtime, depending on the category of the CI downtime configuration, the appropriate downtime category is applied. If no suitable downtime category is available, the Default downtime category is applied.

- 4 In the Set Lifecycle State section, select an action from the following choices:
 - **No change** — retains the original state of the event
 - **Closed** — changes the state to Closed for events that are related to CIs which are in downtime of the specified category (default)

- ▶ **Resolved** — changes the state to Resolved for events that are related to CIs which are in downtime of the specified category
- 5** In the Active Pipeline Steps section, select the pipeline step that you want active for this downtime category.
- 6** Select **Show Confirmation Dialog**, if you want a confirmation dialog box to be displayed before launching tools and actions.
- 7** Select **OK**.

How to Edit a Downtime Category

This task shows you how to edit an existing downtime category.

To edit an existing downtime category:

1 Open the Downtime Behavior manager from Operations Management Administration:

Admin > Operations Management > Tune Operations Management > Downtime Behavior

2 Select the downtime category that you want to edit.

3 In the Categories pane, click the  button to open the Edit Downtime Categories dialog box.

Alternatively, double-click a section in the Details pane to open the Edit Downtime Categories dialog box.

4 Make the required changes to the selected downtime category.

5 Select **OK**.

How to Delete a Downtime Category

This task shows you how to delete an existing downtime category.

To delete an existing downtime category:

- 1** Open the Downtime Behavior manager from Operations Management Administration:

Admin > Operations Management > Tune Operations Management > Downtime Behavior

- 2** Select the downtime category that you want to delete.
- 3** In the Categories pane, click the  button.
- 4** Confirm the deletion by clicking **Yes**.

The selected downtime category is deleted from the list of downtime categories.

Note: The Default category cannot be deleted.

Reference

Downtime Behavior User Interface

The Downtime Behavior manager enables you to configure how Operations Management reacts on events that are related to CIs in downtime.

This section includes:

- Categories Pane on page 561
- Downtime Category Details Pane on page 563

Categories Pane

The Downtime Behavior manager enables you to configure how Operations Management reacts on events that are related to CIs in downtime.

To access	Select Admin > Operations Management > Tune Operations Management > Downtime Behavior
Relevant tasks	For more information about configuring the downtime behavior, see "How to Create a Downtime Category" on page 557.
See also	For more information about the downtime behavior, see "Introduction to Downtime Configuration" on page 554.

The Categories pane displays the UI elements listed in the following table.

UI Element (A-Z)	Description
	<p>Refresh: Reloads the Categories list.</p>
	<p>New Item: Opens the Add New Downtime Category dialog box to create a downtime category. For more information about creating downtime categories, see "How to Create a Downtime Category" on page 557.</p>
	<p>Edit Item: Opens the Edit Downtime Category dialog box to edit an existing downtime category.</p> <p>Alternatively, double-click a section in the Details pane to open the Edit Downtime Categories dialog box.</p> <p>For more information about editing downtime categories, see "How to Edit a Downtime Category" on page 559.</p>
	<p>Delete Item: Deletes the selected downtime category. For more information about deleting downtime categories, see "How to Delete a Downtime Category" on page 560.</p>

 **Downtime Category Details Pane**

The Downtime Details pane displays the configuration details of the downtime configuration selected in the Categories pane.

To access	Select Admin > Operations Management > Tune Operations Management > Downtime Behavior
Relevant tasks	For more information about configuring the downtime behavior, see "How to Create a Downtime Category" on page 557.
See also	For more information about the downtime behavior, see "Introduction to Downtime Configuration" on page 554.

The Details page displays the UI elements listed in the following table.

UI Element (A-Z)	Description
Active	Indicates whether the associated event pipeline step active. Inactive is displayed for step that are not active.
Active Pipeline Steps	<p>Lists the possible event pipeline processing steps. All steps that are set to active are executed on the events when received.</p> <p>The processing steps that can be enabled are:</p> <ul style="list-style-type: none"> ▶ EPI after CI/ETI Resolution — Apply event processing after the CI and ETI resolution steps. ▶ Close Related Events — Close all events related to the event received during downtime of CI. ▶ Duplicate Event Suppression — Apply the Duplicate Event Suppression settings to events received during downtime of CI. ▶ Automatic User Group Assignment of Events — Apply the automatic assignment of user or group to events received during downtime of the CI. ▶ EPI before Storing Events — Apply event processing at the end of the event processing stage. ▶ Topology-Based Event Correlation — Apply Topology Based Correlation Rules to events received during downtime of the CI. ▶ Automatic Run Books — Apply Run Book Automation to events received during downtime of CI.
Set Lifecycle State	<p>Sets the lifecycle state for events received during a downtime period. The possible options are:</p> <ul style="list-style-type: none"> ▶ No change — retains the original state of the event ▶ Closed — changes the state to Closed for all events received during a downtime period. ▶ Resolved — changes the state to Resolved for all events received during a downtime period
Show Confirmation Dialog	Select to display a confirmation dialog box before launching tools and actions.

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Custom Actions

This chapter includes:

Concepts

- ▶ Introduction to Custom Actions on page 566

Tasks

- ▶ How to Create a Custom Action Script on page 567
- ▶ How to Edit a Custom Action Script on page 569
- ▶ How to Duplicate a Custom Action Script on page 570
- ▶ How to Delete a Custom Action Script on page 571

Reference

- ▶ Custom Actions User Interface on page 572

Concepts

Introduction to Custom Actions

The Custom Actions manager enables you to set up scripts to run custom actions on events. For example, you can add a text string to certain events to make them easier to identify in the Event Browser.

Custom actions must be specified in Groovy scripts. For information about writing custom actions, see the *Operations Manager i Extensibility Guide*.

After a custom action is configured in Operations Management, it can be triggered from an event from the context menu:

Right-click event > Launch > Custom Actions > *custom action Scripts list*

Custom actions are listed in alphabetical order. The selected custom action is launched in the context of the CI associated with the selected event. If a custom action is run from a non-assigned event, that event is automatically assigned to the user that executed the custom action, and a corresponding entry is made in the Event History.

Permissions to launch custom actions can be set for each user, for information on configuring access to custom actions, see "How to Set Operations Management User or Group Permissions" on page 637.

Custom actions can be defined in content packs, which are then used to distribute the custom actions to additional Operations Management installations.

Tasks

How to Create a Custom Action Script

This task shows you how to create a custom action.

Note: To use Operations Management Administration areas, you must be granted permission to work with these or a subset of these. For details, see "How to Set Operations Management User or Group Permissions" on page 637.

To create a custom action:

- 1 Open the Custom Actions manager from Operations Management Administration:
Admin > Operations Management > Tune Operations Management > Custom Actions
- 2 In the Scripts pane, click the  button to open the Add New Script dialog box.
- 3 In the General tab, enter a display name, and (optional) a description of the script being specified.
- 4 In the Script field, add the script text.
- 5 Select **Active**, if you want to make the custom action active immediately.
- 6 Select the Advanced tab.
- 7 In the Classpath pane, add and order any JAR files required by the script.

The ordering of the JAR files is used by the classpath during execution. For example:

Jar file A contains a class x.y.z.

Jar file B contains a class x.y.z.

The ordering of the JAR files A and B dictates which class of which JAR file is loaded.

- 8 Specify a timeout value for the script. If the script execution has not completed within the specified time, the result of the script is ignored.
- 9 Select Read-Only for scripts that must not alter the event.

Note: If a script that is labelled as read-only attempts to alter the event, the script is not executed and an error message is written to the ctxm logfile.

- 10 Select OK.

How to Edit a Custom Action Script

This task shows you how to edit an existing custom action.

To edit an existing custom action:

- 1** Open the Custom Actions manager from Operations Management Administration:

Admin > Operations Management > Tune Operations Management > Custom Actions

- 2** In the Scripts pane, select the custom action that you want to edit and click the  button.

The Edit Script dialog box opens.

Alternatively, double-click a section in the Details pane to open the appropriate tab in the Edit Script dialog box.

- 3** Make the required changes to the selected custom action.
- 4** Select **OK**.

How to Duplicate a Custom Action Script

This task shows you how to duplicate an existing custom action to use as the basis for a new custom action.

To duplicate an existing custom action:

- 1** Open the Custom Action manager from Operations Management Administration:

Admin > Operations Management > Tune Operations Management > Custom Actions

- 2** Select the custom action that you want to duplicate.
- 3** In the Scripts pane, click the  button.

The selected custom action is duplicated and added to the list of custom action.

- 4** Edit the duplicate custom action to suit the new custom action.

For details about editing, see "How to Edit a Custom Action Script" on page 569.

How to Delete a Custom Action Script

This task shows you how to delete an existing custom action rule.

To delete an existing custom action:

1 Open the Custom Action manager from Operations Management Administration:

Admin > Operations Management > Tune Operations Management > Custom Actions

2 Select the custom action that you want to delete.

3 In the Scripts pane, click the  button.

The selected custom action is deleted from the list of custom actions.

Reference

Custom Actions User Interface

The Custom Action manager enables you to create and manage custom actions to modify events.

This section includes:

- ▶ Custom Actions Scripts User Interface on page 572
- ▶ Custom Actions Details User Interface on page 574
- ▶ General Tab — Add New and Edit Script Dialog Boxes on page 575
- ▶ Advanced Tab — Add New and Edit Script Dialog Boxes on page 575

Custom Actions Scripts User Interface

The custom action scripts can be accessed and managed from the Scripts pane.

To access	Select Admin > Operations Management > Tune Operations Management > Custom Actions
Relevant tasks	For more information about configuring the custom actions, see "How to Create a Custom Action Script" on page 567.
See also	For more information about the custom actions, see "Introduction to Custom Actions" on page 566.

The Scripts pane displays the UI elements listed in the following table.

UI Element (A-Z)	Description
	Refresh: Reloads the scripts list.
	New Item: Opens the Add New Script dialog box to create a custom action. For more information about creating custom actions, see "How to Create a Custom Action Script" on page 567.
	Duplicate Item: Creates a copy of the selected custom action. For more information about duplicating custom action, see "How to Duplicate a Custom Action Script" on page 570.
	Edit Item: Opens the Edit Script dialog box to edit an existing custom action. Alternatively, double-click a section in the Details pane to open the appropriate tab in the Edit Script dialog box. For more information about editing custom action, see "How to Edit a Custom Action Script" on page 569.
	Delete Item: Deletes the selected custom action. For more information about deleting custom action, see "How to Delete a Custom Action Script" on page 571.
	Activate/Deactivate Item: Toggles between enabling and disabling the selected custom actions. Disabled rules appear dimmed in the list of rules.

Custom Actions Details User Interface

The Custom Action manager enables you to create and manage custom actions to modify events and take actions as a result of receiving particular events.

To access	Select Admin > Operations Management > Tune Operations Management > Custom Actions
Relevant tasks	For more information about configuring the custom actions, see "How to Create a Custom Action Script" on page 567.
See also	For more information about the custom actions, see "Introduction to Custom Actions" on page 566.

The Details pane displays the UI elements listed in the following table.

UI Element (A-Z)	Description
Active	Indicates whether the associated custom action is active.
Classpath	List of JAR files required by the script.
Description	Brief description of the custom action.
Name	Display name of the selected custom action.
Read-Only	Select Read-Only for a script that must not alter the event. If a script that is labelled as read-only attempts to alter the eventuate script is not executed and an error message is written to the ctxm logfile.
Script	Groovy script used to specify the custom action.
Timeout	Timeout value for the script. If the script execution has not completed within the specified time, the result of the script is ignored. The default timeout value is 0 and the maximum timeout value is 10000 ms.

General Tab — Add New and Edit Script Dialog Boxes

To access	Select Admin > Operations Management > Tune Operations Management > Custom Actions
Relevant tasks	For more information about configuring the custom actions, see "How to Create a Custom Action Script" on page 567.
See also	For more information about the custom actions, see "Introduction to Custom Actions" on page 566.

The General Tab displays the UI elements listed in the following table.

UI Element (A-Z)	Description
Active	Specifies whether the associated custom action script is active.
Description	Brief description of the custom action script.
Name	Name of the custom action script.
Script	Text of the custom action script.

Advanced Tab — Add New and Edit Script Dialog Boxes

To access	Select Admin > Operations Management > Tune Operations Management > Custom Actions
Relevant tasks	For more information about configuring the custom actions, see "How to Create a Custom Action Script" on page 567.
See also	For more information about the custom actions, see "Introduction to Custom Actions" on page 566.

The Advanced Tab displays the UI elements listed in the following table.

UI Element (A-Z)	Description
	Opens the Select Files browser dialog box to locate and add JAR files to the script configuration.
	Deletes the selected JAR file from the classpath.
	Moves the selected JAR file later in the order of execution.
	Moves the selected JAR file early in the order of execution.
Class Path	Specifies the names and locations of user-defined supporting libraries (JAR files).
Event Filter	Specifies the filter to select events to be processed by this custom action script.
Read-Only	<p>Select Read-Only for a script that must not alter the event.</p> <p>If a script that is labelled as read-only attempts to alter the eventuate script is not executed and an error message is written to the ctxm logfile.</p>
Timeout	<p>Specifies the timeout value for the custom action script. If the script execution has not completed within the specified time, the script is ignored.</p> <p>The default timeout value is 0 and the maximum timeout value is 10000 ms.</p>

23

Advanced Event Automation

This chapter includes:

Concepts

- ▶ Introduction to Advanced Event Automation on page 578
- ▶ CI Resolution on page 579
- ▶ Close Related Events Automatically on page 594
- ▶ Duplicate Event Suppression on page 596
- ▶ Event Processing Interface on page 597

Tasks

- ▶ How to Configure CI Resolution Cache Usage on page 599
- ▶ How to Limit the Number of CIs Used by CI Resolution on page 602
- ▶ How to Modify TQLs Used by CI Resolution on page 603
- ▶ How to Create an Event Processing Script on page 606
- ▶ How to Edit an Event Processing Script on page 608
- ▶ How to Duplicate an Event Processing Script on page 609
- ▶ How to Delete an Event Processing Script on page 610

Reference

- ▶ EPI User Interface on page 611

Troubleshooting and Limitations on page 619

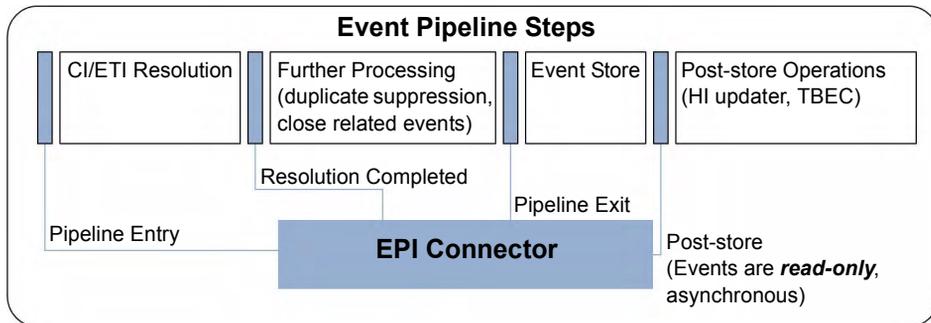
Concepts

Introduction to Advanced Event Automation

Events are processed using event processing rules before being stored in the database, enabling you to change or enrich an incoming event or remove a new event if it is a duplicate of an existing event.

There are dedicated pipeline steps for specific tasks, for example:

- CI, ETI, and user and group resolution
- Update of event using new state information and closing of related events
- Removal of duplicate events
- Event correlation
- EPI Script Execution



CI Resolution

It is necessary to identify the CI in the RTSM to which an event is associated. Many data sources do not use RTSM IDs but provide other data that can be used by the CI Resolver to identify the associated CI.

An event may include the following information:

```
disk:C:databasesystem.example.com
```

This uniquely identifies the CI as the disc C on the system databassystem.example.com.

CI resolution is used to resolve CI-related information or CI hints to CIs for the following purposes:

► Node Resolution

The CI Resolver is used to identify the host system in the RTSM associated with the selected event. If a Node Hint is included in the event, it is used to identify the node.

If the Node Hint is not available, the hints HostInfo, Cilinfo, and Service ID are examined in this order to identify a related Node CI.

► Source CI Resolution

Source CI resolution is used to identify the event source CI and uses the SourceHint attribute of an event. If the SourceHint attribute of an event is also not available, the CI Resolver separates the natural keys contained within the event and attempts to identify the related CI.

► **Related CI Resolution**

Related CI resolution first looks for a value for CiHint information. If this is not available, the Service ID from HPOM topology synchronization is used. If information from topology synchronization is also not available, the CI Resolver separates the natural keys contained within the event and attempts to identify the related CI.

ETI Hint Resolution: The ETI hint field is also used by Related CI resolution for matching of a CI. For example, if an event matches several CIs when considering the CiHint, the ETI resolution attempts to identify the ETI for each CI. If ETI Resolution is successful, the ETI is assumed to be assigned to the CI, and this CI is given a higher match rating.

The hints used to identify the related CI, node, source CI and ETI of an event are displayed in the Resolver Hints tab of the Event browser. For details, see "Resolver Hints Tab" on page 99.

CI resolution details is divided into the following areas:

- "CI Resolution Strategy" on page 580
- "CI Resolution Hint Types and Prefixes" on page 582
- "Advanced CI Resolution Hint Types and Prefixes" on page 584
- "Strict CI Resolution" on page 585
- "Information Used to Identify CIs" on page 586
- "Node Resolution" on page 587
- "Source CI Resolution" on page 587
- "ETI Hint Resolution" on page 585
- "CI Resolution Cache and its TQL" on page 588
- "Limiting Types of CIs" on page 589
- "CI Enrichment" on page 591

CI Resolution Strategy

The CI Resolver uses the following strategy to identify the CI that matches an event. The first match from this list of possible matches is used by the CI Resolver to identify the CI to which the event should be paired.

- 1** Event contains a CI reference. The CI is identified directly from this information and no resolution is necessary. Few events, except for some internal Operations Management events, include a direct reference to the matching CI.
- 2** Cilnfo custom attribute of the event contains a valid RTSM ID, RTSM Global ID, SiteScope monitor ID, or an HPOM Agent ID which identifies the related CI.
- 3** Event Service ID matches a service name that can be mapped by Topology Synchronization into a valid RTSM ID or RTSM Global ID. This match is common for events from HPOM SPIs.

Topology Synchronization provides a mapping table that enables the CI Resolver to map Service IDs directly to RTSM IDs if the service was synchronized by Topology Synchronization.

- 4** Split Cilnfo custom attribute into keywords and hostedOn information, and identify the best-fit CI. This match is common for events from HPOM SPIs
- 5** Split Service ID into keywords and hostedOn information, and identify the best-fit CI.
- 6** Use application and object fields and host info and identify best-fit CI
In this context, Service ID is the HPOM message Service ID.

CI Resolution Hint Types and Prefixes

CI hints can be provided in a number of forms. The CiHint custom attribute and Service IDs are used to identify the CI related to an incoming event. The custom attribute is evaluated before the Service ID, ensuring that the Service IDs is overridden by the custom attribute values when available.

RTSM IDs

Format: UCMDB:<id>

Example: UCMDB:3bcbb67a6233cfd0e400e7c1e637db5

RTSM Global IDs

Format: GUCMDB:<id>

Example: GUCMDB:4acdd67a5433cfaa0b600e7c1e667db9

If a UUID prefixed by the string UCMDB: or GUCMDB: is found, it is assumed to be a native RTSM ID or RTSM Global ID. If the CI Resolver can match the ID to a CI in the RTSM, the CI reference is set to this ID. This is the fastest and most accurate method.

SiteScope Monitor IDs

Format: SiteScope:<session_id>:<monitor_id>

SiteScope:12:2

If a SiteScope ID (SiteScope:<session_id>:<monitor_id>) is found, and if the CI Resolver can match the ID to a CI in the RTSM, the CI reference is set to the CI that is monitored by the SiteScope monitor.

Note: The following IDs are also resolved in the same way as for SiteScope

SiSMeasurement:<session_id>:<measurement_id>

For SiteScope and SiS Measurements, the monitored object is resolved (not the monitor or the measurement).

HPOM Agent IDs

OmCoreId:<omagentid>

If an HPOM Agent Core ID is found, and if the CI Resolver can match the ID to a CI in the RTSM, the CI reference is set to the agent CI.

Service IDs

OSSPI:svc:fs:/dev/hda@@@dbssystem.example.com

A traditional service name as used by HPOM Smart Plug-ins. If this service was synchronized by Topology Synchronization and a corresponding CI was created in the RTSM, the CI Resolver can use this information to directly map the event to the CI. If not, then the service ID is split into keywords.

Natural keys:

CiHint:oracle:database:CMDBDB@@@dbssystem.example.com

or

oracle:database:CMDBDB@@@dbssystem.example.com

If there is no exact knowledge about the target CI, a list of keywords (usually separated by colons in the message) is extracted from the message. The node name that contains the expected CI is specified after the @@ separator.

In our example, we are trying to find an Oracle Database instance called CMDBDB that is running on the node called dbssystem. The node information is important since there may be many occurrences of the Oracle Database instance called CMDBDB installed on different nodes. This information is used by the CI Resolver to find the best match by comparing these keys with the attribute information of the CIs in the RTSM.

Note: This format is very similar to the HPOM Service ID format. This enables the CI Resolver to use the Service ID for resolving a CI when there is no direct resolution.

As for a set of natural keys but for an unhosted CI:

```
mailservice:northamerica
```

For CIs that are not related to a node, like the email service provided for the northamerica region. To indicate that there is no hosted on information, the @@ separator must be omitted.

Note: @@ separator without a node is not permitted (HPOM compatibility).

If the CI Resolver receives a hint with one or more keywords containing the separation character (default :), the keyword is not assessed as desired because it is divided into two or more incomplete keywords. The separation character is not considered part of the keyword.

Important: If you need to provide keywords containing the separator character, enclose the keyword within quotation marks ("keyword part 1:keyword part 2").

Advanced CI Resolution Hint Types and Prefixes

Some data sources can provide the RTSM ID as a CI hint. However, when forwarding events to another BSM system, this ID might not be known to the second RTSM instance. For such cases, multiple CI hints, including the RTSM Global ID can be sent. If the first hint does not provide a match, the next hint is examined.

When an event is forwarded by Operations Management, the RTSM Global ID is added automatically as an additional hint.

Multiple CI hints are specified using the following format:

```
<CiHint1>|<CiHint2>|...
```

where <CiHintX> can be one of the following:

- UCMDB:<RTSM_ID>
- GUCMDB:<RTSM_Global_ID>
- SiteScope:<session_id>:<monitor_id>
- OmCoreId:<omagentid>
- CiHint:<hint1>:<hint2>:...@@<node>

Example:

GUCMDB:4acdd67a5433cfaa0b600e7c1e667db9|c@@@dbssystem.example.com

The CI Resolver first checks whether there is a CI with the given RTSM Global ID. This ID usually provides a match as the Global ID should be synchronized across all RTSM instances. If the Global ID cannot be used, and a natural hint is also included (c@@@dbssystem.example.com in the example above), it is used.

ETI Hint Resolution

The ETI hint field is also used for the matching of a CI by CI Resolution. For example, if an event matches several CIs when considering the CiHint, the ETI resolution attempts to identify the ETI for each CI. If ETI Resolution is successful, the ETI is assumed to be assigned to the CI, and this CI is given a higher match rating.

For example, if the CI hints of an event containing the ETI Memory Load:Critical, matches some CPU CIs and some node CIs, the node CI which has the Memory Load ETI defined is selected. Without the ETI, it would not be possible to resolve a match to this node.

Strict CI Resolution

The host CI can usually be identified as long as the host information is available as a normal hint. Ideally, the @@node notation (an @@ separator with a specified node) is used to identify the node on which the CI is hosted. However, it can be difficult to uniquely match a dedicated CI if a hosted and a non-hosted CI have very similar attributes. If the @@node notation is not used, the first match found is accepted and this may not be the correct CI.

For example, only the hint `CiHint:sendmail` is received. If a sendmail service and a sendmail process exist, the CI Resolver is not able to differentiate between them because it does not differentiate between the hosted-on and not hosted CIs.

To differentiate between them, use:

`CiHint:sendmail@@mailserver.example.com` — to identify the sendmail process running on the `mailserver.example.com` node.

`StrictCiHint:sendmail` — to identify the sendmail service. To match, the sendmail CI must not have a hosted-on CI.

Information Used to Identify CIs

The `hostedOn` information is very important for correctly identifying a CI, and an attempt is made to resolve the node for each CI from the RTSM. The `hostedOn` information is derived by traversing all parent compositions of a CI until a node CI is found. The hostname of this node is used as the `hostedOn` information. When an event is received by Operations Management, the node info value of the CI is compared to the `hostedOn` information of a CI. If they match, the CI is used as a matching candidate.

Note: The combination of the node name and CI name is usually sufficient information to differentiate between CIs on computers. If this information is still not sufficient, check the information that you have for these CIs in the RTSM and select a further attribute that can be used to differentiate the CIs. If identifying CIs is proving difficult because CI names are not unique, the CI type can be used as an identifier. The combination of node name and CI type is very often enough information to identify the CI associated with an event.

Node Resolution

The CI Resolver is used to update the node reference of an event.

The hints used to identify the related CI, node, source CI and ETI of an event are displayed in the Resolver Hints tab of the Event browser. For details, see "Resolver Hints Tab" on page 99.

The following hints are examined in this order to identify a related Node CI:

► HostInfo event attribute

HostInfo is an attribute from the HPOM agent to identify a target host. It usually contains the fully qualified domain name or the IP address of a host.

► Cilinfo custom attribute

Cilinfo contains node information after the @@ separator in the event text.

► Service ID event attribute

Service ID contains node information after the @@ separator in the event text.

The node reference is retrieved from the RTSM as follows:

- 1** Fully qualified domain name (primary_dnsname)
- 2** IP address taken from the related ip_address in the RTSM
 - a** ip_address.authoritative_dns_name attribute
 - b** ip_address.ip_address attribute
- 3** HPOM core ID. A name attribute taken from the related hp_operationsagent CI in the RTSM.

Source CI Resolution

Source CI resolution is used to identify the event source CI and uses the SourceHint attribute of an event. The format of the SourceHint must be the same as that of the normal CI resolution.

CI Resolution Cache and its TQL

The CI Resolver extracts information about potential candidate CIs from the RTSM using a TQL query and maintains this information in a cache. You can either provide a custom TQL query or use the OMiAutoView feature to automatically generate a suitable TQL.

The OMiAutoView feature selects all CIs and all Service Level Agreements, and queries almost all attributes that are potentially useful for resolving CIs. The attributes that are not queried are excluded using the Cache Modification Configuration.

If you are using the TQL query generated by OMiAutoView, to maximize performance, it is also possible to restrict the total number of CIs held in the cache, and restrict the CI types to those most helpful for CI resolution. Configuring the restriction of CIs and CI types is achieved using the following CI Resolver Settings:

- ▶ **CI Limit** — used to limit the number of CIs loaded into the cache.
- ▶ **Cache Modification Configuration** — used to specify which CI types and attribute types to exclude from the cache, and, if there are too many CIs being loaded into the cache, which CI types to use for CI resolution.

For detailed information, see "CI Resolver Settings" on page 689.

There are two cache types, enabling you to decide whether the cache is kept on disk or in main memory:

- ▶ **Database** — It is recommended to select the **Database** cache type when your monitored environment is very large (when the number of CIs being monitored is larger than in the CI Limit setting. CI resolution maintains only the most often-used CIs in RAM. All other required CIs are maintained in a cache file. This option results in a lower memory footprint but may have an impact on CI resolution performance.
- ▶ **In Memory** — It is recommended to select the **In Memory** cache type when the total number of CIs in the monitored environment is smaller than the default value in the CI Limit setting. CI resolution maintains all CIs in RAM. Use this setting for larger environment only when there is sufficient RAM available.

For information about all the CI Resolver Settings, see "CI Resolver Settings" on page 689.

Limiting Types of CIs

Maintaining very large numbers of CIs in cache requires large amounts of RAM and also has an affect on performance. Controlling the maximum number of CIs held in cache reduces this load and is achieved by ignoring less relevant attributes and CI types normally selected using the OMiAutoView-generated TQL query. The CI types to be ignored are set in the Cache Modification Configuration setting. You can also specify which CI type should be permitted to be used for CI resolution and in which order they are to be evaluated.

The CI Resolver Cache Modification Configuration settings specify three types of information:

- ▶ **<IgnoreCiType>** — Contains a list of CI types to always be ignored.

If a CI type is specified to be ignored, it is always ignored by the CI Resolver. For example, if you know that you don't receive SAP events, but you have SAP CIs in your RTSM, then you can ignore the SAP CI types, reducing the size of the CI Resolver cache.

- ▶ **<WhiteListCiType>** — Contains a list of CI types that are always required.

If there are too many CI Types to be included in the available cache capacity, the CI types specified in the whitelist are included in the order that they are listed. As soon as it is no longer possible to include the CIs of the next CI type in the list, that CI type and all subsequent CI types in the whitelist are also ignored.

- ▶ **<IgnoreAttribute>** — Contains a list of attributes that are always ignored.

If an attribute is specified to be ignored, it is always ignored by the CI Resolver. You should ignore attributes that not suitable for identifying CIs.

The following is an example of the structure of the CI Resolver Cache Modification Configuration settings

```
<?xml version="1.0" encoding="UTF-8" ?>
<CiResolver>

  <IgnoreCiTypes>
    <IgnoreCiType>service_address</IgnoreCiType>
    <IgnoreCiType>installedsoftware</IgnoreCiType>
    ...
  </IgnoreCiTypes>

  WhiteListTypes>
    <WhiteListCiType>node</WhiteListCiType>
    <WhiteListCiType>ip_address</WhiteListCiType>
    <WhiteListCiType>business_element</WhiteListCiType>
    ...
  </WhiteListTypes>

  <IgnoreAttributes>
    <IgnoreAttribute>ip_probename</IgnoreAttribute>
    <IgnoreAttribute>ip_isbroadcast</IgnoreAttribute>
    ...
  </IgnoreAttributes>

</CiResolver>
```

To configure CI resolution to minimize the type and number of CI and attributes held in the cache, see "How to Configure CI Resolution Cache Usage" on page 599.

Custom TQLs

If the OMiAutoView TQL does not meet your requirements, you can implement a custom TQL query, ensuring that it meets the following requirements:

- ▶ CIs that are contained within a node must have a direct or transitive Composition relationship to the node. For the IpAddress CI type, the relationship type must be Composition.
- ▶ In the TQL, the node must have one of the following attributes:
 - ▶ Primary Node DNS name
 - ▶ Association with one or more IP addresses (IpAddress with a Containment relationship)
- ▶ At least CI type and data name of the CI must be visible.
- ▶ HPOM Agents must have Core ID value.
- ▶ Site Scope Monitors or performance measures must have a monitored_by relationship to the monitored CI. The monitor_id and session_id must be visible.

CI Enrichment

You can configure CI resolution enrichment rules to enrich the CI resolution cache with additional keywords for a specific CI. These keywords are provided by another CI in their neighborhood. To enrich a CI, you can use the tuneCache setting in the Settings Manager by adding an XML item *<Enrichment>* for an enrichment rule.

Rule Syntax

Enrichment is used to mark a CI with keywords that differentiates the CI from other CIs. This enables the use of the enriched keyword as a hint in an event.

An enrichment rule follows the syntax:

```
[<source ci type>].(from|to:<relationship type>.[<intermediate ci type>].)+[<target ci>].<attribute name>
```

the direction identifier before each reference indicates the direction of that reference (from = incoming or to = outgoing).

Supported Types & Operators

[Operators] and [Types] are combined to form a valid CI resolution enrichment rule.

Examples of supported operators:

- containment
- composition
- monitored_by
- dependency

Supported relation directions:

- to
- from

Supported types:

- [<CITypeName>]

Supported types are any CI types contained in the RTSM, specified within squared brackets. The CI Type's name attribute is the value to put into the squared brackets, for example, [host] or [sitescope_monitor].

Keyword	Description	Example
from to:<reference>	Follow the relationship of a CI to its neighbor CI by a given direction. from = incoming to = outgoing	from:monitored_by
<Ci type name>]	Set the CI type.	[dbtable]
<CI type property name>	Property of the CI type.	[dbtable].name

Example Rule:

Assume that you have two Oracle databases, DB1 and DB2, on one system. Both databases have a `dbtable` CI with the name `USER`. CI resolution cannot identify from which CI the event originated using the information available within the hint because the two `dbtable` CIs can only be differentiated by their parent CI relationship (DB1 and DB2). This information must be added by enrichment. Typically, a related CI hint would look like the following:

```
USER@@dbsystem.example.com
```

However, this does not work because the database name is not known.

However, if CI resolution is enriched with the database instance name using a CI resolution enrichment rule, it is possible to run a CI resolution successfully when the event also provides the DB instance name.

Enrichment rule:

To enrich a `dbtable` CI type with additional information about the CI type host name attribute, you can use the following rule.

```
[dbtable].from:composition.[oracle].name
```

A CI resolution enrichment rule can be specified to enrich the keywords cache to also include keywords from the parent CI. In this way, it is possible to resolve the correct `dbtable` CI if the event also provides the database instance name.

```
USER:DB1@@dbsystem.example.com
```

For information about CI resolution configurations, see "CI Resolver Settings" on page 689.

Close Related Events Automatically

Basic event correlation can close existing events. A new event is considered as being related to an existing event, when it provides specific information like a close key pattern that matches the key of the existing event, or when it contains an updated value of a health-contributing ETI for a specific CI, which out-dates a value of that specific ETI that is contained in an existing event. Both conditions result in closing the existing event. In HPOM, this form of correlation is also known as good/bad message correlation.

Note: Existing events must have same CI and ETI as the new event, but a different ETI value. The ETI must contribute to health. Default value of the Operations Management Infrastructure Setting Detected Related Events by ETI is set to true.

Closing related events can be controlled using the settings available under Closed Related Events Settings in the Operations Management Infrastructure Settings. There are two ways of detecting related events:

- ▶ **Existing events must have the same CI and the same ETI contributing to health as the new event, but a different ETI value.**

Example:

- ▶ Event A for a certain CI has ETI SQL Query Performance: Low
- ▶ Event B for same CI has ETI SQL Query Performance: High
- ▶ ETI SQL Query Performance is an HI

Event B closes event A. Automatic close is tracked in the event history.

- ▶ **Key of existing events must match the `closeKeyPattern` value of the new event.**

Example:

- ▶ Event A has key value `om-db.server.net_VP_SM_DB_Backup:start`
- ▶ Event B has key value `om-db.server.net_VP_SM_DB_Backup:pending`

- Event C contains the `closeKeyPattern` value `om-db.server.net_VP_SM_DB_Backup<*>`

Events A and B are closed. Automatic close is tracked in the event history.

For detailed information on the available setting, see "Close Related Event Settings" on page 692.

Close Key Pattern Syntax

Dynamic parts of event text can be extracted and used as parameters to identify and close related events already received. The pattern-matching language enables you to very accurately specify the character string that you want to identify.

Note: Operations Management uses a subset of the pattern matching functionality supported by HPOM.

The following characters are supported:

- `^` — identifies the beginning of the pattern.
- `$` — identifies the end of the pattern.
- `<*>` — represents any string of zero or more characters (including separators). `<*>` can be used in a close-key pattern as many times as required.

The following table illustrates how the event keys are identified:

closeKeyPattern Syntax	Usage
abc	Any occurrence of the text abc in the event key.
a<*>b<*>c	Any occurrence of the pattern a*b*c in the event key where a can be separated from the b by any number of characters and the b can be separated from the c by any number of characters.
^abc\$	Pattern abc is the complete event key.

closeKeyPattern Syntax	Usage
^abc	Pattern abc is found at the beginning of the event key.
abc\$	Pattern abc is found at the end of the event key.

Duplicate Event Suppression

A new event may be a duplicate of an existing event. As new events are received, they are checked against existing events. If duplicates are found, new information is used to update the existing event and the new event is ignored.

Suppressing duplicate events is controlled using the Duplicate Events Suppression Settings in the Operations Management Infrastructure Settings and must be enabled before any settings become active. For detailed information, see "Duplicate Events Suppression Settings" on page 695.

If duplicate event suppression is enabled, new events that are duplicates of an existing event are not retained and the original event is updated. If the new event includes a key, such as **Select CI**, a search is made for an existing, active event that has the same key value, in this case the same **CI**, as the new event. Events must usually be received relatively soon after the original event to be regarded as a possible duplicate. This time period is also a configurable setting.

If the new event does not include a key, a search is made for an existing, active event where a set of configurable attributes have the same values as the new event.

If no original event is found yet, and the new event has a value for an **HI**, a search is made for an existing, active event that has the same **ETI** value and the same **CI**.

Suppressing duplicate events can result in additional correlations of the original event (both as cause or as symptom). When a duplicate is identified, the timestamp for the original event is updated to the time when the duplicate was received. The event is then correlated again and may now be related to other events which were not available for correlation when the original event was received.

Event Processing Interface

You can specify any number of user defined scripts to be executed during event processing. The Event Processing Interface (EPI) is used to enrich events with additional information from external data sources using Groovy scripts. For example, it is possible to add data to an event from a Microsoft Excel file or an SQL database. If Groovy scripts are specified in the Event Pipeline Script and Step Settings, the event undergoes the associated further processing.

- ▶ EPI scripts must be implemented using the Groovy script language.
- ▶ Scripts are stored directly in the database with JAR files.
- ▶ For each pipeline step, you can set up one or more scripts. There is no limit on the number of scripts that can be executed.
- ▶ EPI scripts can be defined in content packs and can be imported/exported using the Content Manager.
- ▶ Maximum supported script length is 250,000 characters.

Note: You should design and execute scripts in the context of overall event processing. In other words, be aware of the interaction of the scripts with other event processing settings in the Settings Manager, for example for duplicate events suppression and closing related events.

The event pipeline represents the different steps within event processing. There are four points within the event pipeline at which EPI scripts can be executed:

Before CI/ETI Resolution

Scripts can be executed directly before the event enters the event pipeline, so before the resolution of CIs and ETIs takes place.

For example, you may want to execute a script at this point that sets further hints that affect the resolution of CIs and ETIs. An entry point further along the event pipeline would be too late to influence the resolution of CIs and ETIs.

After CI/ETI Resolution

Scripts can be executed directly after CI/ETI resolution, but before further processing, such as duplicate events suppression and closing related events automatically.

For example, you may want to execute a script at this entry point in the event pipeline if you want to influence how duplicate events are handled. It could be that you have duplicate events suppression enabled in general, but you are interested in changing the duplicate events suppression setting for a particular type of event, while leaving it unchanged for all other event types. So you could execute a script at this entry point that disables duplicate events suppression for the specified event type. Any entry point further along the event pipeline would be too late to influence duplicate events suppression behavior.

Before Storing Events in the Database

Scripts can be executed after all event processing has taken place, but before the event is stored in the database.

For example, at this entry point to the event pipeline, you could execute a script that makes changes to some text, or inserts a link to a knowledge base, and so on, before the event gets stored in the database.

After Storing Events in the Database

Scripts can be executed after the event is stored in the database. In this case, the scripts are all read-only scripts, since as soon as an event is stored in the database, it can no longer be modified.

For example, you may want to execute a script at this entry point in the event pipeline to forward events of a particular type, that are already stored in the database, to another application. Or you could execute a script that writes specified events stored in the database to an audit log.

Tasks

How to Configure CI Resolution Cache Usage

This task shows you how to configure CI resolution to minimize the type and number of CI and attributes held in the cache.

Maintaining very large numbers of CIs in cache requires large amounts of RAM and also has an affect on performance. Therefore, controlling the maximum number of CIs held in cache is recommended and this is achieved by ignoring less relevant attributes and CI types. The CI types to be ignored are set in the Cache Modification Configuration. You can also specify which CI type should be permitted to be used for CI resolution and in which order they are to be evaluated.

To optimize the CI resolution cache usage, configure the CI Resolution Cache Modification Configuration settings as follows:

- 1** Open Infrastructure Settings from the Platform Administration:
Admin > Platform > Setup and Maintenance > Infrastructure Settings
- 2** Select **Applications** and use the list to set the administration context to **Operations Management**.
- 3** Go to the **CI Resolver Settings** section.
- 4** Open the **Cache Modification Configuration** (click the associated  button to open the Edit Settings dialog box).

The Edit Setting dialog box displays the CI Resolver Cache Modification Configuration settings. This information uses XML syntax to specify three types of information:

- `<IgnoreCiType>` — CI Types to always be ignored. If a CI type is specified to be ignored, it is always ignored by the CI Resolver.

- ▶ `<WhiteListCiType>` — If there are too many CI Types to be included in the available cache capacity, the CI types specified in the whitelist are included in the order that they are listed. As soon as it is no longer possible to include the CIs of the next CI type in the list, that CI type and all subsequent CI types in the whitelist are also ignored.
- ▶ `<IgnoreAttribute>` — Attributes to always be ignored. If an attribute is specified to be ignored, it is always ignored by the CI Resolver:

The following is an example of the structure of the CI Resolver Cache Modification Configuration settings:

```
<?xml version="1.0" encoding="UTF-8" ?>
<CiResolver>

  <IgnoreCiTypes>
    <IgnoreCiType>service_address</IgnoreCiType>
    <IgnoreCiType>installedsoftware</IgnoreCiType>
    ...
  </IgnoreCiTypes>

  <WhiteListTypes>
    <WhiteListCiType>node</WhiteListCiType>
    <WhiteListCiType>ip_address</WhiteListCiType>
    <WhiteListCiType>business_element</WhiteListCiType>
    ...
  </WhiteListTypes>

  <IgnoreAttributes>
    <IgnoreAttribute>ip_probename</IgnoreAttribute>
    <IgnoreAttribute>ip_isbroadcast</IgnoreAttribute>
    ...
  </IgnoreAttributes>

</CiResolver>
```

- 5 Specify the CI types and the attributes to always be excluded from CI resolution using the `<IgnoreCiTypes>` and the `<IgnoreAttributes>` sections.

- 6 Specify the CI types to be included if the available cache is not sufficient to load all available CIs. The order of the CI types in the list represent the order in which these CIs are included. As soon as the CIs belonging to a CI type cannot be accommodated in the cache, these CIs are excluded and no further CI Types are assessed.
- 7 Select **Save**.

Note: Alternatively, you can replace the automatically generated TQL query with a TQL query customized for your environment.

How to Limit the Number of CIs Used by CI Resolution

This task shows you how to configure CI resolution to limit the number of CI and attributes held in the cache.

Note: If you have more CIs than is recommended to use for CI resolution, limit the CI types and attributes, and optimize the order in which the preferred CI types are assessed. For details, see "How to Configure CI Resolution Cache Usage" on page 599.

To limit the maximum possible number of CIs used for CI resolution, configure the CI Limit setting as follows:

- 1 Open Infrastructure Settings from the Platform Administration:
Admin > Platform > Setup and Maintenance > Infrastructure Settings
- 2 Select **Applications** and use the list to set the administration context to **Operations Management**.
- 3 Go to the **CI Resolver Settings** section.
- 4 Open the **CI Limit** (click the associated  button to open the Edit Settings dialog box).

The Edit Setting dialog box displays the CI Limit value.

- 5 Specify a new CI limit.
-

Note: Maintaining very large numbers of CIs in cache requires large amounts of RAM and also has an affect on performance. Increasing the total number of CI loaded into cache, increase memory usage, which can result in an unstable system. If you need to increase the number of CI permitted for CI resolution, make these increases using small increments and make sure that your installation remains stable.

- 6 Select **Save**.

How to Modify TQLs Used by CI Resolution

BSM uses TQL queries to select CIs from the RTSM and maintains them in the CI Resolver Cache. The CI Resolver compares attributes of discovered CIs held in the CI Resolver Cache with event attributes and event resolver hints to relate each event that BSM receives to a CI in the RTSM.

The out-of-the-box query that BSM uses to query the RTSM is probably broader than you require. You can improve performance by narrowing the scope of the out-of-the-box query so that it loads into your CI Resolver Cache only the CIs that are relevant to your managed environment and to which you expect to map events. If you do not expect to match certain CI types, there is no need to include these CI type in the CI Resolver TQL. For example, if you are only managing Oracle databases, you should exclude databases of other types.

You modify TQL queries using the RTSM Modeling Studio, which provides a graphical representation of the query. You can add or remove information from the query so that it selects only those CIs from the RTSM that you decide are important for your managed environment.

Generally, the procedure for modifying a query is as follows:

To modify a TQL query:

- 1** Start the Modeling Studio: **Administration > RTSM Administration > Modeling > Modeling Studio.**

Note: If necessary, see the RTSM online help to familiarize yourself with the features of the Modeling Studio.

- 2** Select the resource type **Queries** from the drop-down list in the Resources pane.
- 3** Click the **Import from XML** button in the left view browsing pane.
- 4** Select the TQL query file:

```
<HPBSM_Root_Directory>/opr/examples/ciresolver/  
OprSample_CIResoluton_tql.xml
```

Click **Import**.

- 5 Select the resource type **Views** from the drop-down list in the Resources pane.
- 6 Click the **Import from XML** button in the left view browsing pane.
- 7 Select the View file:

```
<HPBSM_Root_Directory>/opr/examples/ciresolver/  
OprSample_CIResoluton_view.xml
```

Click **Import**.

- 8 Modify the query to select only the CIs that you need.
- 9 Use the count button, which shows the CIs and CI types per node, to evaluate if your changes reduce the number of CIs.

Rules for Modification

The modification process is not difficult, but it takes some time to understand what to modify to get the results that you expect. To get a general introduction to TQL concepts, see the *Topology Query Language* chapter of the *HP RTSM Modeling Guide*. Especially important are the concepts of cardinality, attributes, and relationships. In addition, read the rules below to help you get an understanding of the factors that may have an influence on how to modify queries.

- ▶ When selecting a DNS name, use the attribute Primary DNS Name in BSM.
- ▶ Every CI that is part of a host must have a composition to its host. In other words, the composition to a host is required to differentiate between multiple instances of a CI type that may be named identically, or have other identical attributes (for example, "disk drive C:"), but are associated with different parent CIs ("Computers": "C: drive on server1" as opposed to "C: drive on server2").

- Every host in your TQL query must have the host Primary DNS Name attribute enabled. To ensure that the attribute is enabled:
 - a** Go to your TQL query and select **Node Properties** from the host context menu.
 - b** Click **Advanced layout settings** and enable the Primary DNS Name attribute again.
- Every host in your TQL query must have one or more IpAddress CIs that are related to the host by a composition. Here, enable IpAddress and authoritative_dns_name attributes in your TQL query as follows:
 - a** Select **Node Properties** from the context menu of IpAddress.
 - b** Select **Advanced layout settings** and enable both attributes.
- All the CI attributes in your TQL query that are needed for CI resolution must be visible (for example, the labels "C:", "Company Portal", and so on). Usually, the name attribute is enough, but sometimes another attribute (such as an ID) is required. Experiment until you get the results you want.
- Business Services usually are not hosted on a system, so there is no need for a composition. It is sufficient for the services to be a part of the TQL.
- The "hosted on" information is crucial for CI resolution. Make sure that Primary DNS Name and authoritative_dns_name are visible either for the host or for the IpAddress. Without these attributes, the CI Resolver cannot work reliably.

How to Create an Event Processing Script

This task shows you how to create an event processing script.

Note: To use Operations Management Administration areas, you must be granted permission to work with these or a subset of these. For details, see "How to Set Operations Management User or Group Permissions" on page 637.

To create an event processing script:

- 1 Open the Event Processing Customizations manager from Operations Management Administration:

Admin > Operations Management > Tune Operations Management > Event Processing Customizations

- 2 In the EPI Steps pane, select the entry point to the event processing pipeline for the script to be defined. The options are:
 - **Before CI/ETI Resolution**
 - **After CI/ETI Resolution**
 - **Before Storing Events**
 - **After Storing Events**
- 3 In the Scripts pane, click the  button to open the Add New Script dialog box.
- 4 Enter a script name and description for the script being specified.
- 5 Enter the script text in the Script field.

For information about creating scripts, see the *HP Operations Manager i Extensibility Guide PDF*.

Note: Maximum supported script length is 250,000 characters.

- 6** Select **Active**, if you want to make the script active immediately.
- 7** Click **Next** to open the Advanced page.
- 8** *Optional:* Specify Groovy script classpaths.
- 9** Select an event filter for the mapping rule from the **Events Filter** list. The filter determines which events to consider in the mapping operation.

If no appropriate filter is already configured, click the Browse (...) button, which opens the Select an Event Filter dialog box. Create a filter or edit an existing one. For information about filters, see "How to Define Simple Event Filters" on page 221.
- 10** Specify a timeout value for the script. If the script execution has not completed within the specified time, the script is ignored.

Note: If the EPI Server Timeout setting is shorter than the timeout specified for a script, the execution of the script is stopped after the global timeout period is reached. The dedicated timeout cannot be reached. It is recommended to select a shorter dedicated timeout value for individual scripts and set a longer global timeout. For details, see "EPI (Event Processing Interface) Server Settings" on page 699.

- 11** Select Read-Only for scripts that must not alter the event. An error message is displayed if a script that is labelled as read-only attempts to alter the event.
- 12** Select **Finish**.

How to Edit an Event Processing Script

This task shows you how to edit an event processing script.

To edit an event processing script:

- 1** Open the Event Processing Customizations manager from Operations Management Administration:

Admin > Operations Management > Tune Operations Management > Event Processing Customizations

- 2** Select the script that you want to edit.
- 3** In the Scripts pane, click the  button to open the Edit Script dialog box.
Alternatively, double-click a section in the Details pane to open the appropriate tab in the Edit Script dialog box.
- 4** Make the required changes to the selected script.
- 5** Select **OK**.

How to Duplicate an Event Processing Script

This task shows you how to duplicate an event processing script.

To duplicate an event processing script:

1 Open the Event Processing Customizations manager from Operations Management Administration:

Admin > Operations Management > Tune Operations Management > Event Processing Customizations

2 Select the script that you want to duplicate.

3 In the Scripts pane, click the  button.

A copy of the selected script is created and is available for selection from the Scripts pane.

4 Select the copy script and click the  button to open the Edit Script dialog box.

5 Make the required changes to the selected script.

6 Select **OK**.

How to Delete an Event Processing Script

This task shows you how to delete an event processing script.

To delete an event processing script:

- 1** Open the Event Processing Customizations manager from Operations Management Administration:

Admin > Operations Management > Tune Operations Management > Event Processing Customizations

- 2** Select the script that you want to delete.
- 3** In the Scripts pane, click the  button.
- 4** Confirm the deletion by clicking **Yes**.

The selected script is deleted from the list of scripts.

Reference

EPI User Interface

The Event Processing Customizations manager enables you to create and manage Event Processing scripts. You can specify any number of user defined scripts to be executed during event processing. The Event Processing Interface (EPI) is used to enrich events with additional information from external sources data using Groovy scripts.

This section includes:

- ▶ Event Processing Scripts Steps Pane on page 612
- ▶ Event Processing Scripts User Interface on page 613
- ▶ Event Processing Scripts Details User Interface on page 614
- ▶ General Tab — Add New and Edit Script Dialog Box on page 616
- ▶ Advanced Tab — Add New and Edit Script Dialog Box on page 617

Event Processing Scripts Steps Pane

To access	Select Admin > Operations Management > Tune Operations Management > Event Processing Customizations
Relevant tasks	For more information about configuring event processing scripts, see "How to Create an Event Processing Script" on page 606.
See also	For more information about event processing, see: <ul style="list-style-type: none"> ▶ "Close Related Events Automatically" on page 594. ▶ "Duplicate Event Suppression" on page 596. ▶ "Event Processing Interface" on page 597.

The EPI Steps pane displays the UI elements listed in the following table.

UI Element (A-Z)	Description
	Refresh: Reloads the EPI Steps list. Shows the latest status of each step, including whether scripts exist for each step and if they are enabled.
After CI/ETI Resolution	Selects scripts that are executed directly after CI/ETI resolution, but before further processing, such as duplicate events suppression and closing related events automatically.
After Storing Events	Selects scripts that are executed after the event is stored in the database. In this case, the scripts are all read-only scripts, since as soon as an event is stored on the database, it can no longer be modified by further EPI scripts.
Before CI/ETI Resolution	Selects scripts that are executed directly before the event enters the event pipeline (before the resolution of CIs and ETIs takes place).
Before Storing Events	Selects scripts that are executed after all event processing has taken place, but before the event is stored in the database.

Event Processing Scripts User Interface

The Scripts pane lists the specified scripts for the selected EPI step. The Scripts pane enables you to create and manage EPI scripts.

To access	Select Admin > Operations Management > Tune Operations Management > Event Processing Customizations
Relevant tasks	For more information about configuring event processing scripts, see "How to Create an Event Processing Script" on page 606.
See also	For more information about event processing, see: <ul style="list-style-type: none"> ▶ "Close Related Events Automatically" on page 594. ▶ "Duplicate Event Suppression" on page 596. ▶ "Event Processing Interface" on page 597.

The Scripts pane displays the UI elements listed in the following table.

UI Element (A-Z)	Description
	Refresh: Reloads the Scripts list.
	New Item: Opens the Add New Script dialog box to create an EPI script. For more information about creating EPI scripts, see "How to Configure CI Resolution Cache Usage" on page 599.
	Duplicate Item: Creates a duplicate of the selected EPI script.
	Edit Item: Opens the Edit Script dialog box to edit an existing script. Alternatively, double-click a section in the Details pane to open the appropriate tab in the Edit Script dialog box. For more information about editing EPI scripts, see "How to Edit an Event Processing Script" on page 608.

UI Element (A-Z)	Description
	Delete Item: Deletes the selected EPI script. For more information about deleting EPI Steps, see "How to Delete an Event Processing Script" on page 610.
	Move Down: Moves the selected EPI script down to a lower priority position.
	Move Up: Moves the selected EPI script up to a higher priority position.
	Activate/Deactivate Item: Toggles between enabling and disabling the selected pipeline scripts. Disabled rules appear dimmed in the list of rules.

Event Processing Scripts Details User Interface

The Event Processing Customizations Details pane displays a summary of the selected EPI script.

To access	Select Admin > Operations Management > Tune Operations Management > Event Processing Customizations
Relevant tasks	For more information about configuring event processing scripts, see "How to Create an Event Processing Script" on page 606.
See also	For more information about event processing, see: <ul style="list-style-type: none"> ➤ "Close Related Events Automatically" on page 594. ➤ "Duplicate Event Suppression" on page 596. ➤ "Event Processing Interface" on page 597.

The Details page displays the UI elements listed in the following table.

UI Element (A-Z)	Description
Active	Indicates whether the associated event pipeline step is active.
Class Path	Specifies the names and locations of user-defined supporting libraries (Jar files).
Description	Description of the EPI script.
Event Filter	Filter specified to select events to be processed by this EPI script.
Name	Name of the EPI script.
Read-Only	Indicates whether the EPI script is read-only. These scripts must not alter the event. An error message is displayed if a script that is labelled as read-only attempts to alter the event
Script	Text of the EPI script.
Timeout	<p>Timeout value for the EPI script. If the script execution has not completed within the specified time, the script is ignored.</p> <p>The default timeout value is 0 and the maximum timeout value is 10000 ms.</p> <p>Note: If the EPI Server Timeout setting is shorter than the timeout specified for a script, the execution of the script is stopped after the global timeout period is reached. The dedicated timeout cannot be reached. It is recommended to select a shorter dedicated timeout value for individual scripts and set a longer global timeout. For details, see "EPI (Event Processing Interface) Server Settings" on page 699.</p>

General Tab — Add New and Edit Script Dialog Box

To access	Select Admin > Operations Management > Tune Operations Management > Event Processing Customizations
Relevant tasks	For more information about configuring event processing scripts, see "How to Create an Event Processing Script" on page 606.
See also	For more information about event processing, see: <ul style="list-style-type: none"> ➤ "Close Related Events Automatically" on page 594. ➤ "Duplicate Event Suppression" on page 596. ➤ "Event Processing Interface" on page 597.

The General Tab displays the UI elements listed in the following table.

UI Element (A-Z)	Description
Active	Specifies whether the associated event pipeline step is active.
Description	Brief description of the EPI script.
Name	Name of the EPI script.
Script	Text of the EPI script.

Advanced Tab — Add New and Edit Script Dialog Box

To access	Select Admin > Operations Management > Tune Operations Management > Event Processing Customizations
Relevant tasks	For more information about configuring event processing scripts, see "How to Create an Event Processing Script" on page 606.
See also	For more information about event processing, see: <ul style="list-style-type: none"> ➤ "Close Related Events Automatically" on page 594. ➤ "Duplicate Event Suppression" on page 596. ➤ "Event Processing Interface" on page 597.

The Advanced Tab displays the UI elements listed in the following table.

UI Element (A-Z)	Description
Class Path	Specifies the names and locations of user-defined supporting libraries (Jar files).
Event Filter	Specifies the filter to select events to be processed by this EPI script.

UI Element (A-Z)	Description
Read-Only	<p>Specifies whether the EPI script is read-only.</p> <p>These scripts must not alter the event. An error message is displayed if a script that is labelled as read-only attempts to alter the event</p>
Timeout	<p>Specifies the timeout value for the EPI script. If the script execution has not completed within the specified time, the script is ignored.</p> <p>The default timeout value is 0 and the maximum timeout value is 10000 ms.</p> <p>Note: If the EPI Server Timeout setting is shorter than the timeout specified for a script, the execution of the script is stopped after the global timeout period is reached. The dedicated timeout cannot be reached. It is recommended to select a shorter dedicated timeout value for individual scripts and set a longer global timeout. For details, see "EPI (Event Processing Interface) Server Settings" on page 699.</p>

Troubleshooting and Limitations

This section provides help in troubleshooting problems relating to event automation.

- ▶ CI Resolution Does not Resolve Expected CIs on page 619

CI Resolution Does not Resolve Expected CIs

If expected CIs are not being resolved and you receive the following message:

OMi CI Resolver could not load all expected CIs.

The CI Resolver is unable to load the specified CI types and attributes into the cache.

More detailed information about the problem is available in the CI Resolver log file at the following location:

<HPBSM_Root_Directory>/log/opr-backend/opr-ciresolver.log

In debug mode, the handling of each CI type is documented in the log file. In normal mode, only the total number of CIs is reported.

The following steps should be taken to reduce the number of CIs being used for CI resolution:

- ▶ Restrict the types of CI used for CI resolution by using the Cache Modification Configuration. For details, see "How to Configure CI Resolution Cache Usage" on page 599.
- ▶ If it is not possible to load the required CIs into the cache, increase the CI limit in small increments, for example 10,000 CIs, until all essential CIs are available for CI resolution.

Note: Maintaining very large numbers of CIs in cache requires large amounts of RAM and also has an affect on performance. Increasing the total number of CI loaded into cache, increase memory usage, which can result in an unstable system.

- ▶ Replace the automatically generated TQL query with a TQL query customized for your environment.

24

Event Assignment

This chapter includes:

Concepts

- ▶ Assign User Groups to Incoming Events on page 622

Tasks

- ▶ How to Map Events to User Groups on page 623

Reference

- ▶ User Group Assignments User Interface on page 625

Concepts

Assign User Groups to Incoming Events

This chapter describes how to automatically assign incoming events to available user groups. Automatic assigning of events to user groups responsible for solving these events significantly improves the efficiency of event management. Each event is assigned to an appropriate user group as soon as it is received. All operators in a user group are permitted to work on those events assigned to that user group.

The information provided aims to help you understand how to configure automatic event assignment to user groups.

User groups are mapped to incoming events in accordance with the Event User Group Mapping Rules. The user group of the first rule with a matching filter is applied to an event. The following rules are ignored.

These user groups are created and managed from User Management in Operations Management Administration:

Admin > Platform > Users and Permissions > User Management

For information on managing user permissions, see "User Management Basics" on page 630.

Note: Only users with the appropriate access permissions can use Operations Management Administration. For more information about user management, see "User Management" on page 629.

Tasks

How to Map Events to User Groups

This task shows you how to map an incoming event to a user group.

Note: To use Operations Management Administration areas, you must be granted permission to work with these or a subset of these. For details, see "How to Set Operations Management User or Group Permissions" on page 637.

Note: For information on button actions, see "User Group Assignments User Interface" on page 625.

To map an event to a user group

- 1 Open the Event Assignments pane from Operations Management Administration:
Admin > Operations Management > Tune Operations Management > Event Assignments
- 2 In the Event Assignments pane, click the  button to open the Create New Event Assignment Rule dialog box or the  button to open the Edit Event Assignment Rule dialog box.

User groups are mapped to incoming events in accordance with the Event User Group Mapping Rules. The user group of the first rule with a matching filter is applied to an event. All following rules are ignored.

- 3 Select an existing filter from the **Filter** list or create an event filter to identify the events that are to be assigned to the user group specified by this event user group mapping rule. For details about creating filters, see "Filtering Events" on page 211.

- 4 Select an existing user group from the **User Group** list to assign incoming events to.

Note: It can take up to one minute before newly created users are visible.

- 5 *Optional:* Add a description for this event user group mapping rule.
- 6 Select **OK** to apply your mapping and close the Event User Group Mapping Rules dialog box.

Reference

User Group Assignments User Interface

The User Group Assignments manager enables you to view and arrange event user group mapping rules to automatically assign incoming events to existing user groups.

This section includes:

- ▶ Event Assignments User Interface on page 625
- ▶ Create New and Edit Event Assignment Rule Dialog Boxes on page 628

Event Assignments User Interface

The Event Assignments pane enables you to view and arrange event user group mapping rules to automatically assign incoming events to existing user groups.

To access	Select Admin > Operations Management > Tune Operations Management > Event Assignments
Relevant tasks	For more information about automatically assigning events, see "Assign User Groups to Incoming Events" on page 622.
See also	For more information about mapping events to user groups, see "How to Map Events to User Groups" on page 623.

The Event Assignments pane displays the UI elements listed in the following table.

UI Element (A-Z)	Description
	Reloads the list of event user group mapping rules.
	New Item: Opens the Event User Group Mapping Rules dialog box to create an event user group mapping rule. Enter the events filter and user group for the rule. You can select an existing filter or user group or use the Browse (...) button to create a filter or edit an existing filter.
	Edit Item: Opens the Event User Group Mapping Rules dialog box to edit the selected event user group mapping rule. Enter the events filter and user group for the rule. You can select an existing filter or user group or use the Browse (...) button to create a filter or edit an existing filter.
	Delete Item: Removes the selected event assignment from the list of event assignments.
	Go to Users and Groups: Opens the User Management user interface for creating and modifying users and user groups.
	Manage Event Filters: Opens the Manage Named Filters dialog box for adding, editing, and managing filters. For information about defining filters, see "Filtering Events" on page 211.
	Move Up: Moves the selected event assignment up to a higher priority position.
	Move Down: Moves the selected event assignment down to a lower priority position.
Description	Description of the event user group mapping rule (optional).
Filter	The filter applied in the rule. The filter determines which events are mapped to the user group.

UI Element (A-Z)	Description
Order	Where more than one user group assignment mapping rule filter matches, the number in the Order column indicates the order in which the rules are applied during the mapping process. Using the  (Up) and  (Down) buttons, you can change the position of rules in the list. Note: If a rule matches, no further rules are applied.
User Group	Name of the group to which the filtered events are assigned by the selected event user group mapping rule.

Create New and Edit Event Assignment Rule Dialog Boxes

The Create New and Edit Event Assignment dialog boxes enables you to create and edit event user group mapping rules to automatically assign incoming events to existing user groups.

To access	Select Admin > Operations Management > Tune Operations Management > Event Assignments
Relevant tasks	For more information about automatically assigning events, see "Assign User Groups to Incoming Events" on page 622.
See also	For more information about mapping events to user groups, see "How to Map Events to User Groups" on page 623.

The Create New and Edit Event Assignment dialog boxes displays the UI elements listed in the following table.

UI Element (A-Z)	Description
Description	Description of the event user group mapping rule (optional).
Filter	Use the lists to select the filter to apply in the rule. The filter determines which events to consider in the mapping operation. You can select an existing filter or user group or use the Browse (...) button to create a filter or edit an existing filter. For details about creating filters, see "Filtering Events" on page 211. Note: The filter dialog box displayed for Event Assignments is customized for this task. For example, Assigned To: pane is not displayed as it is not relevant.
User Group	Name of the group to which the filtered events are assigned by the selected event user group mapping rule.

25

User Management

This chapter includes:

Concepts

- ▶ User Management Basics on page 630
- ▶ Operations Management Users on page 630
- ▶ Operations Management User Views on page 632

Tasks

- ▶ How to Define Operations Management Users on page 633
- ▶ How to Create Operations Management User Groups on page 635
- ▶ How to Create Operations Management Users on page 636
- ▶ How to Set Operations Management User or Group Permissions on page 637
- ▶ How to Assign Views to a User on page 640
- ▶ How to Import and Export Users and Groups on page 641

Reference

- ▶ User Management for Operations Management on page 643

Troubleshooting and Limitations on page 649

Concepts

User Management Basics

This chapter introduces how to configure users, and user roles for Operations Management.

The user configuration depends on the role the user fulfills as well as the tasks that the user is likely to perform, for example:

- ▶ Event management
- ▶ Operations Management administration

You can create an Operations Management user or group configuration to provide access to the features for specialist operators, for example, email application experts.

User groups enable you to restrict the scope of a user's responsibility to predefined areas. You can specify what features are available, either by configuring a user group (and all members of this group can access the same features) or more specifically by configuring the user directly.

For more information about the default configurations available for Operations Management users, see "Operations Management Users" on page 630. For more information about the user views, see "Operations Management User Views" on page 632.

Operations Management Users

You can define users and user groups for a specific area of responsibility. Configuring a new user or user group involves granting the appropriate level of access to events, health indicators, administrative user interfaces, tools, and custom actions. For example, it is essential for domain experts to be able to see events relating to the domains that they are responsible for configuring and maintaining.

You can grant users different levels of access to events based on whether:

- Events are assigned to the user or to one of the groups that the user is a member of.
- Events are not assigned to the user, nor any of the groups that the user is a member of (includes not assigned at all).

For example, you can permit users full access to any event that is assigned to them and only limited access to any event that is not assigned. Full access to assigned events enables the user to open or close the assigned event, change or work on it, or assign it to another user. Limited access to events that are not assigned to a user either hides the events completely or permits read-only access. You can also choose to grant a user the same access levels both assigned and unassigned events.

You can also define the actions that users or user groups can perform on events and their related CIs.

Permissions can be granted either directly or by a user group. Only users who log on with the appropriate credentials can view the requested object or start the desired Administration manager.

For example, Operations Management enables you to restrict access to the following elements according to individual user or user group:

- Events assigned to user
- Events not assigned to user
- Resetting health indicators
- Administration manager user interfaces (for example, Correlation Rules manager, and Tools manager)
- Tool categories
- Custom actions
- Configuration item types that are included in specific views

To reduce the effort and complexity involved in configuring authorization for individual users, you can grant authorization at the user-group level. Configuring assignment-based authorization at the user-group level makes sure that all users in a group have the same access to any event that is assigned to the group.

For example, you can make sure that all database users can access database-related events by setting up a group of database users, authorizing full access to assigned events for all users in the database user group, and making sure that all database-related events are assigned to the database user group.

Note: Sub groups inherit any authorizations granted to the parent group.

The assignment of events to Operations Management user groups is essential in larger environments. It is possible to automate this assignment to particular user groups, for example, by using event categories. Where no event category exists or an event is not assigned to any event category, Operations Management can automatically assign the event to a default category, which is immediately visible to all users or user groups.

For more information about automatically assigning events, see "Event Assignment" on page 621.

Operations Management User Views

Views enable you to select a specific group of configuration item types with which you can filter events. You can create views to reduce the amount of information presented to regular operators or target the needs of users with experts knowledge in particular fields, for example, database administration, or Microsoft Exchange.

For more information about Operations Management users, see "Operations Management Users" on page 630.

Tasks

How to Define Operations Management Users

This task explains how to set up a new user for Operations Management.

This task includes the following steps:

- "Prerequisites" on page 633
- "Create a User Group" on page 633
- "Create a User" on page 634
- "Define User Access and Permissions" on page 634
- "Assign Views" on page 634

1 Prerequisites

To create and configure new users and user groups, make sure that you can access Operations Management Administration and possess a good understanding of the following areas:

- Types of users that require access to Operations Management, for example, operators, subject matter experts, and administrators.
- Views.
- Events and event categories.
- Stages of the event workflow, for example, Open, In Progress, Resolved, or Closed.
- Concepts of event type indicators and their values.

2 Create a User Group

In this step, you create the group that a particular type of user with specific tasks and objectives belongs to. For more information, see "How to Create Operations Management User Groups" on page 635.

3 Create a User

In this step, you create the users that you want to add to the work group you defined in the previous step. For more information, see "How to Create Operations Management Users" on page 636.

4 Define User Access and Permissions

In this step, you configure the scope of the new user's role by defining the actions the new users can perform on events that are assigned to them or to other users, specifying if the user can reset an HI, and permitting access to Administration features. For more information, see "How to Set Operations Management User or Group Permissions" on page 637.

Note: Administrators usually need access to user-related objects such as events to test the features they are configuring. For example, an event correlation expert needs to see the events that are referenced in the test correlation rules.

5 Assign Views

In this step, you define the objects that the new user is permitted to see and work with. For more information, see "How to Assign Views to a User" on page 640.

How to Create Operations Management User Groups

This task explains how to set up a user group. The group can contain any type of user.

Note: For information on button actions, see "User Operations Tab" on page 646.

To define a user group:

- 1 Open User Management from Platform Administration:
Admin > Platform > Users and Permissions > User Management
- 2 If you want to add a group to an existing user group, select the existing group, click the  button and select **Create Group**.
- 3 In the Create Group dialog box, type the required details, such as: group name, a short description, and select **OK**.

How to Create Operations Management Users

This task explains how to set up a user for Operations Management.

Note: For information on button actions, see "User Operations Tab" on page 646.

To create a user:

- 1** Open User Management from Platform Administration:
Admin > Platform > Users and Permissions > User Management
- 2** If you want to add a user to an existing group, select the group and then click the  button and select **Create User**.

Note: You can create a user by cloning and renaming an existing user.

- 3** In the Create User dialog box, type the required details, such as: user name, log-on name, and password, and select **OK**.

The newly created user can now log on to the BSM console.

How to Set Operations Management User or Group Permissions

In this task, you set or modify the permissions granted to Operations Management users. Regular users require permission to perform operations on Operations Management objects such as, events, event categories, and indicators. Administrative users require access to Administration features and objects.

Note: For information on button actions, see "User Operations Tab" on page 646.

To set the Operations Management user permissions:

- 1** Open User Management from Platform Administration:
Admin > Platform > Users and Permissions > User Management
- 2** In the Groups/Users pane, select the user or group who you want to configure.
- 3** Select the **Permissions** tab.
- 4** In the Context pane, select the context: **Operations Management**.
- 5** In the Context pane, select **Events assigned to user** and, in the **Operations** tab, specify the actions users can perform on events that are assigned to them, for example: **Change**, **Work On /Resolve**, and **Close**. Select **Apply Permissions** to save the changes you make.
- 6** In the Context pane, select **Events not assigned to user** and, in the **Operations** tab, specify the actions users can perform on events that are assigned to other users, for example: **View**, or **Close**. Select **Apply Permissions** to save the changes you make. This setting is useful for administrators who need to see events but do not usually have events assigned to them.

Note: To grant access to events at a more detailed level, for example, per event category, expand the **Events not assigned to user** item and select the event category that you want to grant permission to work with. The event categories displayed in the context list are defined in the Operations Management settings page. For more information, see "Operations Management Infrastructure Settings Manager" on page 686.

- 7** In the context pane, select **Health Indicators** and, in the Operations tab, specify the action a user can perform (Reset). Select **Apply Permissions** to save the changes you make.
-

Note: Resetting an HI manually returns an HI's severity status to a defined default value such as **Normal**. For more information, see "How to Reset Health Indicators" on page 132.

- 8** Administrators and subject matter experts need access to administrative functions. If you want to grant access to all administrator areas, select **Administrative UIs** and, in the Operations tab, select **Grant** for View.

To grant access to Operations Management Administration areas at a more detailed level, for example, per manager, expand the **Administrative UIs** item and select the manager that you want to grant permission to work with, for example, Indicator Mappings manager and Correlation Rules manager. Select **Apply Permissions** to save the changes you make.

- 9** You can control access to tools using tool categories. If you want to grant access to all tool categories, select **Tool Categories** and, in the Operations tab, select **Grant** for Execute.

Tool categories can be used to grant access to tools at a more detailed level. Each tool is assigned a category, and for users to be able to use the tools with a certain category, they must be granted execution permissions for this Tool Category. To grant execution permissions, expand the **Tool Categories** item and select the tool that you want to grant permission to work with. Select **Apply Permissions** to save the changes you make.

- 10** You can also control access to custom actions. If you want to grant access to all custom actions, select **Custom Actions** and, in the Operations tab, select **Grant** for Execute.

Alternatively grant execution permissions for the custom actions that you want this user to use. To grant execution permissions, expand the **Custom Actions** item and select the custom action that you want to grant permission to and, in the Operations tab, select **Grant** for Execute. Repeat for other custom actions that this user requires. Select **Apply Permissions** to save the changes you make.

Note: Changes to a user account are only fully available after the user whose account was changed logs on again to the BSM console. BSM reloads user permissions every 0 minutes by default. However, events already loaded into the browser remain unaffected.

How to Assign Views to a User

In this task, you specify the views that are available to users and the type of access the user has to the view. Views define which RTSM objects users can see. Access type defines what users can do with the associated view, for example, View, Change, Delete or Full Control.

Note: For information on button actions, see "User Operations Tab" on page 646.

To assign a view to a user:

- 1** Open User Management from Platform Administration:
Admin > Platform > Users and Permissions > User Management
- 2** In the Groups/Users pane, select the user or user group you want to configure. If no user or group yet exists, create it now.
- 3** In the Context pane, select RTSM, and expand the Views item.
- 4** Scroll down the list of views and select those that you want to assign to the new user or user group. Multiple selections are possible using the **Shift** and **Ctrl** keys.
- 5** In the Operations tab, use the check boxes in the **Grant** column to indicate the type of access you want to assign to the new user, for example, **View**, **Change**, or **Delete**. Select **Full Control** if you want to grant the new user global rights to the objects referenced in the selected view.
- 6** Select **Apply Permissions** to save the changes.

Note: Changes to a user account are only fully available after a new logon to Operations Management. Operations Management reloads user permissions every 0 minutes by default. However, events already loaded into the browser remain unaffected.

How to Import and Export Users and Groups

In this task, you learn how to import user and group configurations exported from one BSM installation to another BSM installation.

Categories are not exported. However, the permissions for categories that do not exist on an installation are imported and stored. If a category is added on the target installation that matches a previously imported category, these existing permissions are applied accordingly.

Note: If users or groups already exist on the target installation, importing new configurations appends additional permissions. If the imported configuration is more restrictive, existing permissions on the target installation are not reduced. Descriptive information on the target installation remains unchanged.

To export user and group configurations:

- 1** Open the JBoss JMX Management Console on the BSM system from which you want to export the user and group configurations:
`http://<Source BSM Hostname>:8080/jmx-console`
- 2** Enter a user and password for the JBoss JMX Management Console.
- 3** Under the TOPAZ section, select:
`service=Authorization Service Data Import Export`
- 4** In the `exportAllTasEntities()` section, enter the name of the ZIP archive file (complete path) in the `toFilePath` field, and select **Invoke**.
All users and group data is exported to this ZIP archive file.

To import user and group configurations:

- 1** Copy the ZIP archive file containing the user and group configurations to the BSM system where you want to import the data.
- 2** Open the JBoss JMX Management Console on the BSM system to which you want to import the user and group configurations:
`http://<Target BSM Hostname>:8080/jmx-console`

- 3** Enter a user and password for the JBoss JMX Management Console (default: `admin/admin`).
- 4** Under the TOPAZ section, select:
service=Authorization Service Data Import Export
- 5** In the `importAllTasEntities()` section, enter the name of the zip archive file (complete path) in the `fromFilePath` field, and select **Invoke**.
All users and group data is imported to the BSM system.
- 6** Make sure that the new users and groups are available in User Management:
Admin > Platform > Users and Permissions > User Management

Reference

User Management for Operations Management

If you select the Operations Management context from the Context list, you can select the Operations Management areas and define the permissions to these areas.

Note: Granting access permissions to a user group automatically assigns the same access permissions to any users in the group.

This section includes the descriptions for the Operations Management areas:

- ▶ User Context Pane on page 644
- ▶ User Operations Tab on page 646

User Context Pane

If you select the Operations Management context from the Context list, you can select the Operations Management areas and define the permissions to these areas.

To access	Select Admin > Platform > Users and Permissions > User Management
Relevant tasks	<p>For more information about managing Operations Management users, see:</p> <ul style="list-style-type: none"> ➤ "How to Define Operations Management Users" on page 633. ➤ "How to Create Operations Management User Groups" on page 635. ➤ "How to Create Operations Management Users" on page 636.
See also	<p>For more information about Operations Management users, see:</p> <ul style="list-style-type: none"> ➤ "User Management Basics" on page 630. ➤ "Operations Management Users" on page 630. ➤ "Operations Management User Views" on page 632.

The Operations Management context displays the UI elements listed in the following table.

UI Element (A-Z)	Description
Administrative UIs	<p>Grants access to the Administration features in the Operations Management Administration, for example:</p> <ul style="list-style-type: none"> ▶ Correlation Rules manager ▶ Content Packs manager ▶ Performance Graphs manager ▶ View Mappings manager ▶ Event Processing Customization ▶ Custom Actions <p>Users who do not have view permissions to Operations Management Administration are not be able to see the Operations Management Administration features or see an error message when they try to start an Administration manager.</p>
Custom Actions	Grants access to custom actions. Any custom actions to which a user has access can be executed by the user.
Events assigned to users	Specifies the type of access a user or user group should have to events that are assigned to them. You can select one or more of the available operations, for example: Work On / Resolve, Close, Reopen, or Assign to.
Events not assigned to users	Specifies the type of access a user or user group should have to events that are not assigned to them. You can select one or more of the available operations, for example: Work On / Resolve, Close, Reopen, or Assign to.
Health Indicators	Indicates if the user or user group has access to the feature that enables the resetting of HIs. For more information about resetting HIs, see "How to Reset Health Indicators" on page 132.
Tool Categories	Grants access to tool categories. Any tools belonging to a tools category to which a user has access can be executed by the user.

User Operations Tab

The Operations tab in the Users and Permissions settings displays the permissions granted to users for access to specified objects.

To access	Select Admin > Platform > Users and Permissions > User Management
Relevant tasks	For more information about managing Operations Management users, see: <ul style="list-style-type: none"> ➤ "How to Define Operations Management Users" on page 633. ➤ "How to Create Operations Management User Groups" on page 635. ➤ "How to Create Operations Management Users" on page 636.
See also	For more information about Operations Management users, see: <ul style="list-style-type: none"> ➤ "User Management Basics" on page 630. ➤ "Operations Management Users" on page 630. ➤ "Operations Management User Views" on page 632.

The User Operations tab displays the UI elements listed in the following table.

UI Element (A-Z)	Description
Add/Delete/Update Annotations	Enables the user to create, modify and delete annotations for an event.
Add/Delete/Update Custom Attributes	Enables the user to create, modify and delete custom attributes.
Add/Remove Event Relations	Enables the user to add and remove relations between events in the Event Browser.
Assign To	Enables the user to assign the selected events to a specific user or user group.
Change	Enables the user to change events attributes of events.

UI Element (A-Z)	Description
Close	Enables the user to set the lifecycle state for the selected events to Closed.
Close Transferred	Enables the user to close events in the Event Browser for which control was transferred to an external manager.
Execute	Enables the user to execute tools belonging to the selected category or execute the selected or custom action.
Grant	Select one or more of the available operations to enable access to the object selected in the Context pane, for example: Work On / Resolve, Close, Reopen, or Assign to.
Granted from	Indicates with a check if access is already granted through inheritance from another object, such as a user group, a user role, or a parent object.
Inherit	Indicates if the permission can be passed on.
Launch	<p>Enables the user to run HP Operations Manager actions for an event containing event-related actions. There are two types of HP Operations Manager:</p> <ul style="list-style-type: none"> ➤ Operator actions ➤ Automatic actions
Operation	Type of operation to be performed, for example: View, Open, or Delete. The list of available operations depends on the context selected.
Reset	Enables the user to clear the current status of an HI and reset the HI to the status specified in the default HI value.
Reopen	<p>Enables the user to set the lifecycle state for the selected Closed events to Open. The events can now be reassigned to users for further investigation and resolution.</p> <p>Note: Reopening symptom events with a closed cause is not possible.</p>
Transfer Control	Enables the user to transfer control of events in the Event Browser to an external manager.

UI Element (A-Z)	Description
View	Enables the user to access and use the selected Administrative user interface (for example, the ETI Mapping manager, or Correlation Rules manager).
Work On / Resolve	<p>Enables the user to set the lifecycle state for the selected events to In Progress. This indicates that the underlying problems of the events are under investigation by the user setting the status to In Progress or by another user assigned to the event.</p> <p>Enables the user to set the lifecycle status for the selected events to Resolved when the underlying problems are solved.</p>

Troubleshooting and Limitations

This section provides the following help for those people who are troubleshooting problems with users and user groups in Operations Management administration:

- Users Not Available on page 649
- Users Has Incorrect Home Page on page 649
- Users Sees Incorrect Features on Log On on page 649
- Users Denied Access to Tools on page 649

Users Not Available

- User not configured
- Incorrect user or group configuration

Users Has Incorrect Home Page

Incorrect user settings

Users Sees Incorrect Features on Log On

Incorrect user settings

Users Denied Access to Tools

- Browser session started by user who does not have the authorization to launch a tool
- Tool definitions not imported into Operations Management

26

Auditing in Operations Management

This chapter includes:

Concepts

- Introduction to Auditing on page 652

Tasks

- How to Enable Auditing on page 653
- How to View Audit Information on page 654

Reference

- Audited Operations Management Areas on page 655

Concepts

Introduction to Auditing

Auditing the changes to configurations of Operations Management, changes to events, and execution of tools and actions is critical to reducing security risk and achieving compliance.

You can configure Operations Management to generate and record audit events when a user changes an Operations Management configuration or an event. For example, if a user executes an action on a node, a corresponding entry is made in the Operations Management Audit Log, recording the date and time of execution, the user who started the action, and a description of the action run.

There are two audit categories to configure which type of changes are logged:

► **Configuration**

The default value is Configuration. When you set this category, only configuration changes are written to the Audit Log.

► **All**

When you set this category, both event and configuration changes are written to the Audit Log.

Areas Not Audited

The Operations Management areas that are not audited are listed in the following list.

- Changes to displayed columns in the Event Browser
- Change to column sizes
- Information about which column was used for ordering
- Active filter applied

Tasks

How to Enable Auditing

This task shows you how to enable auditing of Operations Management.

Note: To use Operations Management Administration areas, you must be granted permission to work with these or a subset of these. For details, see "How to Set Operations Management User or Group Permissions" on page 637.

To enable auditing:

- 1 Open the Infrastructure Settings manager:
Admin > Platform > Setup and Maintenance > Infrastructure Settings
- 2 In the **Applications** list, set the context to **Operations Management**.
- 3 In the Auditing Settings section, click the  button for the entry: Audit Category.
- 4 In the Edit Setting dialog box, select the auditing level:
Configuration: Record only changes made to Operations Management configurations. Default setting.
All: Records all changes to Operations Management configurations and events.
- 5 Select **Save**.
- 6 In the Auditing Settings section, click the  button for the entry: Enable Auditing.
- 7 In the Edit Setting dialog box, select **True**.
- 8 Select **Save**.
Auditing is enabled immediately.

How to View Audit Information

This task shows you how to view the audit logging information for Operations Management.

To view the audit information for Operations Management:

- 1 Open the Audit Log manager:

Admin > Platform > Setup and Maintenance > Audit Log

- 2 In the **Context** list, set the context to **Operations Management**.

The contents of the audit log are displayed.

- 3 *Optional:* Set the Auditing Filters to display only the audit information that you are interested in:

User: Specifies user associated with the audit information that you want to view.

Containing text: Specifies the text string that you want to search for.

Start after: Specifies the start time for the time period for which you want to search the audit log.

End before: Specifies the end time for the time period for which you want to search the audit log.

- 4 Select **Apply**.

The filtered results are displayed.

Modification Date	Modified By	Actions
4/27/10 11:12 AM	administrator (admin)	Content Pack Definition exported, id:23edf5c3-0116-4638-b942-a528de51133, name:OMI_Demo_Assignments, version:0
4/27/10 11:11 AM	administrator (admin)	Content Pack Definition created, id:23edf5c3-0116-4638-b942-a528de51133, name:OMI_Demo_Assignments, label:OMI Demo Assignments
4/27/10 10:28 AM	administrator (admin)	Content Pack Definition created, id:d1ed9f53-4d05-4d44-a0f9-4126d040b64, name:EPI_Demo, label:EPI Demo
4/27/10 10:28 AM	administrator (admin)	Content Pack import committed, mode:OVERWRITE, testonly:false, importer:admin
4/27/10 10:28 AM	administrator (admin)	Content Pack import start, contentPackName:EPI_Demo, contentPackVersion:1.00, mode:OVERWRITE, testonly:false, importer:admin
4/27/10 10:27 AM	administrator (admin)	Content Pack Definition deleted, id:9f6c2b68-2d08-4983-bdcf-25706990b964, name:t1, label:t1
4/27/10 10:27 AM	administrator (admin)	Content Pack Definition deleted, id:7c496779-7d60-43e2-965c-41739ab91de6, name:t5, label:t5
4/27/10 10:27 AM	administrator (admin)	Content Pack Definition deleted, id:699c70c3-74ae-4d5e-9286-be9e21b97d9d, name:t2, label:t2
4/27/10 10:27 AM	administrator (admin)	Content Pack Definition deleted, id:61f00191-a749-4b80-98bc-8db267235e, name:hh, label:hh
4/27/10 10:27 AM	administrator (admin)	Content Pack Definition deleted, id:6f69ed7-1615-441a-9c73-794d6425f20c, name:hkhjk, label:hkhjk
4/28/10 6:13 PM	administrator (admin)	CI-Type to View Mapping created, id:7b722641-bb4d-422b-b686-f9371, ciType:database, viewName:OprSample
4/28/10 6:13 PM	administrator (admin)	CI-Type to View Mapping created, id:9282e7cd-74b5-43b0-b7b4-e8230b3024d5, ciType:node, viewName:OprSample
4/28/10 6:12 PM	administrator (admin)	CI-Type to View Mapping created, id:59499f9e-e8d5-4884-9925-a859985039fa, ciType:cluster, viewName:OprSample
4/28/10 6:12 PM	administrator (admin)	CI-Type to View Mapping created, id:c86bc253d-1fae-40e7-8414-b97283cc802a, ciType:dbtablespace, viewName:OprSample
4/28/10 6:12 PM	administrator (admin)	CI-Type to View Mapping created, id:aebf2341-b3a4-4714-ad60-156d1b8aa126, ciType:2eeapplication, viewName:OprSample

Reference

Audited Operations Management Areas

The following sections list of the Operations Management areas that can be audited, and include the specific changes that generate an entry in the Audit Log.

Event Changes in the User Interface

The following is a list the event changes that are audited. For event-related changes to be recorded, the Audit Category must be set to All.

When a change is made, only the new value is written to the Audit log.

- Action launches.
- Add Custom Attributes — creating, editing, and deleting.
- Annotations — creating, editing, and deleting.
- Assign Event to User or Group changes.
- Event Title edits.
- Forwarding Actions.
- Lifecycle State of event changes.
- opr-archive-events.bat and opr-close-events.bat maintenance tools launches.
- Priority of event changes.
- Re-run Automatic or Operator Action.
- Severity of event changes.
- Tool launches.

Configuration Changes

The following is a list of the configuration changes that are audited. For configuration-related changes to be recorded, the Audit Category can be set to Configuration or All.

- ▶ Audit Configuration — changing, enabling, and disabling.
- ▶ CI Resolver Mapping — creating, editing, and deleting.
- ▶ Connected Server — creating, editing, and deleting.
- ▶ Content Packs — creating, editing, deleting, importing and exporting.
- ▶ Custom Action Configurations — creating, editing, and deleting.
- ▶ Downtime Configuration — creating, editing, and deleting.
- ▶ EPI Configuration — creating, editing, and deleting.
- ▶ ETI Mapping Rules — creating, editing, and deleting.
- ▶ Event Assignment Rules — creating, editing, and deleting.
- ▶ Event Forwarding — WS-triggered actions using the console API.
- ▶ Filters — creating, editing, and deleting.

Only changes about filters created and used in the Operations Management Admin user interface, for example, ETI Mapping Rules, User Group Assignment, Forwarding Rules are written to the Audit log. Filters defined by operators in the Operations Management Application user interface are not audited.

- ▶ Forwarding Rules — creating, editing, and deleting.
- ▶ TBEC Rules — creating, editing, and deleting.
- ▶ Tools for CI Type — creating, editing, and deleting.
- ▶ View Mapping for CI Type — creating, editing, and deleting.

27

Tracing and Logging Operations Management User Interfaces

This chapter includes:

Concepts

- ▶ Introduction to Tracing and Logging on page 658

Tasks

- ▶ How to Enable Logging on page 659
- ▶ How to Save Log Information on page 660

Reference

- ▶ Logging Settings User Interface on page 661

Concepts

Introduction to Tracing and Logging

The Operations Management logging and tracing capabilities help simplify on-site troubleshooting.

Logging is designed to be run on the client system and uses JavaScript to send logging and tracing output to a browser window. You can enable logging and tracing on demand and save the output to aid troubleshooting.

Note: Due to sandbox restrictions in the Adobe Flash Player and the browser, it is not possible to write logs to the clients local file system.

Tasks

How to Enable Logging

This task shows you how to enable logging of the user interface client.

To enable logging:

1 Log on to BSM:

`http://<BSM_host>/bsm`

2 Open the following URL to open the logging configuration application.

`http://<hostname>/opr-admin-server/logging/logging.html`

The Logging Settings dialog box opens.

3 To enable logging, select the **Enable logging for this session** check box.

4 Select the required logging level. Each log level includes the higher levels:

Critical: Shows only problems of level Critical.

Error: Shows problems of level Error and Critical.

Warning: Shows problems of level Warning, Error, and Critical.

Info: Shows problems of level Info, Warning, Error, and Critical.
The resulting information provides a brief overview over the flow of the executed steps.

Debug: Shows problems of level Info, Warning, Error, and Critical.
The resulting information provides a detailed, verbose view over the flow of the executed steps.

5 *Optional:* Set a filter value to find instances of the specified text strings. By default, all messages that have a category starting with com.hp. are logged. You can restrict this to certain categories to filter the output or extend it, for example, to show messages from the Flex framework.

6 Click **Apply**.

The settings become effective for the current browser session.

- 7 Restart the user interface that you want to trace.

As soon as the first log output is sent, a browser window opens that shows the log messages.

Note: Each time you change the logging settings you must restart the user interface that you want to trace.

The settings are for applications that are served from the same domain as that of the current browsing session. If you restart the web browser, you must reapply the logging settings

How to Save Log Information

This task shows you how to save the logging information of the user interface client.

To save the current logging information from the browser window:

- 1 Select the following menu options:

File > Save As

The Save Web Page dialog box opens.

- 2 Select a destination directory, specify a file name, select the file type and encoding for the logging information to be saved.
- 3 Click **Save**.

Reference

Logging Settings User Interface

The Logging Settings page enables you to enable or disable logging of Operations Management Flex-based user interfaces, such as the Operations Management administration components.

To access	<ol style="list-style-type: none"> 1 Select Log on to BSM: <code>http://<BSM_host>/bsm</code> 2 Open the following URL to open the logging configuration application. <code>http://<hostname>/opr-admin-server/logging/logging.html</code>
Relevant tasks	<p>For more information about configuring the logging, see:</p> <ul style="list-style-type: none"> ➤ "How to Enable Logging" on page 659. ➤ "How to Save Log Information" on page 660.
See also	<p>For more information about logging, see "Introduction to Tracing and Logging" on page 658.</p>

The Logging Settings page UI elements are listed in the following table.

UI Element (A-Z)	Description
Add	Adds the filter category specified in the Filter field to the list of filters to be applied.
Apply	Applies the logging settings for use as soon as the application being logged is reloaded.
Enable logging for this browser setting	Enables logging of the current browser session.
Filter	Field used to specify a filter category. You can the * symbol as a wildcard character to limit the output to certain categories.

UI Element (A-Z)	Description
Log Level	<p>Sets the detail level to be logged. The available levels are listed below:</p> <p>Critical: Shows only problems of level Critical.</p> <p>Error: Shows problems of level Error and Critical.</p> <p>Warning: Shows problems of level Warning, Error, and Critical.</p> <p>Info: Shows problems of level Info, Warning, Error, and Critical. The resulting information provides a brief overview over the flow of the executed steps.</p> <p>Debug: Shows problems of level Info, Warning, Error, and Critical. The resulting information provides a detailed, verbose view over the flow of the executed steps.</p>
Remove	<p>Removes the selected filter category from the list of filters to be applied.</p>

28

Topology Synchronization

This chapter includes:

Concepts

- ▶ Dynamic Topology Synchronization on page 664
- ▶ Basic Topology Synchronization on page 666

Tasks

- ▶ How to Run Dynamic Topology Synchronization on page 667
- ▶ How to Run Basic Topology Synchronization on page 671

Reference

- ▶ Basic Topology Synchronization Command-Line Interface on page 672

Troubleshooting and Limitations on page 674

Concepts

Dynamic Topology Synchronization

Discovery is the process of populating the Run-time Service Model database (RTSM) with CI and service data. Accurate CI topology information provided by discovery of the system infrastructure is essential for the health system and Topology-based Event Correlation.

Discovery ensures that topology data in the RTSM is accurate, current, and almost instantly updated whenever something changes in the environment. The discovered data can be made available to both BSM and HP Operations Manager.

Service discovery uses policies consisting of the following components:

- ▶ Discovery schedule.
- ▶ Type model.
- ▶ Parameters, for example, credentials.
- ▶ Script or instrumentation to execute the discovery.

The agent functionality incorporates delta detection, deletion detection, and communication with the HPOM server. The scripts provide the data in a form that the HPOM server can handle.

Exchange Node and Service Configurations Automatically

In an environment with multiple servers (HP Operations Manager and Operations Management), you can automatically synchronize node and service data with other servers by forwarding the information from one server to one or more other servers. The synchronized data includes nodes, external nodes, node groups, services, and service types.

The data synchronization by default uses both of the following synchronization methods in combination:

► Scheduled (time-based) Synchronization

Service auto-discovery policies on the source server regularly download the node and service data. The agent on the HPOM management server processes the data to detect any changes and reports the changed elements to the HPOM management server. The HPOM management server then establishes an HTTPS connection to one or more target servers and forwards the changed elements only.

► Event-driven synchronization

A WMI event listener continuously listens on the source server for changes to the node and service data. When a change occurs, the HPOM management server immediately forwards the changed elements. This ensures that the node and service configuration on all servers is always accurate and up to date because it is updated at runtime each time the environment changes.

Note: Instead of using the policy-based synchronization method you can use the `startInitialSync` tool on the HPOM management server to download and forward all the topology data that already exists on HPOM management servers manually. For more information about migrating from scheduled synchronization, see the Operations Manager i Extensibility Guide.

Basic Topology Synchronization

Operations Management provides the command-line tool **opr-startTopologySync** that enables you to synchronize topology data, such as services and managed nodes, from HPOM to the RTSM.

On startup, the **opr-startTopologySync** tool uses parameters defined and stored in the settings manager. The topology synchronization process requires the following prerequisites:

- ▶ Connection between Operations Management and the HPOM management servers
- ▶ HPOM management server configured to forward events to Operations Management
- ▶ Access to both the Operations Management installation and the RTSM

You can run the **opr-startTopologySync** tool manually from the command-line or according to a defined schedule, for example, with the Windows task scheduler.

Note: For multi-system, distributed installations, the **opr-startTopologySync** tool must be run on the Data Processing Server system.

For more information about the settings for the topology synchronization tool, see "Topology-Based Event Correlation Settings" on page 717. For more information about the **opr-startTopologySync** command, see "Basic Topology Synchronization Command-Line Interface" on page 672.

Note: Some features are only available to users who are logged on with the appropriate authorization. If you are logged on to Operations Management without administrative authorization, you may be required to supply a user name and password to start Content Packs tools.

Tasks

How to Run Dynamic Topology Synchronization

Before configuring forwarding of topology (node and service) data to Operations Management from HP Operations Manager management servers, complete the following configuration steps in Operations Management:

- ▶ Add the HP Operations Manager management server as a connected server in Operations Management. For details, see "How to Create a Connection to an HPOM Server" on page 413.
- ▶ Establish a trust relationship between the Data Processing Server and the HP Operations Manager management server. For details, see "How to Establish a Trust Relationship for a Server Connection" on page 426.
- ▶ *Optional:* Use the `opr-sd-tool.bat` command-line tool to upload new or changed synchronization packages from the file system to the database. For details, see the *Operations Manager i Extensibility Guide*.

After ensuring that the HP Operations Manager management server is added in Operations Management as a connected server, configure the forwarding of topology (node and service) data on the HP Operations Manager management server as described in the following section.

The following sections describe how to configure topology synchronization:

- ▶ "How to Configure Dynamic Topology Synchronization on HPOM for Windows Systems" on page 668
- ▶ "How to Configure Dynamic Topology Synchronization on HPOM for UNIX Systems" on page 669

How to Configure Dynamic Topology Synchronization on HPOM for Windows Systems

This section describes how to configure Dynamic Topology Synchronization on HPOM for Windows management servers. For further details, see the HPOM for Windows documentation.

To forward topology data to Operations Management, complete the following steps on the HP Operations Manager for Windows management server from which you want to receive topology information:

1 Configure trusted certificates for multiple servers.

In an environment with multiple servers, you must configure each server to trust certificates that the other servers issued. For details, see "How to Establish a Trust Relationship for a Server Connection" on page 426.

2 Configure the list of target servers:

- a** In the console tree, right-click **Operations Manager**, and select **Configure Server**.

The Server Configuration dialog box opens.

- b** Click **Namespaces**, and select **Discovery Server**.

A list of values appears.

- c** Add the hostname of the Gateway Server to **List of target servers to forward discovery data**.

If there is more than one target server, separate the hostnames with semicolons, for example:

```
server1.example.com;server2.example.com
```

- d** *Optional:* If the target server uses a port other than port 383, append the port number to the hostname, for example:

```
server1.example.com:65530;server2.example.com:65531
```

- e** *Optional:* Set the value of Enable discovery WMI listener to false if you do not want to immediately synchronize changes with other servers. The other servers are updated again the next time discovery runs.

- f** Click **OK** to save your changes and close the Server Configuration dialog box.

- g** Restart the OvAutoDiscovery Server process for your changes to take effect using the following commands:

```
net stop "OvAutoDiscovery Server"
```

```
net start "OvAutoDiscovery Server"
```

Note: If you exchange certificates after configuring dynamic topology synchronization, restart the OvAutoDiscovery server process.

- 3** Deploy the following policy group to the source management server agent:

Policy Management > Policy Groups > Samples > en > HPOM Discovery

The policy group contains the following service auto-discovery policies:

- **DiscoverOM** — Discovers and downloads nodes, external nodes, node groups, and services.
- **DiscoverOMTypes** — Discovers and downloads service types.

How to Configure Dynamic Topology Synchronization on HPOM for UNIX Systems

This section describes how to configure Dynamic Topology Synchronization on HPOM for UNIX management servers. For further details, see the HPOM for UNIX documentation.

To forward topology data to Operations Management, complete the following steps on the HP Operations Manager for UNIX management server from which you want to receive topology information:

- 1** *Prerequisite:* Make sure that the minimum patch level for the HPOM 9.10 for UNIX management server is installed:
- HP-UX: Patch PHSS_41692 or superseding patch.
 - Linux: Patch OML_00034 or superseding patch.
 - Solaris: Patch ITOSOL_00748 or superseding patch.

2 *Prerequisite:* Make sure that the HPOM for UNIX Agent version on the HPOM for UNIX management server is 8.60.500 or higher (Older agents require the Agent hotfix QCCR1A100254 and Agtrep must be configured to send complete instance data.

3 *Prerequisite:* Configure trusted certificates for multiple servers.

In an environment with multiple servers, you must configure each server to trust certificates that the other servers issued.

4 *Prerequisite:* Type the following command to upload the HPOM Discovery policy group to the HPOM management server:

```
/opt/OV/contrib/OpC/enableToposync.sh -upload -online  
-sched -target <BSM_Gateway_Server_DNS_Name>
```

The policy group contains the following service auto-discovery policies:

- ▶ **DiscoverOM:** Discovers and downloads nodes, external nodes, node groups, and services.
- ▶ **DiscoverOMTypes:** Discovers and downloads service types.

How to Run Basic Topology Synchronization

How to Use the Topology Synchronization Tool

You start the Topology Synchronization command-line tool as follows:

- 1 Make sure the BSM platform is running.
- 2 On the Data Processing Server, execute the following command:

```
<HPBSM_Root_Directory>/bin/opr-startTopologySync.bat
```

Note: You can also start this tool as a scheduled task in Windows. The tool reads its required parameters from the BSM platform Settings Manager.

For configuration details, see "HPOM Topology Synchronization Connection Settings" on page 710 and "HPOM Topology Synchronization Settings" on page 712.

Reference

Basic Topology Synchronization Command-Line Interface

This section describes the options and parameters available in the Operations Management topology synchronization command-line interface.

Note: For multi-system, distributed installations, the **opr-startTopologySync** tool must be run on the Data Processing Server system.

The **opr-startTopologySync** command without any options loads the complete service model and synchronizes all configured data from HPOM to the RTSM. The normal mode also performs delta detection and deletes elements from the RTSM that have been deleted in HPOM.

To run the **opr-startTopologySync.bat** tool in normal mode, run the following command:

```
<HPBSM_Root_Directory>/bin/opr-startTopologySync.bat
```

The **opr-startTopologySync** command accepts the following option:

opr-startTopologySync -touch

The **ContentManager** command has one option:

-touch

Does not perform the full synchronization. Reads the data saved from the last synchronization from the file system. This data is the same as that used for delta detection. The touch options touches every configuration item to reset configuration item aging and prevent them being deleted during the synchronization process as a result of being too old.

For more details about RTSM aging, see the *HP Business Availability Center Model Management* guide.

Troubleshooting and Limitations

This section provides the following help on troubleshooting problems about topology synchronization:

- ▶ "Event Synchronization Does Not Work" on page 674
- ▶ "Security Certificates are Missing or Incorrect" on page 675
- ▶ "Topology Synchronization Fails to Work" on page 677
- ▶ "Topology Synchronization Troubleshooting, Common Issues, and Tips" on page 677

Event Synchronization Does Not Work

The exchange and synchronization of events between Operations Management and either HPOM is not working correctly:

- ▶ Make sure that the name of the HPOM management server is configured in Operations Management. For details, see "HPOM Topology Synchronization Connection Settings" on page 710.
- ▶ Make sure that the names of the systems hosting the BSM Gateway Servers are configured as managed nodes in HPOM. HP Operations Manager for Windows only accepts messages containing nodeinfo referring to known nodes.
- ▶ Make sure that the server-based flexible management policy is configured correctly and deployed on the HPOM management server. Flexible management is also known as Manager of Manager (MoM).
- ▶ Make sure that the local time and date is the same on all BSM servers and the HPOM server. Otherwise, the certificate generated for the trust relationship between the servers fails and no communication can take place.
- ▶ Verify that the installation and configuration of BSM created a Sonic queue named **opr_gateway_queue**:
 - ▶ Start the Sonic Management Console:
Start > Programs > Progress > Sonic <version> > Sonic Management Console

- Select the **Configure** tab, browse to the **Queues** element (**Managed Objects > Containers > <HPOM Management Server> > Queues**), and make sure that the queue named **opr_gateway_queue** exists.
- Make sure that both the **Control** daemon and **bbc** (used for communication between HPOM and BSM) are running on both the BSM host system and the HPOM management server system:

```

ovc -status
ovcd    OV Control           CORE (8452)  Running
ovbbccb OV Communication Broker  CORE (2032)  Running

```

If the **ovc -status** command indicates that **ovc** is not running, start **ovc** with the **-start** parameter, for example: **ovc -start**.

Security Certificates are Missing or Incorrect

If security certificates are missing or incorrect, verify security certificates on BSM and HPOM.

Solution

Make sure that BSM and HPOM exchanged security certificates and a trust relationship exists between the servers, as indicated in the following steps.

To verify security certificates and trust relationships:

- 1 On the BSM system, make sure that the correct security certificate is installed:

```

ovcert -check

OvCoreId set           : OK
Private key installed  : OK
Certificate installed   : OK
Certificate valid       : OK
Trusted certificates installed : OK
Trusted certificates valid  : OK

```

2 List the contents of the certificate**ovcert -list**

(Sample output)

```

+-----+
| Keystore Content-----|
+-----+
| Certificates           |
| 6073fd42-9326-7531-1b2d-cdab6fa099d4 (*)           |
+-----+
| Trusted Certificates: |
| CA_14d14502-1671-7531-13d6-a06656d31bf3           |
+-----+

```

- 3** Make sure that communication is possible between BSM and HPOM. Run the following command on *both* the BSM host system and the HPOM management server system:

```

bbcutil -ping https://<hpom server name>
https://<hpom server name>: status=eServiceOK
   coreID=14d14502-1671-7531-13d6-a06656d31bf3
   bbcV=06.10.070 appN=ovbbccb appV=06.10.070 conn=7
   time=453 ms

```

- 4** Make sure that communication is possible between BSM and the HPOM Message Receiver. Run the following command on *both* the BSM host system and the HPOM management server system:

```

bbcutil -ping https://<hpom server name>/com.hp.ov.opc.msgr
https://<hpom server name>: status=eServiceOK
   coreID=14d14502-1671-7531-13d6-a06656d31bf3
   bbcV=06.10.070 appN=ovbbccb appV=06.10.070 conn=7
   time=453 ms

```

Topology Synchronization Fails to Work

Make sure that the following settings are correctly specified:

- ▶ Database Settings: required to write the ID mapping into the database for resolution of configuration items.
- ▶ HPOM Connection Settings: required to read the topology data from the HPOM web service during synchronization.
- ▶ RTSM Connection Settings: required to write the configuration item information to the RTSM during the synchronization.

Topology Synchronization Troubleshooting, Common Issues, and Tips

The following Dynamic Topology Synchronization log files are a good starting point for troubleshooting.

Log Files:

<HPBSM root directory>/log/wde/opr-svcdiscserver.log

- ▶ Default on Windows:

C:\HPBSM\log\wde\opr-svcdiscserver.log

- ▶ Default on Linux:

/opt/HP/BSM/log/wde/opr-svcdiscserver.log

<OvDataDir>/log/OvSvcDiscServer.log

- ▶ Default on Windows:

%OvDataDir%\log\OvSvcDiscServer.log

- ▶ Windows 2003:

C:\Documents and Settings\All Users\Application Data\HP\HP BTO Software\log\OvSvcDiscServer.log

- ▶ Windows 2008:

C:\Program Data\HP\HPBSM\log\OvSvcDiscServer.log

► **Default on Linux:**

`/var/opt/OV/log/OvSvcDiscServer.log`

Log File Configuration Files:

`<HPBSM root directory>/conf/core/Tools/log4j/wde/oprsvcdiscserver.properties`

► **Default on Windows:**

`C:\HPBSM\conf\core\Tools\log4j\wde\oprsvcdiscserver.properties`

► **Default on Linux:**

`/opt/HP/BSM/conf/core/Tools/log4j/wde/oprsvcdiscserver.properties`

See the *Operations Manager i Extensibility Guide* for further details.

The most common issues are listed in the following table. The issues apply to topology synchronization generally, unless otherwise specified.

Symptom	Cause	Solution
Topology synchronization fails	Operations Manager <i>i</i> Enablement Patches are not installed. See the BSM 9.10 Readme for details, including information about any required agent hotfixes or patches.	<p>Operations Manager for Windows: Install Patch OMW_00090 or superseding and OMW_00092 for HPOM 8.1x for Windows. HPOM 9.00 for Windows does not require any patches.</p>
		<p>Operations Manager for UNIX or Linux: Install Patch PHSS_41692 or superseding for HPOM 9.10 for HP-UX. Install Patch OML_00034 or superseding for HPOM 9.10 for Linux. Install Patch ITOSOL_00748 or superseding for HPOM 9.10 for Solaris.</p>

Symptom	Cause	Solution
Basic topology synchronization fails.	Port for the web service is not configured correctly.	Make sure the port for the web service is correctly configured.
	User name / password are wrong.	Format for HPOM for Windows: DOMAIN\Username User must have at least PowerUser rights and must be a member of HP-OVE-Admins group.
Dynamic topology synchronization fails.	Synchronization package was changed on disk, but not uploaded to the database.	Run the opr-sd-tool.bat command-line tool to upload changes to synchronization packages to the database (see <i>Operations Manager i Extensibility Guide</i> for further details).
Result of dynamic topology synchronization is incomplete or empty.	Discovery policies (DiscoverOMTypes and DiscoverOM) are deployed prior to configuring the Operations Management instance as a target server in HPOM.	On the HPOM management server, run the command: ovagtrep -publish This command resends all topology data to the HPOM or Operations Management instances.
All of a sudden, no more node CIs are created and the synchronization fails.	The default synchronization package is missing from the Topology Synchronization settings.	Check if the default synchronization package was removed from the Topology Synchronization settings. The default package must always be present in the semicolon-separated list.
Warnings in the log file.	Model-related issues.	No immediate action required, however topology synchronization performance can be affected.
You created your own synchronization package but you only get a cryptic RTSM (Run-time Service Model) exception in the log file.	Mapping-related issues.	Enable the data dump option and check if the file in the directory: <HPBSM root directory>/opr/tmp/datadump/postenrichment contains all expected attributes for the CIs of your synchronization package.

29

Infrastructure Settings for Operations Management

This chapter includes:

Concepts

- ▶ Settings Management Basics on page 682

Tasks

- ▶ How to Display and Edit Operations Management Settings on page 685

Reference

- ▶ Operations Management Infrastructure Settings Manager on page 686

Concepts

Settings Management Basics

This chapter provides an overview of the settings required for Operations Management including information that helps to configure the Operations Management settings.

The Infrastructure Settings Manager page for Operations Management page enables you to view and modify the default configuration for Operations Management. The settings displayed on this page determine how Operations Management behaves and performs. Changing settings can affect the performance of both the application itself and the underlying platform. Only users with both the required background knowledge and access permission should attempt to change these settings.

To access the Infrastructure Settings Manager page for Operations Management page, see "How to Display and Edit Operations Management Settings" on page 685.

Note: Modified values are displayed in **bold** text. In some cases, the changes you make are not effective immediately. You might have to restart the browser session or a server process.

The Infrastructure Settings Manager page for Operations Management displays details of the following settings:

UI Element (A-Z)	Description
Audit Settings	Defines whether auditing is enabled and whether just configuration changes are recorded or also changes to events.
CI Resolver Settings	Defines how and when configuration items should be resolved.

UI Element (A-Z)	Description
Certificate Server Settings	Configures the Certificate Server that issues certificates for secure communication.
Close Related Events Settings	Defines how and when new events are used to close one or more existing, related events.
Closed Events Browser Settings	Sets the maximum number of closed events to be displayed in the Closed Events Browser.
Custom Attribute Settings	List of the attributes that can be added to the HPOM Event Browser as columns.
Downtime Settings	List of the attributes that are used for controlling the handling of events that were received while the CI was not available due to a scheduled downtime.
Duplicate Events Suppression Settings	List of the attributes that are used for matching new events with existing events used to suppress duplicates.
EPI Server Settings	Sets the Server Timeout value used for the Event Pipeline.
Event Cache Settings	<p>Maximum limit for the number of active top level events that are cached on a gateway server.</p> <p>This mechanism is required to prevent the gateway servers from running out of memory, for example, in case of event storms that cause lots of active events.</p>
Event Forwarding Settings	Controls whether events are forwarded to connected servers, the forwarding mode, and the expiration time of forward requests.
Event History Settings	Sets the maximum limit for the history text length.
Event Lifecycle State and Assignment Propagation	Controls the propagation of assignment and lifecycle state operations to symptom events.
Event Type Indicator Settings	Controls whether to globally enable mapping rules to override the CMA-driven Event Type Indicator assignment.

UI Element (A-Z)	Description
Graphing Settings	Defines graph characteristics, including how graphs and charts look, when they are generated, and how often they are refreshed with data.
HPOM Topology Synchronization Connection Settings	Specifies the connection to the HP Operations Manager for UNIX or HP Operations Manager for Windows management server (including log-on credentials).
HPOM Topology Synchronization Settings	Specifies the base settings to use when synchronizing the topology of the environment monitored by HPOM.
License Reporting Settings	Specifies the address of the License Reporting Server.
Reconciliation Settings	Specifies the polling time to the RTSM for reconciliation of changes.
Relative Filter Re-evaluation Settings	Specifies the time in seconds after which relative date filters are re-evaluated.
Topaz Authorization Service Settings	Defines the event categories recognized by Operations Management, for example: Exchange, WebApp, System, or Operating Systems.
Topology View Settings	Defines the distance (in hops) from a selected configuration item (that does not have a defined view) before Operations Management stops displaying any more related configuration items.
Topology-Based Event Correlation Settings	Defines how long Operations Management waits when gathering events before starting the correlation process.
User Interface Settings	Specifies the interval of user interface updates and enables sound settings.

For more information about the individual sections on the Infrastructure Settings Manager page for Operations Management, see "Operations Management Infrastructure Settings Manager" on page 686.

Tasks

How to Display and Edit Operations Management Settings

This task shows you how to display a complete list of the current infrastructure settings for Operations Management. You can configure all settings using the Edit Setting dialog box.

Note: For information on button actions, see "Operations Management Infrastructure Settings Manager" on page 686.

To display and edit Operations Management settings:

- 1 Open Infrastructure Settings from the Platform Administration:
Admin > Platform > Setup and Maintenance > Infrastructure Settings
- 2 Select **Applications** and use the list to set the administration context to **Operations Management**.
- 3 For any settings that you want to change, click the associated  button to open the Edit Settings dialog box.
- 4 Modify the existing settings as required and select **Save**. Alternatively, select **Restore Default** and **Save**, to reset the Operations Management defaults values.

Reference

Operations Management Infrastructure Settings Manager

This section lists and briefly describes the Operations Management settings that the software administrator needs to configure after installation.

To access	Select Admin > Platform > Setup and Maintenance > Infrastructure Settings Select Applications and use the list to set the administration context to Operations Management
Relevant tasks	"How to Display and Edit Operations Management Settings" on page 685.
See also	"Settings Management Basics" on page 682.

Note: To change existing or default settings, click the  button.

This sections includes:

- "Auditing Settings" on page 688
- "CI Resolver Settings" on page 689
- "Certificate Server Settings" on page 692
- "Close Related Event Settings" on page 692
- "Closed Events Browser Settings" on page 693
- "Custom Attribute Settings" on page 694
- "Downtime Settings" on page 694
- "Duplicate Events Suppression Settings" on page 695
- "EPI (Event Processing Interface) Server Settings" on page 699

- "Event Cache Settings" on page 700
- "Event Correlation Cache Settings" on page 701
- "Event Forwarding Settings" on page 702
- "Events History Settings" on page 704
- "Event Lifecycle State and Assignment Propagation" on page 706
- "Event Type Indicator Settings" on page 707
- "Graphing Settings" on page 708
- "HPOM Topology Synchronization Connection Settings" on page 710
- "HPOM Topology Synchronization Settings" on page 712
- "License Reporting Settings" on page 714
- "Reconciliation Settings" on page 714
- "Relative Filter Re-evaluation Settings" on page 715
- "Topaz Authorization Service Settings" on page 715
- "Topology View Settings" on page 716
- "Topology-Based Event Correlation Settings" on page 717
- "User Interface Settings" on page 720
- "Web Service Settings" on page 721

Auditing Settings

The Auditing Settings contains the available configurations used to customize how audit information is recorded. The Audit Logs can be viewed from:

**Admin > Platform > Setup and Maintenance Audit Log > Locations/
Operations Manager**

The following elements are included in the Audit Settings pane.

UI Element (A-Z)	Description
Audit Category	Configure which audit categories are logged. The default value is Configuration, which only writes configuration changes to the Audit Log. When you set the audit category to All, event and configuration changes are written to the Audit Log.
Enable Auditing	If enabled, Operations Management actions are written to the Audit Log.

CI Resolver Settings

The CI Resolver Settings contains the configurations used to control how the CI Resolver manages incoming CI-related information and uses it to identify the best matching CI for a particular event. All attributes of the compared CIs are taken to calculate a similarity using a scoring function. The output of the scoring function indicates how similar two CIs are to each other. The CI with the highest score is selected as the best matching CI.

The following elements are included in the CI Resolver Settings pane.

UI Element (A-Z)	Description
Cache Modification Configuration	<p>Sets, using XML format, the attributes and CI types that should be used and those that should be ignored during CI resolution.</p> <p>Some CI attributes do not provide useful information. For example, an attribute value may apply to many CIs but does not help to identify matching CI. These types are specified in the <code><IgnoreAttributes></code> and the <code><IgnoreCiTypes></code> entries.</p> <p>Any CI types and attributes included in the ignore lists are always ignore by CI resolution.</p> <p>Some types of information are essential for successful CI resolution. These types are specified in the <code><WhiteListType></code> entries. Should it not be possible to load all CIs, the CI types specified in the whitelist are used. The order of the CI types in the list represent the order in which these CIs are included. As soon as the CIs belonging to a CI type cannot be accommodated in the cache, these CIs are excluded and no further CI Types are assessed.</p> <p>Entries in the ignore lists override entries in the whitelist. Entries in the whitelist are handled in their order of appearance.</p>
Cache Refresh Rate	<p>Specifies the frequency with which the CI cache is refreshed (minutes).</p>

UI Element (A-Z)	Description
<p>Cache Type</p>	<p>Sets the Cache Type for CI Resolution.</p> <p>In Memory — It is recommended to select the In Memory cache type when CI resolution performance is more important than minimizing the memory footprint on the Data Processing Server. In smaller managed environments, where the total number of CIs in the monitored environment is smaller than the default value in the CI Limit setting, using the In Memory cache type is preferable. CI Resolution maintains all CIs in RAM. Use this setting for larger environment only when there is sufficient RAM available.</p> <p>Database — It is recommended to select the Database cache type when your monitored environment is very large (when the number of CIs being monitored is larger than in the CI Limit setting). CI Resolution maintains only the most often-used CIs in RAM. This is typically 20% of the CI Limit setting. All other required CIs are maintained in a cache file. This option results in a lower memory footprint but may have an impact on CI resolution performance.</p>
<p>Cache Type File Path</p>	<p>Sets the file path to the specified folder for the Persistent cache type, which maintains cache entries in a file in the file system. You can use either an absolute path or a relative path to the BSM home directory.</p>
<p>CI Limit</p>	<p>Sets the maximum number of CIs that are loaded into cache by the CI Resolver.</p>
<p>CI Limit Fully Qualified Domain Name</p>	<p>Sets the source attribute of the event sent to the Event Browser when the CI Limit is reached.</p>
<p>CI Limit Event Severity</p>	<p>Sets the severity of the event sent to the Event Browser when the CI Limit is reached.</p>
<p>CI Resolver Attribute Splitting Rules</p>	<p>Semicolon separated list of attribute/pattern pairs: <CI Type name>.<attribute name>=<regular expression>;<CI Type name>.<attribute name>=<regular expression>;...</p>

UI Element (A-Z)	Description
CiInfo Host Separation Character	Character used to divide the host name from the CiInfo text string, for example: @@ Note: If you need to provide keywords containing the separator character, enclose the keyword within quotation marks ("keyword").
CiInfo Key Separation Character	Character used to divide the CiInfo text string into keywords used to find CIs in the RTSM, for example, a colon (:)
Ignore Resolution Hints Text Case	CI Resolver ignores the case of the CI type information when set to true.
TQL Queries	Defines the TQL queries to run for resolving a CI. Note: You can replace the automatically generated TQL query with a TQL query customized for your environment.
Use Topology Sync Shortcut	CI Resolver can use service ID information from Topology Sync to map service IDs directly to CIs.

Certificate Server Settings

The Certificate Server is a component used to issue the certificates required for secure communication. It runs on each of the Data Processing Servers. This setting can be used to route all incoming certificate requests from the multiple Gateway Servers to a single Data Processing Server. On this Data Processing Server incoming certificate request can be granted with the `ovcm` command-line tool.

The following elements are included in the Certificate Server Settings pane.

UI Element (A-Z)	Description
Certificate Server IP Address	Specifies the IP Address of Data Processing Server to which certificate requests are forwarded.

Close Related Event Settings

A new event can be used to automatically close one or more existing, related events. When a new event is received, a search for existing, related events is made. If any related events are found, these are closed and replaced by the new event.

There are two ways in which events can be related:

► `closeKeyPattern` attribute

If an event comes in and its `closeKeyPattern` matches the key attribute of an existing event, the older event is closed.

► ETIs Contributing to Health

Events can be related when they all contain an ETI contributing to health. The value of the ETI of the new event must be different from the value of the existing, active events, but must be associated with the same CI.

If `Enable Closing Related Events` is set to true, on receiving a new event, a search is made for related events and any found related event is closed.

The following elements are included in the Close Related Events Settings pane.

UI Element (A-Z)	Description
Detected Related Events by ETI	Existing events must have same CI and ETI as new event, but a different ETI value. Only if ETI contributes to health. Default value is true.
Detected Related Events by Key Matching Pattern	Key of existing events must match closeKeyPattern of new event. Default value is true.
Enable Closing Related Events	For each newly received event, the existing events are inspected to find events related to the new event. Any events that are related to the new event are closed. Default value is true.

Closed Events Browser Settings

The Closed Events Browser Settings contains the available configurations used to customize how closed events are displayed in the Closed Events Browser.

The following elements are included in the Closed Events Browser Settings pane.

UI Element (A-Z)	Description
Maximum Closed Events	Sets the maximum number of closed events to be displayed in the Closed Events Browser. Default is 1000.

Custom Attribute Settings

The Custom Attribute Settings contains the available configurations used to customize how custom attributes are used.

The following elements are included in the Custom Attributes Setting pane.

UI Element (A-Z)	Description
Available Custom Attributes	List of custom attributes separated by semicolons (;) that you can add to the Event Browser as columns, for example: "Customer;Region;Manager;Company".

Note: Each custom attribute can then be selected as a column in the Event Browser.

Downtime Settings

The Downtime Settings contains the following attributes that are used for controlling the handling of events that were received while CIs were not available due to scheduled downtimes.

The following elements are included in the Downtime Setting pane.

UI Element (A-Z)	Description
Downtime History Range	Time period in minutes within which past downtime configurations are considered. All downtime periods are ignored which have an end time that is before the beginning of the configured history time period.
Future Downtime Range	Ignore all maintenance windows which starts after current time plus the future downtime range in minutes.
Refresh Time Interval	Maximum time in minutes after changes in the maintenance windows configuration are taking effect.

Duplicate Events Suppression Settings

A new event can be a duplicate of an existing event. For each new event that is received by Operations Management, a check is made to establish whether it is a duplicate of an existing (original) event. If the original event is found, the new event is excluded from any further processing and not added to the Event Browser. The original event is updated with information from the new event. The updates include the following information:

- Duplicate count is increased by 1
- Received time is changed to that of the new event

Note: Original received time remains available in event history lines.

Optionally, the following updates can also be made:

- Change title to that of new event
- Change severity to one of the following states:
 - Value contained in the new event
 - Most critical value from the new and original severity

Duplicate matching operates as follows:

- If the new event has the No Duplicate Suppression flag set, no search for an original event is made.
- If the new event includes a key, a search is made for an existing, active event that has the same key as the new event, and that are separated by less than the time period specified in the Maximum Age of Duplicate Events setting.
- If the new event does not include a key, a search is made for an existing, active event where a set of configurable attributes have the same values as the new event, and that are separated by less than the time period specified in the Maximum Age of Duplicate Events setting.

- If no original event is found yet, and the new event has an ETI value for a health-contributing ETI, a search is made for an existing, active event that has the same ETI value and the same CI, and that are separated by less than the time period specified in the Maximum Age of Duplicate Events setting.

The number of duplicates received for an event is available in the Event Browser. The Time Received value reflects the time that the latest duplicate arrived. The first received time is maintained in the Event History.

The following elements are included in the Duplicate Events Suppression Setting pane.

UI Element (A-Z)	Description
Detect Duplicate Events by ETI	Use ETIs to find original event. Duplicate events must have same CI, ETI, and ETI value, and the ETI must contribute to health. Default value is true.
Detect Duplicate Events by Identical Attributes	Use selected attributes (for example Select Application or Select CI) to find the original event. All selected attributes must be identical. Default value is false.
Detect Duplicate Events by Key	Use key attribute to find original event. Duplicate events must have identical key. Default value is true.
Enable Duplicate Events Suppression	If enabled, duplicate events are dropped and the related original event is updated instead. Default value is true.
Maximum Age of Duplicate Events	Maximum number of seconds difference between received times of original and new event (0 = infinite). Default value is 0.
Select Application	Duplicate events must have identical application. Default value is true.
Select Category	Duplicate events must have identical category. Default value is true.
Select CI	Duplicate events must have identical CI. Default value is true.
Select CI Hint	Duplicate events must have identical CI hint. Default value is true.

UI Element (A-Z)	Description
Select ETI Hint	Duplicate events must have identical ETI hint. Default value is true.
Select ETI Value	Duplicate events must have identical ETI and ETI value. Default value is true.
Select HPOM Service ID	Duplicate events must have identical HPOM service ID. Default value is true.
Select Node	Duplicate events must have identical node. Default value is true.
Select Node Hints	Duplicate events must have identical node hints. Default value is true.
Select Object	Duplicate events must have identical object. Default value is true.
Select Policy Condition ID	Duplicate events must have identical policy condition ID. Default value is true.
Select Severity	Duplicate events must have identical severity. Default value is true.
Select Subcategory	Duplicate events must have identical subcategory. Default value is true.
Select SubComponent ID	Duplicate events must have the same SubComponent ID.
Select Title	Duplicate events must have identical title. Default value is true.
Select Type	Duplicate events must have identical type. Default value is true.

UI Element (A-Z)	Description
Update Severity of Original Event	Update severity of original event based on selected mode. The mode values are: <ul style="list-style-type: none"> ▶ Use new (severity value) ▶ Most critical (severity value) ▶ No (do not change severity of event) Default value is No.
Update Title of Original Event	Update title of original event with title of last duplicate event. Default value is false.

Note: Wrong keys can suppress events that are not duplicates of existing events. To avoid suppressing non-duplicate events,

- ▶ Include enough information within the key to make the key specific enough to achieve a reliable match.
- ▶ Include all necessary attributes in the identity check.

Dropping duplicates also results in the inability to update health because the following differences between the original event and duplicate event may exist:

- ▶ Original event had no ETIs.
 - ▶ Original event and the new event had different ETIs.
-

EPI (Event Processing Interface) Server Settings

The Event Processing Interface Server Settings contains the available configurations for the Event Pipeline Server.

The Event Processing Interface (EPI) is used to enrich events with additional information from sources accessible using Groovy scripts. For example, it is possible to add data to an event from a Microsoft Excel file or an SQL database. If Groovy scripts are specified in the Event Pipeline Script and Step Settings, the event is forwarded to the EPI Server.

The following elements are included in the Event Cache Settings pane.

UI Element (A-Z)	Description
EPI Server Timeout	<p>Configures the maximum time period (in msec) for event processing in the EPI Server. The value zero (0) disables the timeout which means that a problem during processing in the EPI server may block further event processing indefinitely.</p> <p>Note: If the EPI Server Timeout setting is shorter than the timeout specified for a script, the execution of the script is stopped after the global timeout period is reached. The dedicated timeout cannot be reached. It is recommended to select a shorter dedicated timeout value for individual scripts and set a longer global timeout.</p>

Event Cache Settings

The Event Cache Settings contains the available configurations used to customize how event information is managed.

The following elements are included in the Event Cache Settings pane.

UI Element (A-Z)	Description
Max Cache Level	<p>Maximal number of active, top-level events to be kept in Event Cache.</p> <p>The value is automatically set during deployment and is dependent on the selected deployment option:</p> <p>Small - 1000</p> <p>Med. - 5000</p> <p>Large - 10000</p> <p>Extra large - 20000</p> <p>Note: The more events that are stored in cache, the greater the memory demands from MercuryAS. If you significantly increase the Max Cache Level setting, check for out-of-memory errors in the log files or increase the memory settings for MercuryAS in:</p> <p><HPBSM root directory>/bin/mercuryAS_vm_params.ini</p> <p>If you change the deployment in ServerDeployer, you will have to change the memory settings again.</p> <p>If the configured maximum is reached the oldest 10% of the top level events are removed from the cache.</p> <p>When the number of active, top-level events is less than 80% of the maximum value, the purged events are reloaded.</p> <p>For example, if the default Event Cache Max Level of 20000 is reached, the 2000 oldest events are removed from the cache. As the number of events in the Event Browser drops to 16000, the purged events are reloaded.</p> <p>The settings are per deployment. The same setting is applied to all gateway servers within the same deployment.</p>

Event Correlation Cache Settings

The Event Correlation Cache Settings contains the available configurations used to customize how duplicate events suppression and close related event information is cached.

The following elements are included in the Event Correlation Cache Settings pane.

UI Element (A-Z)	Description
Cache Clean-Up Interval	Time interval in seconds after which the cache is cleaned up.
Maximum Event Age	Maximum age of cached events in minutes. Older events are removed from the cache during clean-up.
Maximum Event Count	Maximum number of events held in the cache. If the current cache size is greater than this number, the oldest events are removed from the cache during clean-up.

Event Forwarding Settings

The Event Forwarding Settings contains the available configurations used to specify whether events are forwarded to connected servers, the forwarding mode, and the expiration time of forward requests.

The following elements are included in the Event Forwarding Settings pane.

UI Element (A-Z)	Description
Event Forwarding Batch Count	<p>Maximum number of events or updates send simultaneously for each synchronization request to HPOM and Integration Adapter servers.</p> <p>The default value is 100. Minimum value is 1. Maximum value is 500.</p> <p>Note: If less than the configured maximum number of events or updates are available in the queue, all are sent in one request. Only if more than the configured number are waiting in the queue, are multiple requests created.</p> <p>For example, if 120 events are in the queue and the default is set to 100, the first 100 events are sent, followed by the remaining 20 events. If only 1 event is in the queue at that moment, that one event is sent.</p>

UI Element (A-Z)	Description
Event Forwarding Expiration	<p>Number of hours an event forward request or event update synchronization request is held in the queue. If the request cannot be delivered to the target server before this expiration time, it is automatically deleted from the queue.</p> <p>Default value is 12 hours. Minimum value is 1 hour. Maximum value is 720 hours (30 days).</p> <p>Note: If the request to forward an event to a particular connected server fails, the request is deleted from the forwarding queue and the event makes an internal note that the delivery to the target server has failed. The event maintains information about the failed request to the specified connected server. Any further forwarding rule matches on this event for this connected server is ignored. If the forwarding type was set to Synchronize and Transfer Control, a standard event annotation is also added to the event, otherwise no event annotation is made.</p> <p>Failure to deliver can occur for retry timeouts, or a catastrophic delivery error. A catastrophic delivery error is a situation where it does not make sense to retry the request, for example, a mis-configuration (authentication fails), or a programming error is encountered in an External Process groovy adapter (NullPointerException). These cases require manual intervention before retrying.</p> <p>To manually retry failed requests to a particular connected server, from the Event Browser, manually transfer control of an event that has previously failed delivery to a particular server.</p>
Forward Event Properties as CMAs	<p>If disabled (false), event attributes that are unknown in HPOM for Windows or HPOM for UNIX are not forwarded as Custom Message Attributes. This affects the following Event properties: Priority, Description, State, Subcategory, Cause Event Id, Solution, Related CI, Related CI Hint, Node Hint, Source CI, Source CI Hint, ETI, ETI Hint, Skip Duplicate Suppression, Controlled Transferred.</p>

UI Element (A-Z)	Description
Forward Events	Specifies whether forwarding of events to connected servers is enabled.
One-line Event Forwarding	<p>Every forwarded event includes a list of servers that have a copy of this event. By default, when the event is modified on one server, it notifies all servers in the list of the change.</p> <p>When enabled (true), for each event change (for example, close, annotation, or add), the server only informs the server from which the event was received and to which the event was forwarded.</p> <p>This can be useful in simplifying connections in firewall environments.</p>
Retry Notify Interval	<p>Event Forwarding automatically retries delivery of event forward requests once a minute. Whenever a target server is unavailable, an internal event is generated indicating the failure to deliver. This setting defines the minimum number of minutes to elapse before generating another event for the failing request.</p> <p>Default: 60 minutes. Range: Minimum of 1 minute and a maximum of 1440 minutes (1 day).</p> <p>Note: This setting does not affect the retry interval of one minute.</p>

Events History Settings

The Event History Settings contains the available configurations used to customize how event history information is handled.

The following elements are included in the Event History Settings pane.

UI Element (A-Z)	Description
Maximum Property Length	<p>History of properties of type string or text which are longer than the configured value are ignored. Values with a fixed length like UUID cannot be limited.</p> <p>The default value is 0 which retains all information regardless of length.</p> <p>If an attribute modification where the new or old value exceeds the maximum length, the following text appears in place of the value in the event history:</p> <p><i>Value exceeds the maximum permitted length of 'configured length' characters.</i></p>

Event Lifecycle State and Assignment Propagation

The Event Lifecycle State and Assignment Propagation settings contains the available configurations used to customize how correlated events are handled when closing cause events.

The following elements are included in the Event Lifecycle State and Assignment Propagation settings pane.

UI Element (A-Z)	Description
<p>Propagation of Assignment operation to symptom events</p>	<p>Enables the propagation of user and group assignments to symptom events.</p> <p>When enabled (True), changing the user or group assignment of a cause event also applies the change to all symptom events.</p> <p>Note: If Enabled (True), assignments cannot be changed for symptom events.</p>
<p>Propagation of Lifecycle State operations to symptom events</p>	<p>Enables the propagation of lifecycle state changes to symptom events.</p> <ul style="list-style-type: none"> ▶ Disabled but close operation is propagated to symptom events — Lifecycle state changes are not propagated to symptom events except for closing of events. ▶ Enabled — Lifecycle state changes are propagated to symptom events. ▶ Disabled but close operation unrelates symptom events — Lifecycle state changes are not propagated to symptom events. Closing the cause event unrelates symptom events. <p>Note: If Enabled (True), lifecycle states cannot be changed for symptom events.</p>

Event Type Indicator Settings

The Event Type Indicator Settings contain the configuration setting that you enables you to let ETI mapping rules override indicators specified in custom attributes.

The following elements are included in the Event Type Indicator Settings pane.

UI Element (A-Z)	Description
Allow Rule Overwrite	<p>Permits ETI Mapping Rules to overwrite indicators specified in custom attributes (CAs).</p> <p>Default: False</p> <p>If set to false, and CMA-matched event type indicators are recognized, mapping rules are ignored.</p> <p>If set to true, the CMAs are still evaluated but mapping rules are used to process events.</p> <p>For example, migrating from customized, non-Operations Management-ready SPIs to Operations Management-ready SPIs can result in errors in event processing as new content packs no longer work as expected with the existing handling.</p> <p>Permitting mapping rules to override the CMA-driven event assignment leaves the Operations Management administrator in control.</p>

Graphing Settings

The Graphing Settings contain the configuration settings that are used to determine how performance graphs are generated and displayed.

The following elements are included in the Graphing Settings pane.

UI Element (A-Z)	Description
Daily Maintenance Time	Schedules the time at which regular maintenance tasks occur. The value is specified in HH:MM format, for example: 04:30.
Graph Auto-Refresh Rate	Specifies the interval (in seconds) used to automatically refreshes the displayed graphs.
JVM Minimum Memory	Prevents accepting of new performance graphs requests when there is insufficient memory available in the Java Virtual Machine (JVM). The default minimum value is 0 (zero).
Max Data Points	Specifies the maximum number of data points used to draw graphs.
Maximum Instances	Maximum number of Instances that can be launched in a Graph. If a CI has more instances than the value specified here, graphing cannot display those instances.
Metrics Per Graph	Specifies the number of metrics you want to see in a graph. The default value is 8. If you specify a value for this parameter in the graph template, Graphing chooses the highest value between the two values while drawing the graph.
Real Time View Unsubscription Interval	Specifies the interval at which RTV (Diagnostic View of Performance Manager) unsubscribes data gathering from RTM (Real-Time Measurement agent). The default interval period is 60 seconds. RTV unsubscribes data gathering for any metric class that is not chosen for graphing. You can configure the interval at which RTV checks for metric classes that are being used for graphing. If the metric class is not being used for duration longer than the value specified for this parameter, then RTV unsubscribes data gathering from the agent.

UI Element (A-Z)	Description
Report Template	Modifies the properties of the report template. The settings you configure here appear in the Print view of the graph.
Show Mouse Hover	<p>If enabled (true), hovering the mouse on the graph area of a drawn graph opens a pop-up window displaying the actual value of the data point and the time interval of the selected data.</p> <p>If disabled (false), no pop-up window is opened.</p> <p>The default value is true.</p> <p>Note: The value selected from the user interface menu option overrides the setting specified for this parameter.</p>
Sort by Maximum Graph Count	Limits the number of graphs drawn for an instance-comparison graph when Metric Data Display Order is specified as <i>average value</i> or <i>reverse average value</i> in the Performance Graphs, for example: 20.
System Performance Classes	Lists the available system performance classes. A graph template that contains any of these system performance classes is a System Performance graph. A system performance graph must be associated with a host CI.
Table Row Count	Configure the default value for the number of rows in a chart (graph in tabular form), for example: 100.
Trace Level	Enable (1) or disable (0) tracing.

HPOM Topology Synchronization Connection Settings

The HPOM Topology Synchronization Connection Settings pane contains the Operations Management settings that can be used to specify connection information used to communicate with one

HP Operations Manager for UNIX or HP Operations Manager for Windows management server. These connection settings are used for synchronization of events and basic topology synchronization between Operations Management and the specified HP Operations Manager management server.

Note: The recommended method of synchronizing topology information is by using Dynamic Topology Synchronization. For details, see "Dynamic Topology Synchronization" on page 664.

The following elements are included in the HPOM Connection Settings pane.

UI Element (A-Z)	Description
Forward All Events	Enables (true) forwarding of all events to this HPOM system. Use for testing only. For production systems, set up servers using the Connected Servers manager and create appropriate Event Forwarding Rules.
HPOM Host	Name of the system hosting the HPOM management server that is forwarding events. This setting is used for the bi-directional synchronization of events between Operations Management and one HPOM management server. It is recommended to specify connections to external servers, including HPOM management servers, using the Connected Servers manager. For details, see "How to Create a Connection to an HPOM Server" on page 413.
HPOM Password	Password for the user that Operations Management uses to connect to the configured HPOM management server.
HPOM Port	Port number to use when establishing a connection to the HPOM management server.

UI Element (A-Z)	Description
HPOM Type	Specify the platform of the HPOM installation. For HP Operations Manager for Windows, the user must have at least PowerUser rights and must be a member of HP-OVE-Admins group and the local administrators group.
HPOM User	User name that Operations Management uses to connect to the configured HPOM management server.
HTTPS HPOM Web Service Connection	Set to true to use HTTPS to connect to the HPOM web service.

HPOM Topology Synchronization Settings

The HPOM Topology Synchronization contains the settings used by Operations Management to synchronize its topology with HPOM.

These settings are used for basic and dynamic synchronization of the object topology in the environments monitored by Operations Management and HPOM. The recommended method of synchronizing topology information is by using Dynamic Topology Synchronization. For details, see Chapter 28, "Dynamic Topology Synchronization".

Note: For more information about the `opr-startTopologySync.bat` command, see "Basic Topology Synchronization Command-Line Interface" on page 672.

For the basic synchronization of Operations Management and HPOM topologies, make sure that the following settings are correctly configured:

HPOM Connection Settings

The topology synchronization process needs to read the topology data from the HPOM Web Service (WS) during synchronization. For more information, see "HPOM Topology Synchronization Connection Settings" on page 710.

The following elements are included in the HPOM Topology Synchronization pane.

UI Element (A-Z)	Description
Dump Data	Saves all data from the topology synchronization to the hard disk. This setting is not recommended for production systems because it can have a significant negative effect on performance. The default setting is False.
Groovy Scripts	Enables Groovy scripts used to manipulate the synchronization data during the synchronization process.

UI Element (A-Z)	Description
Packages for Topology Sync	Lists the packages used for the topology synchronizations.
Resolve IPs During Synchronization	Enable IP resolution for nodes without IP address information in HPOM. Enable IP resolution (true) has a negative effect on the synchronization performance.

License Reporting Settings

The License Reporting Settings contains the available configurations used to specify the License Reporting Server.

The following elements are included in the License Reporting pane.

UI Element (A-Z)	Description
Server Name	Specifies the fully qualified domain name of the License Reporting Server. If no server is specified, no reports are generated.

Reconciliation Settings

The Reconciliation Settings contains the available configurations used to poll the RTSM for reconciling changes.

The following elements are included in the Reconciliation Settings pane.

UI Element (A-Z)	Description
Polling Interval	Specifies the interval used to poll RTSM for reconciliation changes (in seconds). Use 0 to disable polling.

Relative Filter Re-evaluation Settings

The Relative Filter Re-evaluation Settings contains the available configurations used to specify the time after which relative date filters are re-evaluated.

The following elements are included in the Relative Filter Re-evaluation Settings pane.

UI Element (A-Z)	Description
Relative Filter Re-evaluation Settings	Specifies the time after which relative date filters are re-evaluated (in seconds). Valid range is 30 seconds to 86400 seconds (24 hours).

Topaz Authorization Service Settings

The Topaz Authorization Service Settings contains the configurations that Operations Management uses in conjunction with user management.

Note: The list of event categories defined here is also available in the user configuration dialog box, where you can grant users or user groups access to work with events and event categories.

The following elements are included in the Topaz Authorization Service Settings pane.

UI Element (A-Z)	Description
Categories	<p>List indicating event categories recognized by Operations Management separated by semicolons (;), for example: Exchange;WebApp;System.</p> <p>Event categories are logical groups of events (for example: database, OpenVMS, or hardware) which can be assigned to Operations Management users.</p>
Refresh Interval	<p>Refresh interval in minutes for reloading user permissions from the database. Operations Management reloads user permissions every 10 minutes by default. However, events already loaded into the browser remain unaffected. Changes to a user account are only fully available after a new logon to Operations Management.</p>

Topology View Settings

The Topology View Settings contain the configuration setting that you can use to change how information is displayed in the Health Top View pane either in the Health Perspectives tab or the Dashboard.

The following elements are included in the Topology View Settings pane.

UI Element (A-Z)	Description
CI Centering Mode	<p>Enables updating of the view selector in the Top View when a CI is selected in the view.</p>

Topology-Based Event Correlation Settings

The Event Correlation Settings contain the configuration settings that correlation rules are managed.

The following elements are included in the Topology-Based Event Correlation Settings pane.

UI Element (A-Z)	Description
Auto-Extend Time Window Mode	<p>Enables the automatic extension of the correlation time period whenever an additional symptom is correlated to the same cause.</p> <p>Each time that an event is correlated with a problem, the time period set in the correlation time window is restarted to help enable the correlation of a greater proportion of symptoms associated with the original event.</p> <p>The correlation time window is only automatically extended when an a new symptom is added to a cause AND the cause is not yet closed.</p> <p>If the cause is already closed, the time window is not extend anymore so that after the last time window elapses, future repetitions of symptoms are no longer correlated to the closed cause.</p> <p>This avoids ignoring new similar symptoms. Just because a cause is closed, it is not necessarily true that the problem is solved. If the same symptoms continue to occur, they were most likely not caused by the closed cause event and should become visible in the Event Browser.</p>

UI Element (A-Z)	Description
<p>Correlate Closed Cause Events</p>	<p>Controls whether symptoms are correlated to closed causes or not. Default is true. If set to false, no correlation is done with newly occurring symptom events after a cause is closed. This prevents any auto-closing of new events.</p> <p>Correlation takes place regardless of the lifecycle state of cause event, as long as events occur within the correlation time window. Correlating a symptom to a closed cause closes the symptom as it is not possible to have open symptoms with a closed cause.</p>
<p>Correlation Time Window</p>	<p>Sets the period of time in seconds that correlation rules wait for all required events to occur before reporting the cause event and emptying the correlation rule cache.</p> <p>Cause and symptom events must arrive within that time frame in the correlation engine to be considered for correlation. A time window starts when a first cause or symptom event arrives that cannot be correlated with any other event.</p> <p>Default value is 960 seconds (16 minutes).</p>
<p>Max Query Result Cache Time</p>	<p>Sets the maximum time in seconds that a query result for a cause-symptom relationship between CIs for a given correlation rule is cached. After this time period elapses, the RTSM is queried again.</p> <p>Valid range is 0 seconds to 86400 seconds (24 hours). Default value is 300 seconds (5 mins).</p> <p>For very high numbers of possible cause-symptom relationships, event correlation can take a long time. The result of the correlation query for possible symptom CIs is stored in a cache and this cache is used for further checks. When the configured Max Query Result Cache Time period has elapsed, the query is rerun. This minimizes the number of times that queries are run for multiple open causes/symptoms relationships.</p>

UI Element (A-Z)	Description
Max Waiting Queue Size	<p>Maximum number of events waiting to be processed by the correlation engine. If this limit is exceeded, the oldest event is removed from the queue and no longer considered for correlation.</p> <p>Default value: 5000</p> <p>Valid range of Values: 100-20000</p> <p>Changes are enabled immediately.</p>

User Interface Settings

The User Interface Settings contains the time interval used to update the Operations Management user interface with new event-related data.

The following elements are included in the User Interface Settings pane.

UI Element (A-Z)	Description
Sound Notification for New Events	Enables sound notification for new events. When loading an event browser, this setting is used unless the user has defined alternative behavior in the browser options.
User Interface Update Interval	The interval of user interface updates (in milliseconds). The default value is 5000 ms (5 seconds).

Web Service Settings

The Web Service Settings contains the time interval used to update the Operations Management user interface with new event-related data.

The following elements are included in the User Interface Settings pane.

UI Element (A-Z)	Description
Error Response Verbosity	<p>Controls the verbosity of responses from the Operations Management Web Service. The option Standard returns to the caller of the web service the appropriate HTTP error code, as listed in the HTTP 1.1 standard, along with a standard error text message describing the error. The option Verbose is recommended for development environments and returns a detailed message describing the reason for the error. The option Brief returns only error codes 400 (Bad Request) or 503 (Service Unavailable), depending on the type of the error, and an error identifier. A detailed error message may be obtained by locating the identifier and detailed error message in the error logs.</p>
Secure Modify	<p>Operations Management Web service modify operations are secured by setting the X-Secure-Modify-Token HTTP header on Web service modify requests (PUT, POST and DELETE). For details on how to set this header, see the <i>Operations Manager i Extensibility Guide</i>. This header provides enhanced security protection against malicious exploits of web applications. Secure Modify is enabled by default.</p> <p>Note: Secure Modify is not backwards compatible with Operations Management 9.0 Web services and may cause some Web service clients designed to communicate with these Web services to fail when this feature is enabled. For backwards compatibility, this feature may be disabled. See the <i>Operations Manager i Extensibility Guide</i> for additional measures that may be taken to reduce the impact of disabling Secure Modify.</p>

Part III

Content Packs

30

Content Packs

This chapter includes:

Concepts

- ▶ Content Management on page 726

Tasks

- ▶ How to Upload OO Flows on page 731

Concepts

Content Management

Content is information that Operations Management uses to describe the configuration items that you are monitoring.

Content can include the following types of information:

- ▶ Configuration item types
- ▶ Mapping rules for topology synchronization
- ▶ Discovery sources
- ▶ Correlation rules
- ▶ Rules for HI-based key performance indicators
- ▶ Event type indicators
- ▶ Health indicators
- ▶ Graph family definitions
- ▶ Tool definitions

Content for a specific management area is typically contained in dedicated content packs. The BSM Content Packs manager helps you manage this data.

You use Content Packs to install or update items in an Operations Management instance. You can also take content from one Operations Management instance and upload it to other Operations Management instances, using the Import and Export features.

The Content Packs manager enables you to create a content pack that contains a snapshot of the rules and tools that you defined with Operations Management and save the snapshot information in a file. The snapshot file you create includes all (or any selection of) the event type indicators, health indicators, key performance indicators, mapping rules, KPI calculation and business rules, tool definitions, view mappings, and graphing assignments that you defined specifically for Operations Management.

The following table gives an overview of the items you can include in a content pack:

Content Type	Description
Key Performance Indicators	Configuration and calculation of key performance indicators (KPI).
Event Indicator	Configuration and calculation of event type indicators.
Event Type Mapping Rules	Rules that map the attributes of HPOM messages to Operations Management events.
Event correlation	Rules that correlate similar or related events. For more information, see "Correlation Rules" on page 371.
Performance graphs	Information about the graph family templates used to generate performance graphs.
Tools	Definitions for customized tools that the Operations Management software administrators or subject matter experts configure for users.
View Mappings	Contents of the list of views displayed in the Selected View list in the Health Top View pane in the Health Perspective tab.
Context Menus	Operations Management extensions to context menus, for example, to launch Operations Management configuration tools, start custom tools for specific CI types, and display Operations Management graphs.

You can use the Content Packs manager to perform the following tasks:

- Define the contents of a content pack and save the definition in the Operations Management database.
- Export a content pack definition and the data it references to a file called a content pack.
- Import a content pack definition and the data it references.
- Exchange content packs between installed instances of Operations Management.

Content Manager Interfaces

The Content Packs manager has two interfaces:

► **BSM Content Packs graphical user interface**

You can also start the BSM Content Pack manager using the following menu option:

Admin > Operations Management > Manage Content > Content Packs

► **ContentManager command-line interface (CLI)**

The features and functionality of the Content Pack manager are also accessible using the **ContentManager** command-line interface. You can access the **ContentManager** command-line interface directly, in a shell, or remotely, for example, in a script.

Note: You cannot use the **ContentManager** command-line interface to create a content pack definition.

Operations Management Content Packs

Content Packs are for first-time installation. The installation setup copies files to the local file system on the management server system.

Content Packs include CI types, their relationships and dependencies, TQLs, enrichment rules, KPI assignments, health indicators, event indicators, view mappings, tool definitions, correlation rules, graph definitions, graphing family definitions, menu extensions, and details of the underlying architectural model. The Content Packs are stored on the Data Processing server in a two system deployment.

At every Gateway Server startup, the contents of the following directory is checked:

<BSM_Install_Dir>/conf/opr/content/\${locale_of_server}

Any package that has not already been loaded, and which does not have unresolved package dependencies (references to packages, which are neither already loaded nor in the same folder), is loaded during this startup.

The following directory is checked next:

`<BSM_Install_Dir>/conf/opr/content/en_US`

Any content packs that were not uploaded from the first location are uploaded. This can result in mixed-language content.

The packages are loaded with the standard import mode, already existing artifacts are not changed. Only new artifacts are added.

Note: Progress can be followed in the admin backend log file. The operation is done in the background and may still be in progress when a user logs in. The system prevents that multiple content packages are loaded at the same time. An error message is returned.

Installation packages are available for a variety of different application areas and are installed using patches after the setup. The installation packages include content packs that extend the functionality of Operations Management, for example: so that Operations Management can use events reported by Smart Plug-ins (SPIs) on the HP Operations Manager management server.

The content packs provide a collection of preconfigured rules, tools, HIs, ETIs, graphs, and views to help you monitor events reported to the HP Operations Manager management server by the SPIs. If a SPI is installed on an HP Operations Manager management server and this server is configured to forward messages to Operations Management, you can make use of the tools, rules, and definitions listed in the respective installation package.

Note: If you change any HI/ETI name, you must change the custom message attribute (CMA) value of the underlying policies to ensure proper functioning of the Content Pack.

The following table lists the available Content Packs:

Content Pack	Application Monitored
HPOprOra	Oracle Database Server
HPOprMss	Microsoft SQL Server
HPOprJee	J2EE Server (WebSphere Application Server and WebLogic Application Server)
HPOprAds	Microsoft Active Directory Server
HPOprExc	Microsoft Exchange Server
HPOprInf	Infrastructure which includes UNIX and Windows operating systems, Virtualization Systems, and Cluster Systems
HPOprLys	Microsoft Lync Server 2010

Note: For more detailed information about the contents of a Content Pack, start the Content Packs manager and browse to the respective Content Pack.

The following packages are either installed by default or available separately:

- "Oracle Content Pack" on page 734
- "Microsoft SQL Server Content Pack" on page 762
- "J2EE Application Server Content Pack" on page 848
- "Infrastructure Content Pack" on page 782
- "Microsoft Active Directory Server Content Pack" on page 918
- "Microsoft Exchange Server Content Pack" on page 960
- "Microsoft Lync Server 2010 Content Pack" on page 1016
- "BlackBerry Enterprise Server Software" Content Pack

A separate document titled "BlackBerry SPI Content Pack" is located at:

`<HPBSM_Root_Directory>/AppServer/webapps/site.war/amdocs/eng/pdfs/BlackBerrySPI_OMicontentpack.pdf`

Tasks

How to Upload OO Flows

This task shows you how to upload OO Flows included in Operations Management content packs.

To upload OO Flows form Operations Management content packs:

- 1 On the HP Business Service Management system where the content packs are installed, go to the directory:

<HPBSM_Root_Directory>/conf/opr/oo

- 2 Copy the required OO JAR file to a temporary location on a system where HP OO Studio (version 07.51.02 or greater) is installed.

The file names take the following form:

HPOprOO<content_name>.jar

For HP OO Studio version 09.00:

- **HPOprOOADS90.jar** for Microsoft Active Directory
- **HPOprOOEXC90.jar** for Microsoft Exchange
- **HPOprOOInf90.jar** for Infrastructure
- **HPOprOOJEE90.jar** for J2EE
- **HPOprOOMss90.jar** for Microsoft SQL Server
- **HPOprOOOra90.jar** for Oracle

For HP OO Studio version 07.51.02 to 07.60:

- **HPOprOOADS.jar** for Microsoft Active Directory
- **HPOprOOEXC.jar** for Microsoft Exchange
- **HPOprOOInf.jar** for Infrastructure
- **HPOprOOJEE.jar** for J2EE
- **HPOprOOMss.jar** for Microsoft SQL Server
- **HPOprOOOra.jar** for Oracle

- 3 To install and upload the OO flows, for each required content pack, run the command:

```
java -jar -Xmx1024m "<temp>/HPOprOO<content_name>"  
-centralPassword <centralpassword>
```

For example:

```
java -jar -Xmx1024m "<temp>/HPOprOOMss90" -centralPassword  
<centralpassword>
```

Note: If the admin user in HP OO is not the default user, another parameter is required. For further details about installing content and the options available, see the *HP Operations Orchestration Software Development Kit Guide*.

Using HP OO Studio, the uploaded OO flows are accessed under:

```
../Library/Operations Management/..
```

- 4 From BSM, complete the mapping of OO flows to CIs in:

Admin > Integration > Operations Orchestration

and map the OO flow input variables to CI attributes.

To automatically launch Run Books, see "How to Create a Run Book Automation Rule" on page 505.

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Databases Content Packs

This chapter includes:

Reference

- ▶ Oracle Content Pack on page 734
- ▶ Microsoft SQL Server Content Pack on page 762

Reference

Oracle Content Pack

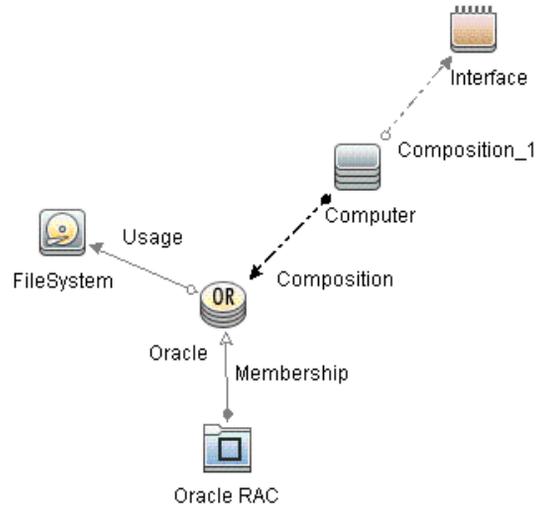
The Oracle Content Pack contains the following artifacts:

- ▶ Views on page 735
- ▶ Health Indicators on page 736
- ▶ Event Type Indicators on page 740
- ▶ Correlation Rules on page 742
- ▶ Tool Definitions on page 748
- ▶ Graph Templates on page 749
- ▶ Policies Setting ETIs on page 753
- ▶ Operations Orchestration Flow on page 760

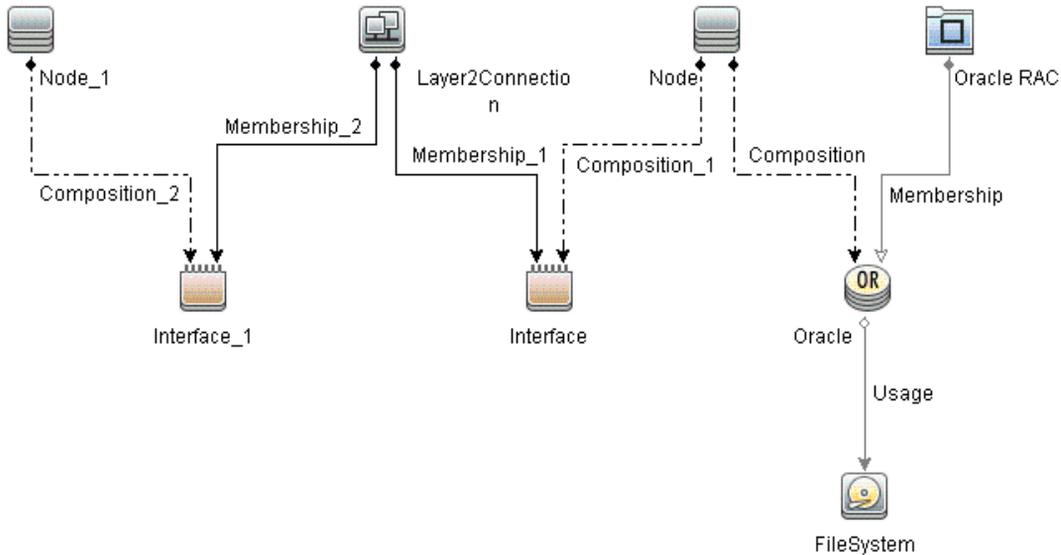
Views

The RTSM package in the Oracle Content Pack includes the following views:

- **ORA_Deployment:** This view refers to the Oracle, Oracle RAC, Computer, and File System CI types. The following image shows the relationship among the CI types.



- **ORA_Network_Deployment:** This view refers to the Oracle, Oracle RAC, Node, Interface, and File System CI types. The following image shows the relationship among the CI types.



Health Indicators

The content pack includes the following Health Indicators (HIs) to monitor the Oracle-related events:

CI Type	HI	Description	Value
Database	CPU Usage by SQL	Indicates SQL statements with high CPU time per execution.	High Normal
Oracle	Database Object Status	Indicates database object status.	Invalid Valid Enabled Disabled
Oracle	Database Segment Status	Indicates the status of segments in a Oracle Database Instance.	Normal Inextensible

CI Type	HI	Description	Value
Oracle	Database Segment Usage Level	Indicates the usage of segments in a Oracle Database Instance.	High Normal
Database	Database Server Status	Indicates database server availability.	Up Down
Oracle	Datafiles Status	Indicates oracle datafiles status.	Online Offline
Oracle	Default Bufferpool Busy Ratio	Indicates the ratio of buffered data requests of the Oracle Default Bufferpool.	High Low
Oracle	Default Bufferpool Hit Ratio	Indicates the ratio of buffered data requests of the Oracle Default Bufferpool.	High Normal Low
Oracle	Dictionary Cache Miss Ratio	Indicates the effectiveness of the Oracle Dictionary Cache.	High Normal Low
Oracle	Dispatcher Busy Ratio by Network	Indicates the workload of the Oracle Dispatcher.	High Normal Low
Oracle	Dispatcher Process Queue Response Time	Indicates the average time an item in the Oracle Dispatcher queue waits before being processed.	High Low
Oracle	Flash Recovery Area Usage Level	Indicates the availability of an Oracle Instance as affected by the percentage of space used by Flash Recovery Area.	High Medium Normal
Oracle	Library Cache Functioning	Indicates the performance of a Oracle Database Instance as affected by: 1 - library cache misses to executions 2 - library cache get hits to gets 3 - library cache pin hits to pins	HighReload LowGetHits LowPinHits Normal

CI Type	HI	Description	Value
Oracle	Logical Read Rate	Indicates the performance of an Oracle Instance as affected by the number of logical reads per min.	High Normal
Oracle	Long Table Scans Percentage	Indicates the percentage of Long Table Scans performed.	High Normal Low
Oracle	Oracle Background Dump Device Usage Level	Indicates Oracle background dump device space usage.	High Normal
Oracle	Oracle Core Dump Device Usage Level	Indicates Oracle core dump device space usage.	High Normal
Oracle	Oracle Opened Cursor Current	Indicates the oracle current opened cursor.	High Normal
Oracle	Oracle Parse Count (Hard)	Indicates the hard parses during this sample period.	High Normal
Oracle	Oracle Parse Count (Failures)	Indicates the oracle parse failures.	High Normal
Oracle	Oracle Session Connect Time	Indicates the connect time for the Oracle session.	High Normal
Oracle	Oracle User Dump Device Usage Level	Indicates Oracle user dump device space usage.	High Normal
Oracle	Oracle Users Call Rate	Indicates rate of recursive calls to user calls and rate of recursive calls to cumulative opened cursors.	High Normal
Oracle	Physical Read Rate	Indicates the performance of an Oracle Instance as affected by the number of physical reads per min.	High Normal

CI Type	HI	Description	Value
Oracle	Row Cache Hit Ratio	Indicates the ratio of which row data requests could be served from the cache.	High Low
Database	Replication Status	Indicates database server replication status.	Broken Failed Up
Database	Server Transaction Rate	Indicates the rate of transactions for the entire database server.	High Normal
Oracle	Shared Pool Memory	Indicates the performance of a Oracle Database Instance as affected by the free space in shared pool memory.	Low Normal
Oracle	SQL Disk ReadWrite Rate	Indicates SQL statement with high disk read-write per execution.	High Normal
Database	SQL Query Performance	Indicates SQL statements with high elapsed time per execution.	Low Normal
Oracle	Streams Apply Status	Indicates the performance of an Oracle Instance as affected by apply processes having errors in an oracle streams environment.	Disabled Aborted Normal
Oracle	Streams Capture Status	Indicates the performance of an Oracle Instance as affected by capture processes having errors in an oracle streams environment.	Disabled Aborted Normal
Oracle	Streams Propagation Status	Indicates the performance of an Oracle Instance as affected by propagation processes having errors in an oracle streams environment.	Disabled Aborted Normal

CI Type	HI	Description	Value
Oracle	Tablespace Temp Segment Usage	Indicates the high use of temp segments to allocated of tablespaces in a Oracle Database Instance.	High Normal
Oracle	Tablespaces Availability	Indicates the availability of DB Tablespaces in a Oracle Database Instance.	Online Offline
Oracle	Tablespace Physical Read Ratio	Indicates the ratio of block to physical reads of tablespaces in a Oracle Database Instance.	High Normal
Oracle	Tablespace Usage Level	Indicates the usage of tablespaces in a Oracle Database Instance.	High Moderate Normal
Oracle	Wait Locked Sessions	Indicates the performance of a Oracle Database Instance as affected by the number of sessions held by locks.	High Normal
Oracle	Waits On Redo Log Space	Indicates the performance of a Oracle Database Instance as affected by the number of waits for redo log space.	High Normal

Event Type Indicators

The content pack includes the following Event Type Indicators (ETIs) to monitor Oracle-related events:

CI Type	ETI	Description	Value
Oracle	Archive Status	Indicates the status of an Oracle Archive Log.	Normal
Oracle	Checkpoint Rate	Indicates high checkpoint rate.	Normal
Oracle	Control File ReadWrite Status	Indicates oracle control file read/write error.	Normal

CI Type	ETI	Description	Value
Oracle	Flash Recovery Errors	Indicates the errors related to flash recovery in an Oracle Instance.	Normal
Oracle	Heavy SQL Statements	Indicates the number of heavy SQL statements in an Oracle Instance.	Normal
Oracle	Latch Contention Ratio	Indicates possible latching problems.	Normal
Oracle	Latch Hit Ratio	Indicates possible latching problems.	Normal, High
Oracle	Locks Usage Level	Indicates the ratio of locks used in an Oracle Database Instance.	Normal, High
Oracle	Materialized View Errors	Indicates the errors related to materialized views in an Oracle Instance.	Normal
Oracle	Memory Sort Rate	Indicates the ratio of which sorts have been performed solely on memory. A low memory sort ratio implies a high disk sort ratio.	Normal
Oracle	Oracle Database Process Status	Indicates Oracle database service/process status.	Running
Oracle	Oracle Disk ReadWrite Errors	Indicates oracle disk read write errors.	Normal
Oracle	Oracle Session Count	Indicates oracle session count to configured.	Normal
Oracle	Streams Errors	Indicates the errors in an oracle streams environment.	Normal
Database	SQL Query Tuning	Indicates SQL statements with low query tuning.	Normal

CI Type	ETI	Description	Value
Oracle	Tablespaces Free Space Fragmentation Index	Indicates the worse fragmented tablespaces in a Oracle Database Instance.	Normal, Moderate, High
Oracle	Total Sort Rate	Indicates the total sorts on disk and in memory in an Oracle Database Instance.	Normal

Correlation Rules

The content pack in the Oracle Content Pack includes the following rules to correlate Oracle-related events:

For more information on how the correlation rules work, see the *Operations Manager i Concepts Guide*.

Database::FileSystem:Disk Usage Level >> Oracle Device Usage Level HIs

Description: Filesystem usage level impacts Oracle Space Usage (Background, User and Core dump device free space)		
Cause		
CIT: File system	ETI: Disk Usage Level	Value: Near Capacity
Symptom 1		
CIT: Oracle	ETI: Oracle Background Dump Device Usage Level	Value: High
Symptom 2		
CIT: Oracle	ETI: Oracle Core Dump Device Usage Level	Value: High
Symptom 3		
CIT: Oracle	ETI: Oracle User Dump Device Usage Level	Value: High

Database::Computer:Memory Usage Level >> Oracle Performance HIs

Description: Memory Usage Impacts Oracle Performance		
Cause		
CIT: Computer	ETI: Memory Usage Level	Value: Near Capacity/ Much Higher Than Normal
Symptom 1		
CIT: Oracle	ETI: Dictionary Cache Miss Ratio	Value: High
Symptom 2		
CIT: Oracle	ETI: Library Cache Functioning	Value: HighReload, LowGetHits, LowPinHits
Symptom 3		
CIT: Oracle	ETI: Memory Sort Rate	Value: Low
Symptom 4		
CIT: Oracle	ETI: SQL Query Performance	Value: Low

Database::FileSystem: Oracle Tablespace Usage Level >> Disk Usage Level

Description: Correlates High Disk Space Usage by Db Tablespace to Near Capacity Disk Usage Level of FileSystem		
Cause		
CIT: Oracle	ETI: Tablespace Usage Level	Value: High
Symptom		
CIT: File System	ETI: Disk Usage Level	Value: Near Capacity

Database::FileSystem:Oracle Tablespace Temp Segment Usage Level >> Disk Usage Level

Description: Correlates High Disk Space Usage by Db Tablespace Temp Usage to Near Capacity Disk Usage Level of FileSystem		
Cause		
CIT: Oracle	ETI: Tablespace Temp Segment Usage	Value: High
Symptom		
CIT: File System	ETI: Disk Usage Level	Value: Near Capacity

Database::Computer:Oracle CPU Usage by SQL >> CPU Load

Description: CPU usage by Oracle SQL query and Heavy SQL statements increase CPU Load on Computer		
Cause		
CIT: Oracle	ETI: CPU Usage by SQL	Value: High
Symptom		
CIT: Computer	ETI: CPU Load	Value: Bottlenecked, Constrained, Busy, Overloaded

Database::Computer:Oracle Heavy SQL Statement >> CPU Load

Description: Oracle Heavy SQL statements increase CPU Load on Computer		
Cause		
CIT: Oracle	ETI: Heavy SQL Statements	Value: High
Symptom		
CIT: Computer	ETI: CPU Load	Value: Bottlenecked, Constrained, Busy, Overloaded

Database::Computer: Node Status >> Oracle Database Server Status

Description: Correlates Unavailability of node to that of Database		
Cause		
CIT: Computer	ETI: Node Status	Value: Down, Unknown, Suspended, Hang
Symptom		
CIT: Oracle	ETI: Database Server Status	Value: Down

Database::Computer: Ping Availability >> Oracle Database Server Status

Description: Correlates Unavailability of node to that of Database		
Cause		
CIT: Computer	ETI: Ping Availability	Value: Unavailable
Symptom		
CIT: Oracle	ETI: Database Server Status	Value: Down

Database::Interface: InterfaceCommunicationStatus >> Oracle Database Broken Jobs

Description: Correlates Interface Communication Status of node to Oracle Database Broken Jobs		
Cause		
CIT: Interface	ETI: Interface Communication Status	Value: Unavailable
Symptom		
CIT: Oracle	ETI: Replication Status	Value: Broken

Database::Interface: InterfaceCommunicationStatus >> Oracle Database Failed Jobs

Description: Correlates Interface Communication Status of node to Oracle Database Failed Jobs		
Cause		
CIT: Interface	ETI: Interface Communication Status	Value: Unavailable
Symptom		
CIT: Oracle	ETI: Replication Status	Value: Failed

Database::Interface: InterfaceCommunicationStatus >> Oracle Database Stream Propagation Error

Description: Correlates Interface Communication Status of node to Oracle Database Stream Propagation Error		
Cause		
CIT: Interface	ETI: Interface Communication Status	Value: Unavailable
Symptom 1		
CIT: Oracle	ETI: Streams Propagation Status	Value: Aborted
Symptom 2		
CIT: Oracle	ETI: Streams Propagation Status	Value: Disabled

Database::Interface: InterfaceUtilization >> Oracle Database Replication Status

Description: Correlates Interface Utilization of node to Oracle Database Replication and SQL Query Performance Health		
Cause		
CIT: Interface	ETI: Network IQ	Value: High, Higher Than Normal, Much Higher Than Normal

Description: Correlates Interface Utilization of node to Oracle Database Replication and SQL Query Performance Health		
Symptom 1		
CIT: Oracle	ETI: Replication Status	Value: Broken, Failed
Symptom 2		
CIT: Oracle	ETI: Dispatcher Busy Ratio by Network	Value: High
Symptom 3		
CIT: Oracle	ETI: SQL Query Performance	Value: Low

Database::Interface: InterfaceUtilization >> Oracle Database SQL Query Performance

Description: Correlates Interface Utilization of node to Oracle Database SQL Query Performance		
Cause		
CIT: Interface	ETI: Interface Utilization	Value: High
Symptom		
CIT: Oracle	ETI: SQL Query Performance	Value: Low

Tool Definitions

The content pack contains the following tools mapped to the Oracle CI type and the Database Operational Tools category.

CI Type	Tool
Oracle	Archive Device Free Space
	Archive Log Write Rate
	Background Dump Device Usage Level
	Cached Tables
	Core Dump Device Usage Level
	Database Object Status
	Datafiles Status
	Disabled Constraints
	Disabled Triggers
	Flash Recovery Area Usage Level
	Global Cache Block Status
	Global Cache Blocks Timed Out Count
	Oracle Database Connection Check

CI Type	Tool
Oracle	Oracle Product Manuals, starts a web browser and connects to the Oracle product manuals web site.
	Oracle Segments Near Max Extents
	Oracle Segments Not Extendable
	Oracle Sessions Waiting For Lock
	Shared Pool Memory
	Shared Servers Waiting For Requests
	SQL Statements CPU Time
	SQL Statements Performing Full Table Scans
	SQL Statements With High Buffer Gets Per Execution
	SQL Statements With High Disk Reads
	SQL Statements With High Elapsed Time Per Execution
	SQL Statements With High Execution Rate
	SQL Statements With High Fetches
	SQL Statements With Long Table Scans
	Tables And Indexes Unanalyzed
	Tablespace Free Space
	Tablespaces Fragmented
	Tablespaces With High Read
	User Dump Device Usage Level
	Users Logons

Graph Templates

The content pack includes the SPI for Databases - Oracle graph family, which is mapped to the Oracle CI type.

The following table lists the graph templates present in the SPI for Databases - Oracle graph family and the mapped policies:

Graph Templates	Metric Name	Policy Description
Archive Device	DBSPI-0058	Percentage of free space on archive device.
Archive Logs	DBSPI-0056	Number of archive logs in archive device.
	DBSPI-0057	Average time of archive log writes.
Calls	DBSPI-0050	Ratio of recursive calls to user calls.
	DBSPI-0075	Ratio of recursive calls to cumulative opened cursors.
Checkpoints	DBSPI-0035	Rate of background checkpoints completed.
	DBSPI-0083	Rate of DBWR checkpoints.
Dump Devices	DBSPI-0062	Percentage of space used on background dump device.
	DBSPI-0064	Percentage of space used on user dump device.
	DBSPI-0065	Percentage of space used on core dump device.
	DBSPI-0066	Size in MB of alert log.
Initialization Limits	DBSPI-0028	Percentage of DML locks used to total configured.
	DBSPI-0031	Number of users with percentage of open cursors to maximum configured.
	DBSPI-0085	Percentage of current transactions to configured.
	DBSPI-0087	Percentage of current processes to configured.
	DBSPI-0089	Percentage of enqueues to configured.

Graph Templates	Metric Name	Policy Description
Multi-threaded Server	DBSPI-0090	Percentage of busy (average) for all dispatchers.
	DBSPI-0091	Number of clients currently connected to all dispatchers.
	DBSPI-0092	Percentage of shared servers waiting for requests.
	DBSPI-0093	Percentage of busy to max shared server processes.
	DBSPI-0094	Current percentage of shared pool allocated to UGA.
	DBSPI-0095	Maximum percentage of shared pool allocated to UGA.
	DBSPI-0096	Percentage of highwater to max shared server processes.
Parallel Query Option	DBSPI-0070	Percentage of parallel query servers busy.
	DBSPI-0071	Percentage of parallel query servers busy highwatermark.
	DBSPI-0074	Rate of parallel queries initiated.
	DBSPI-0076	Percentage of full table scans using rowid range scans compared to total full table scans.
Rollbacks	DBSPI-0068	Number of rollback segment shrinks.
	DBSPI-0069	Percentage of rollback segment wait.
RollBacks Generated	DBSPI-0054	Rate of generated rollbacks.
Redo	DBSPI-0032	Number of waits for redo log space.
	DBSPI-0033	Percentage of redo allocation latch misses.
	DBSPI-0034	Percentage of redo copy latch misses.
Sessions	DBSPI-0082	Maximum number of sessions from startup.

Graph Templates	Metric Name	Policy Description
Sharedpool	DBSPI-0022	Total buffer cache hit percentage.
	DBSPI-0023	Current buffer cache hit percentage.
	DBSPI-0026	Percentage of cache get misses to gets in dictionary cache.
	DBSPI-0027	Percentage of library cache misses to executions.
	DBSPI-0039	Percentage of gethits to gets in dictionary cache.
	DBSPI-0040	Percentage of pinhits to pins in dictionary cache.
	DBSPI-0045	Percentage of free pool memory.
	DBSPI-0059	Percentage of cursors in cache parameter.
Sorts	DBSPI-0019	Disk sort rate.
	DBSPI-0052	Rate of total sorts on disk and in memory.
Sorts Memory/ Rows	DBSPI-0020	Percentage of memory sorts.
Tablespace	DBSPI-0006	Number of tablespaces with low free space percentage.
	DBSPI-0007	Number of tablespaces not ONLINE.
	DBSPI-0008	Number of tablespaces with high ratio of block to physical reads.
	DBSPI-0009	Number of tablespaces with high use of temp segments to total.
	DBSPI-0011	Number of fragmented tablespaces.
	DBSPI-0016	Number of segments that cannot extend.
	DBSPI-0017	Number of segments approaching max extent.
	DBSPI-0018	Number of segments adding extents rapidly.

Graph Templates	Metric Name	Policy Description
Table Scan	DBSPI-0030	Rate at which full table scans (long tables) occur.
Tables and Indexes	DBSPI-0042	Percentage of the tables and indexes which were never analyzed.
	DBSPI-0046	Percentage of the rows fetched by index.
	DBSPI-0048	Percentage of chained rows fetched.
Waits	DBSPI-0021	Percentage of buffer busy waits to logical reads.
	DBSPI-0024	Percentage of enqueue waits to enqueue requests.
	DBSPI-0038	Number of latches with high contention ratio greater than threshold.
	DBSPI-0043	Percentage of enqueue timeouts to enqueue requests.
	DBSPI-0029	Number of sessions waiting for release of a lock.

Policies Setting ETIs

The following table lists the content pack ETIs and SPI policies that set the ETIs.

Note: For more information on the measurement threshold policies and events, refer to the HP Operations Smart Plug-in for Databases documents.

ETI/HI	Policy Name	Policy Description
Archive Status	ORA-00270	Error creating archive log.
	ORA-00272	Error writing archive log.
	ORA-00290	Operating system archiving error.
	ORA-00255	Error archiving log.
Background Dump Device Usage Level	DBSPI_0062	Background dump device free space is low.
Checkpoint Rate	DBSPI_0035	Rate of background checkpoints completed.
	DBSPI_0083	Rate of DBWR checkpoints.
Control File ReadWrite Status	ORA-00204	Error reading control file.
	ORA-00206	Error writing control file.
	ORA-00210	Cannot open control file.
	ORA-00221	Error on write to control file.
Oracle Core Dump Device Usage Level	DBSPI_0065	Core dump device free space is low.
CPU Usage by SQL	DBSPI_0107	Number of seconds used by SQL server to total amount of elapsed time since last probing: 1. SQL server has excessive load 2. Thread is in an endless CPU loop
Database Object Status	DBSPI_0077	SYS.DUAL status, row status invalid.
	DBSPI_0078	Database Objects invalid.

ETI/HI	Policy Name	Policy Description
Oracle Database Process Status	DBSPI_0002	The critical Oracle process indicated either aborted or was killed.
	ORA-00348	Single process redo failure.
	ORA-00443	Background process did not start.
	ORA-00444	Background process failed while starting.
	ORA-00445	Background process did not start after n seconds.
	ORA-00447	Fatal error in background process.
	ORA-00470	LGWR process terminated with error.
	ORA-00471	DBWR process terminated with error.
	ORA-00472	PMON process terminated with error.
	ORA-00473	ARCH process terminated with error.
	ORA-00474	SMON process terminated with error.
	ORA-00475	TRWR process terminated with error.
	ORA-00476	RECO process terminated with error.
	ORA-00477	SNP _x process terminated with error.
	ORA-00480	LCK _x process terminated with error.
ORA-00483	During shutdown a process abnormally terminated.	
Database Segment Status	DBSPI_0016	Number of segments that cannot extend.
Database Segment Usage Level	DBSPI_0017	Number of segments approaching max extent.
Database Server Status	DBSPI_0001	Database status check.
Datafiles Status	DBSPI_0014	Number of data files not online.
Default Buffer Pool Hit Ratio	DBSPI_0022	Total buffer cache hit percentage.

ETI/HI	Policy Name	Policy Description
Dictionary Cache Miss Ratio	DBSPI_0026	Percentage of cache get misses to gets in dictionary cache.
Dispatcher Busy Ratio by Network	DBSPI_0090	Average percentage busy for all Dispatchers.
Flash Recovery Area Usage Level	DBSPI_0136	Percentage of space used by Flash Recovery Area.
Flash Recovery Errors	ORA-38767	Flashback retention target parameter mismatch.
	ORA-38776	Cannot begin flashback generation - flash recovery area is disabled.
	ORA-38786	Recovery area is not enabled.
	ORA-38791	Flashback did not start because file string was not in a valid incarnation.
	ORA-38861	Flashback recovery stopped before reaching recovery target.
Heavy SQL Statements	DBSPI_0119	Number of heavy SQL statements.
SQL Disk ReadWrite Rate	DBSPI_0101	Number of SQL statement with high disk reads per execution.
Oracle User Dump Device Usage Level	DBSPI_0064	Percentage of space used on user dump device.
Latch Contention Ratio	DBSPI_0038	Number of latches with high contention ratio threshold.
Latch Hit Ratio	DBSPI_0033	Percentage of redo allocation latch misses.
	DBSPI_0034	Percentage of redo copy latch misses.

ETI/HI	Policy Name	Policy Description
Library Cache Functioning	DBSPI_0027	Percentage of library cache misses to executions.
	DBSPI_0039	Percentage of gethits to gets in dictionary cache.
	DBSPI_0040	Percentage of pinhits to pins in dictionary cache.
Locks Usage Level	DBSPI_0028	Percentage of DML locks used to total configured.
Long Table Scan Percentage	DBSPI_0103	SQL statements with long table scans.
Logical Read Rate	DBSPI_0088	Number of logical reads per minute.
Materialized View Errors	ORA-12008	Error in materialized view refresh path.
	ORA-12057	Materialized view "string"."string" is invalid and must complete refresh.
	ORA-12096	Error in materialized view log on "string"."string".
	ORA-12097	Changes in the master tables during refresh. Try refresh again.
	ORA-19809	Limit exceeded for recovery files.
	ORA-19816	WARNING: Files may exist in location that are not known to database.
Memory Sort Rate	DBSPI_0020	Percentage of memory sorts.
Oracle Disk Read Write Errors	ORA-01114	IO error writing block to file.
	ORA-01115	IO error reading block from file.
	ORA-01116	Error in opening datafile.
	ORA-01242	Data file suffered media failure.
	ORA-01243	System tablespace file suffered media failure.

ETI/HI	Policy Name	Policy Description
Oracle Session Count	ORA-00018	Maximum number of sessions exceeded.
	ORA-00019	Maximum number of sessions licenses exceeded.
	ORA-00020	Maximum number of processes exceeded.
Oracle Users Call Rate	DBSPI_0050	Ratio of recursive calls to user calls.
	DBSPI_0075	Ratio of recursive calls to cumulative opened cursors.
Physical Read Rate	DBSPI_0086	Number of physical reads per minute.
Replication Status	DBSPI_0113	Number of broken DBMS jobs.
	DBSPI_0114	Number of failed DBMA jobs.
Server Transaction Rate	DBSPI_0085	Percentage of current transactions to configured.
Shared Pool Memory	DBSPI_0045	Percentage of shared pool memory.
SQL Query Performance	DBSPI_0106	SQL statement with high elapsed time per execution.
SQL Query Tuning	DBSPI_0030	Rate at which full table scans (long tables) occur.
	DBSPI_0042	Percentage of never analyzed tables and indexes.
	DBSPI_0046	Percentage of rows retrieved by index.
	DBSPI_0048	Percentage of chained rows retrieved.
	DBSPI_0070	Percentage of busy parallel query servers.
	DBSPI_0071	Percentage of busy highwater to maximum parallel query servers.
	DBSPI_0074	Rate of parallel queries initiated.
	DBSPI_0076	Percentage of full table scans using rowid range scans compared to total full table scans.

ETI/HI	Policy Name	Policy Description
Streams Apply Status	DBSPI-0143	Monitors the apply processes having errors in an oracle streams environment.
Streams Capture Status	DBSPI-0141	Monitors the capture processes having errors in an oracle streams environment.
Streams Propagation Status	DBSPI-0142	Monitors propagation errors in an oracle streams environment.
Streams Errors	ORA-24093	AQ agent string is not granted privileges of database user string.
	ORA-26662	Unable to process STREAMS Data Dictionary information for object.
	ORA-26666	Cannot alter STREAMS process string.
	ORA-26671	Maximum number of STREAMS processes exceeded.
	ORA-26672	Timeout occurred while stopping STREAMS process string.
	ORA-26713	Remote object does not exist or is inaccessible
	ORA-26715	Time limit reached.
	ORA-26745	Cursors (string) are not sufficient.
	ORA-26786	A row with key string exists but has conflicting column(s) string in table string.
	ORA-26816	STREAMS apply process "string" (OS id string) is exiting due to ORA-number.
	ORA-26819	STREAMS capture server for apply "string" and capture "string"encounters disabled or aborted propagation "string".
	ORA-26826	STREAMS apply coordinator and apply slave are unable to communicate.
E144_StrmsA ppllyErrs	Monitors general apply errors in an oracle streams environment.	

ETI/HI	Policy Name	Policy Description
Tablespaces Availability	DBSPI_0007	Number of tablespaces not ONLINE.
Tablespaces Free Space Fragmentation Index	DBSPI_0011	Number of fragmented tablespaces.
Tablespace Physical Read Ratio	DBSPI_0008	Number of table spaces with high ratio of block to physical reads.
Tablespace Temp Segment Usage	DBSPI_0009	Number of tablespaces with high use of temp segments to total.
Tablespace Usage Level	DBSPI_0206	Number of tablespaces with low free space percentage.
Total Sort Rate	DBSPI_0052	Drill down data for # of segments approaching max extent.
Wait Locked Sessions	DBSPI_0029	Number of sessions waiting for release of a lock
Waits On Redo Log Space	DBSPI_0032	Number of waits for redo log space.

Operations Orchestration Flow

The following table lists the Oracle Operations Orchestration (OO) Flows:

OO Flows	Flow input	CI Type	CI attribute	Event Attribute
Oracle database performance check	instance omServer	oracle	database_dbsid	Originating Server
Oracle database health check				

When creating the mapping defined in the preceding table, you can set default values for the attributes listed in the following table.

Attribute	Description
omServerPort	Port number of the HPOM Tool WS.
omServerUser	User name for the HPOM Server that will use used in the HPOM Tool WS.
omServerPassword	Password for the HPOM Server that will use used in the HPOM Tool WS.

For more information about creating the mapping and a Run Book automation rule, see "How to Create a Run Book Automation Rule" on page 505.

The user input when executing OO flows is as follows:

omNode: The DNS name of the Oracle node.

Microsoft SQL Server Content Pack

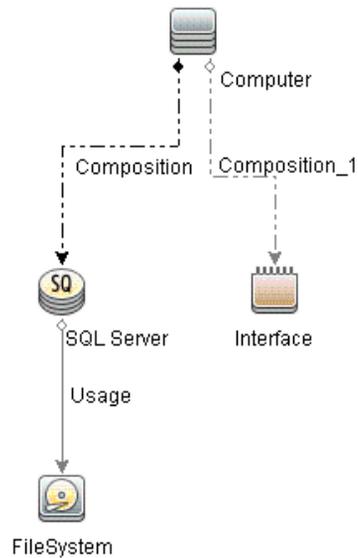
The Microsoft SQL Server Content Pack contains the following artifacts:

- Views on page 763
- Health Indicators on page 764
- Event Type Indicators on page 768
- Correlation Rules on page 769
- Tool Definitions on page 773
- Graph Templates on page 774
- Policies Setting ETIs on page 777
- Operations Orchestration Flow on page 779

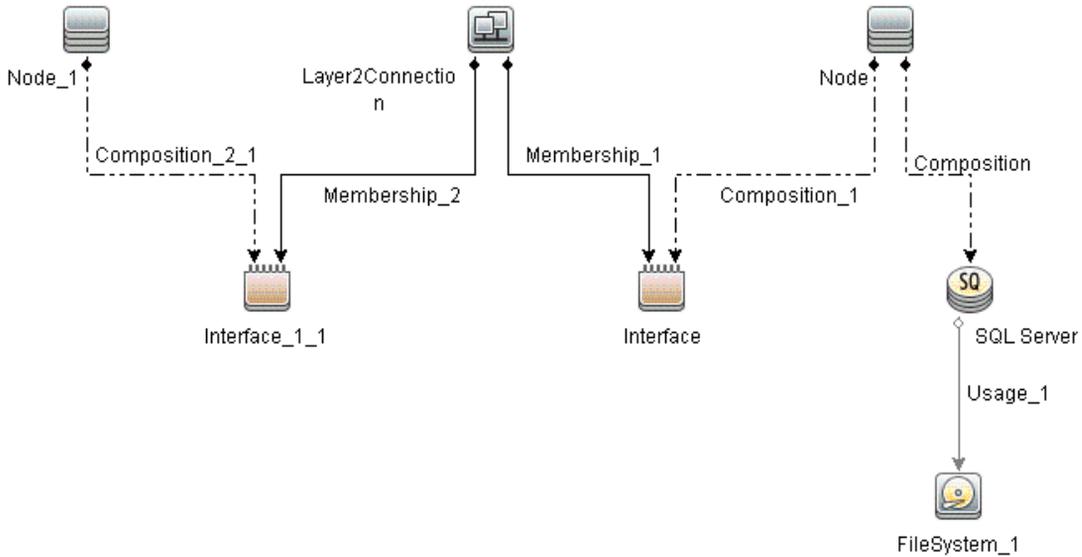
Views

The RTSM package in the Microsoft SQL Server Content Pack includes the following views.

- **MSSQL_Deployment:** This view refers to the SQL Server, File System, and Computer CI type. The following image shows the relationship among the CI types.



- **MSSQL_Network_Deployment:** This view refers to the SQL Server, File System, Node, and Interface CI type. The following image shows the relationship among the CI types.



Health Indicators

The content pack includes the following Health Indicators (HIs) to monitor Microsoft SQL Server-related events:

CI Type	HI	Description	Value
SQL Server	Cache Performance	Indicates cache hit percentage.	Low Normal
Database	CPU Usage by SQL	Indicates SQL statements with high CPU time per execution.	High Normal
SQL Server	Database Deadlock Rate	Indicates the performance of a SQL Server instance based on the rate of deadlocks in the database.	High Normal

CI Type	HI	Description	Value
SQL Server	Database FileGroup Space Usage Level	Indicates availability of a Database in the SQL Server Instance as the percentage of space used per filegroup per database and the percentage of space available per filegroup per database.	High Medium Normal
SQL Server	Database Latch Wait Rate	Indicates the performance of a SQL Server instance based on number of latch waits.	High Normal
SQL Server	Database Lock Timeout Rate	Indicates the performance of a SQL Server instance based on the rate of deadlocks in the database.	High Normal
SQL Server	Database Mirroring Transaction Delay	Indicates the delay in waiting for unterminated commit acknowledgement.	High Normal
SQL Server	Database Reads Outstanding	Indicates the performance of a SQL Server instance wrt the number of outstanding read requests to the host operating system.	High Normal
Database	Database Server Status	Indicates database server availability.	Down Up
SQL Server	Database Status	Indicates the availability of a Database in an SQL Server Instance.	Down Up
SQL Server	Database Space Usage Level	Indicates availability of Database in the SQL Server Instance as the percentage of database space used.	High Normal

CI Type	HI	Description	Value
SQL Server	Database Writes Outstanding	Indicates the performance of a SQL Server instance wrt the number of outstanding write requests to the host operating system.	High Normal
SQL Server	Lock Memory Used Pct	Indicates percentage of used lock memory.	High Normal
SQL Server	Lock Wait Rate	Indicates number of lock requests per second that could not be satisfied immediately and required the caller to wait, for all object types combined: Extent, Key, Page, Table, RID, Database. Also indicates number of lock requests per second that resulted in a deadlock.	High Normal
SQL Server	Locks in Use Percentage	Indicates percentage total locks currently held to the total number of locks configured for SQL Server.	High Normal
Database	Replication Status	Indicates database server replication status.	Broken Failed Up
SQL Server	Runnable Workers Ratio	Indicates the ratio between SQL Server workers currently running and workers potentially runnable. A ratio above 100.00 means more workers are currently running than runnable.	Full Capacity High Normal
Database	SQL Query Performance	Indicates SQL statements with high elapsed time per execution.	Long Normal

CI Type	HI	Description	Value
SQL Server	SQL Server Active Cursor	Indicates Microsoft SQL Server active cursors.	High Normal
SQL Server	SQL Server Cursor Memory Usage	Indicates amount of memory consumed by cursors.	High Normal
SQL Server	SQL Server Database Active Transactions	Indicates the number of active transactions with the database.	High Normal
SQL Server	SQL Server Databases Data File Size	Indicates the cumulative size of all the data files in the database including any automatic growth.	High Normal
SQL Server	SQLServer Databases Transaction Rate	Indicates Number transactions started for the database per second.	High Normal
SQL Server	SQL Server Service Status	Indicates the availability of a SQL Server Service that corresponds to a given SQL Server Instance.	Down Up
Database	Server Transaction Rate	Indicates the rate of transactions for the entire database server.	High Normal
SQL Server	Transaction Log Usage Level	Indicates the availability of an SQL Server instance as affected by the percentage of transaction log space used.	High Normal
SQL Server	Users Connected Percentage	Indicates percentage of the current user connections to the total number of user connections configured for SQL Server.	High Medium Normal
SQL Server	Virtual Device Space Usage Level	Indicates percentage of space used on a virtual device.	High Medium Normal

Event Type Indicators

The content pack includes the following Event Type Indicators (ETIs) to monitor Microsoft SQL Server-related events:

CI Type	ETI	Description	Value
SQL Server	Database Mirroring Status	Indicates mirroring state of the SQL Server.	Normal
SQL Server	Inactive Database Connections	Indicates the number of total active and sleeping connections in a SQL Server instance.	Normal
SQL Server	Merge Conflicts	Indicates the number of conflicts per second during Publisher or Subscriber upload and download in a SQL Server instance.	Normal
Database	SQL Query Tuning	Indicates SQL statements with low query tuning.	Normal
SQL Server	SQL Server Disk Read/Write Errors	Indicates SQL Server disk read/write errors.	Normal

Correlation Rules

The content pack includes the following rules to correlate Microsoft SQL Server-related events.

For more information on how the correlation rules work, see the *Operations Manager i Concepts Guide*.

Database::FileSystem:SQLServer Space Usage Level HIs >> Disk Usage Level

Description: Correlates the High Usage of Virtual Device Space by SQL Server to Near Capacity Disk Usage Level of FileSystem		
Cause		
CIT: SQL server	ETI: Database Space Usage Level	Value: High
Symptom		
CIT: File System	ETI: Disk Usage Level	Value: Near Capacity

Database::FileSystem:SQLServer Transaction Log Usage Level HIs >> Disk Usage Level

Description: Correlates the High Usage of Virtual Device Space by SQL Server to Near Capacity Disk Usage Level of FileSystem		
Cause		
CIT: SQL server	ETI: Transaction Log Usage Level	Value: High
Symptom		
CIT: File System	ETI: Disk Usage Level	Value: Near Capacity

Database::FileSystem:SQLServer Virtual Device Space Usage Level HIs >> Disk Usage Level

Description: Correlates the High Usage of Virtual Device Space by SQL Server to Near Capacity Disk Usage Level of FileSystem		
Cause		
CIT: SQL server	ETI: Virtual Device Space Usage Level	Value: High
Symptom		
CIT: File System	ETI: Disk Usage Level	Value: Near Capacity

Database::FileSystem:SQLServer FileGroup Space Usage Level HIs >> Disk Usage Level

Description: Correlates the High Usage of Virtual Device Space by SQL Server to Near Capacity Disk Usage Level of FileSystem		
Cause		
CIT: SQL server	ETI: Database FileGroup Space Usage Level	Value: High
Symptom		
CIT: File System	ETI: Disk Usage Level	Value: Near Capacity

Database::Computer: Node Status >> SQL Server Status

Description: Correlates Unavailability of node to that of Database		
Cause		
CIT: Computer	ETI: Node Status	Value: Down, Unknown, Hang
Symptom		
CIT: SQL Server	ETI: Database Server Status	Value: Down

Database::Computer:Ping Availability >> SQL Server Status

Description: Correlates Unavailability of node to that of Database		
Cause		
CIT: Computer	ETI: Ping Availability	Value: Unavailable
Symptom		
CIT: SQL Server	ETI: Database Server Status	Value: Down

Database::Computer:SQL Server CPU Usage by SQL >> CPU Load

Description: CPU usage by MSSQL SQL query increases CPU load on Computer		
Cause		
CIT: SQL Server	ETI: CPU Usage by SQL	Value: High
Symptom		
CIT: Computer	ETI: CPU Load	Value: Bottlenecked, Busy, Constrained, Overloaded

Database::Computer:Memory Usage Level >> SQL Server SQL Performance HIs

Description: Memory Usage Level on host impacts SQL Server Performance		
Cause		
CIT: Computer	ETI: Memory Usage Level	Value: Near Capacity, Much Higher Than Normal
Symptom 1		
CIT: SQL Server	ETI: Cache Performance	Value: Low
Symptom 2		
CIT: SQL Server	ETI: SQL Query Performance	Value: Low

Database::Interface: InterfaceCommunicationStatus >> SQLServer Database Packet Error

Description: Correlates Interface Communication Status of node to SQL Server Database Packet Error		
Cause 1		
CIT: Interface	ETI: Interface Communication Status	Value: Unavailable
Cause 2		
CIT: Interface	ETI: Interface Discard Rate	Value: High
Cause 3		
CIT: Interface	ETI: Interface Error Rate	Value: High
Symptom		
CIT: SQL Server	ETI: SQL Server Disk ReadWrite Errors	Value: High

Database::Interface: InterfaceUtilization >> SQLServer Database Replication Status

Description: Correlates Interface Utilization of node to SQL Server Database Replication and SQL Query Performance Health		
Cause		
CIT: Interface	ETI: Network IQ	Value: High, Much Higher Than Normal
Symptom 1		
CIT: SQL Server	ETI: Replication Status	Value: Broken, Failed
Symptom 2		
CIT: SQL Server	ETI: SQL Query Performance	Value: Low

Tool Definitions

The content pack contains the following tools mapped to the SQL Server CI type and the Database Operational Tools category.

CI Type	Tool
SQL Server	Active Connections
	Databases Status
	Filegroup Space Usage
	Locks Wait Rate
	Microsoft SQL Server Connection Check, checks the connection of the all Microsoft SQL Servers configured to the Smart Plug-in for Microsoft SQL Server.
	Microsoft SQL Server Documents, starts a web browser and connects to the Microsoft SQL Server product manuals web site.
	Mirroring Status
	Network Statistics
	Processes Blocked
	Replication Agents Status
	Replication Latency
	Server Statistics
	Server Status
	Transaction Log Space Usage
	Transactions Active
	Users Connected
Virtual Device Space Usage	

Graph Templates

The content pack includes the SPI for Databases - Microsoft SQL Server graph family, which is mapped to the SQL Server CI type.

The following table lists the graph templates present in the SPI for Databases - Microsoft SQL graph family and the mapped policies.

Graph Templates	Metric Name	Policy Description
Cache	DBSPI_3022	Buffer chain average length
Data Access	DBSPI_3051	Full Scans Rate
	DBSPI_3052	Index searches rate
	DBSPI_3053	Pages allocated rate
	DBSPI_3054	Extents allocated rate
	DBSPI_3055	Page splits rates
	DBSPI_3056	Table lock escalation rate
Errors	DBSPI_3023	Number of SQL Server read/write errors since the last probing.
	DBSPI_3024	Number of packet errors while reading or writing packets.
	DBSPI_3028	Number of databases marked as suspect.
IO Utilization	DBSPI_3007	Number of read requests issued to OS that are not completed.
	DBSPI_3008	Number of write requests issued to the OS not completed.

Graph Templates	Metric Name	Policy Description
Latches	DBSPI_3068	Number of latch requests that was not immediately granted and had to wait before being granted.
	DBSPI_3069	Average latch wait time for latch requests that had to wait from the time server started.
	DBSPI_3076	Average latch wait time for latch requests that had to wait during the current collection interval.
Locks and its Memory Utilization	DBSPI_3013	Percentage of locks in use.
	DBSPI_3075	Percentage of lock memory in use.
Lock Requests	DBSPI_3070	Lock timeout rate
	DBSPI_3071	Deadlocks rate
	DBSPI_3072	Locks wait rate
	DBSPI_3073	Average lock wait time
Least Recently Used	DBSPI_3001	Percentage of times a data page was found in the cache.
Server Status	DBSPI_3017	Percentage of the command queue length used.
	DBSPI_3025	Percentage of the CPU time used by SQL server.
	DBSPI_3074	Batch requests rate
Transactions	DBSPI_3009	Server transaction rate
	DBSPI_3066	Number of the log expansions for the server.
Server Status for processes and transactions	DBSPI_3014	Number of blocked processes.
	DBSPI_3064	Number of active transactions for the entire server.

Graph Templates	Metric Name	Policy Description
Users	DBSPI_3011	Percentage of the current users connected.
	DBSPI_3026	Percentage of the total connections that are active and sleeping.

Policies Setting ETIs

The following table lists the content pack ETIs and SPI policies that set the ETIs.

Note: For more information on the measurement threshold policies and events, refer to the HP Operations Smart Plug-in for Databases documents.

ETI/Hi	Policy Name	Policy Description
Cache Performance	DBSPI_3001	Percentage of times a data page was found in the cache.
CPU Usage by SQL	DBSPI_3025	CPU time percentage used by SQL Server.
Database Mirroring Status	DBSPI_3084	Mirroring state of the Server instance.
	DBSPI_3085	Unsent log on the principle.
	DBSPI_3086	Unrestored log on the mirror.
Database Space Usage Level	DBSPI_3218	Percentage of database space used.
Database Status	DBSPI_3230	Number of databases marked as suspect.
Database Server Status	DBSPI_3030	Ability to connect to a database.
SQL Server Disk ReadWrite Errors	DBSPI_3023	Number of SQL Server read/write errors since the last probing.
	DBSPI_3024	Number of packet errors while reading or writing packets.
Locks in Use Percentage	DBSPI_3013	Percentage total locks currently held to the total number of locks configured for SQL Server.
Lock Memory Used Percentage	DBSPI_3075	Percentage of lock memory in use.

ETI/HI	Policy Name	Policy Description
Database Lock Timeout Rate	DBSPI_3070	Lock timeout rate.
Lock Wait Rate	DBSPI_3072	Locks wait rate.
Replication Status	DBSPI_3081	Replication agents status.
SQL Server Service Status	DBSPI_3031	Number of users.
	DBSPI_3057	Checks the status of SQL Server service.
	DBSPI_3058	Checks the status of the SQL Agent service.
SQL Query Performance	DBSPI_3035	Long running transaction.
SQL Query Tuning	DBSPI_3051	Full scans rate.
	DBSPI_3052	Index searches rate.
	DBSPI_3053	Pages allocation rate.
	DBSPI_3054	Extents allocation rate.
	DBSPI_3055	Page splits rate.
Users Connected Percentage	DBSPI_3011	Percentage of current users connected.
Virtual Device Space Used	DBSPI_3215	Percentage of space used on a specific virtual device.

Operations Orchestration Flow

The following table lists the Microsoft SQL Server Operations Orchestration (OO) Flows:

OO Flows	Flow input	CI Type	CI attribute	Event Attribute
Microsoft SQL Server Performance check	sqlServerName omServer	sqlserver	database_dbsid	Originating Server
Oracle database health check				

When creating the mapping defined in the preceding table, you can set default values for the attributes listed in the following table.

Attribute	Description
omServerPort	Port number of the HPOM Tool WS.
omServerUser	User name for the HPOM Server that will use used in the HPOM Tool WS.
omServerPassword	Password for the HPOM Server that will use used in the HPOM Tool WS.

For more information about creating the mapping and a Run Book automation rule, see "How to Create a Run Book Automation Rule" on page 505.

The user input when executing OO flows is as follows:

omNode: The DNS name of the Microsoft SQL Server node.

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Infrastructure Content Pack

This chapter includes:

Reference

- ▶ Infrastructure Content Pack on page 782

Reference

Infrastructure Content Pack

Note: You can use the Infrastructure Content Pack with Smart Plug-ins for Infrastructure 2.00 suite that includes: Smart Plug-ins for Virtualization Infrastructure 2.00, Smart Plug-ins for Systems Infrastructure 2.00, and Smart Plug-ins for Cluster Infrastructure 2.00.

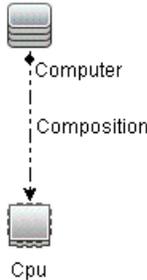
The Infrastructure Content Pack contains the following artifacts:

- ▶ Views on page 783
- ▶ Health Indicators on page 790
- ▶ Event Type Indicators on page 802
- ▶ Correlation Rules on page 803
- ▶ Mapping Rules on page 809
- ▶ Tool Definitions on page 812
- ▶ Graph Templates on page 817
- ▶ Systems Infrastructure Graph Templates on page 818
- ▶ Policies Setting HIs/ETIs on page 832
- ▶ Operations Orchestration Flow on page 844

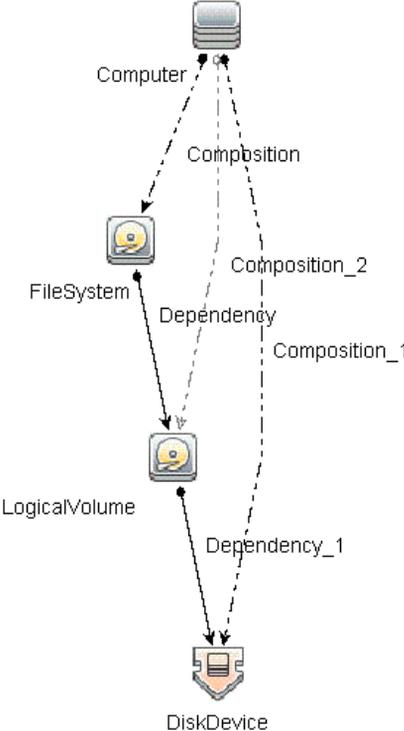
Views

The Infrastructure Content Pack contains the following views:

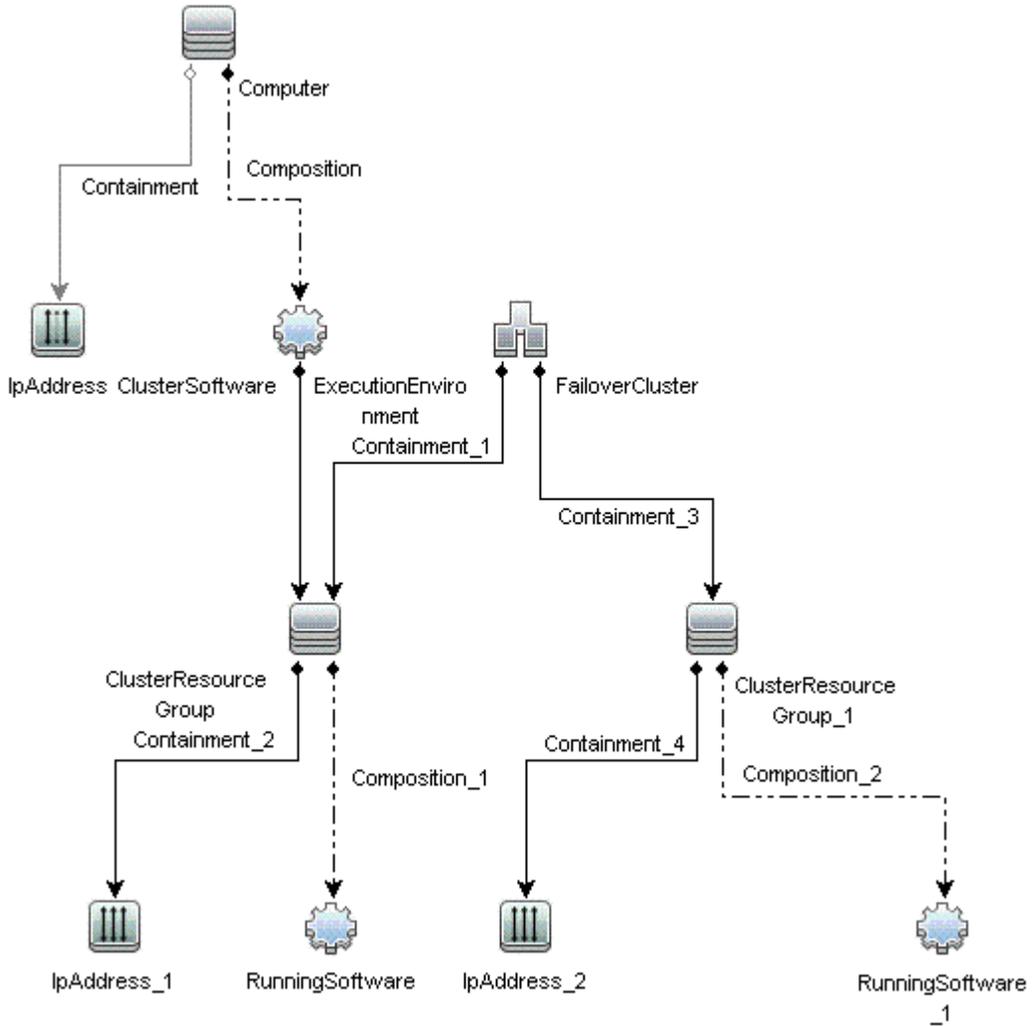
- **CPU_Infrastructure:** This view refers to the CPU and Computer CI types.



- **Filesystem_Infrastructure:** This view refers to the File System and Computer CI types.

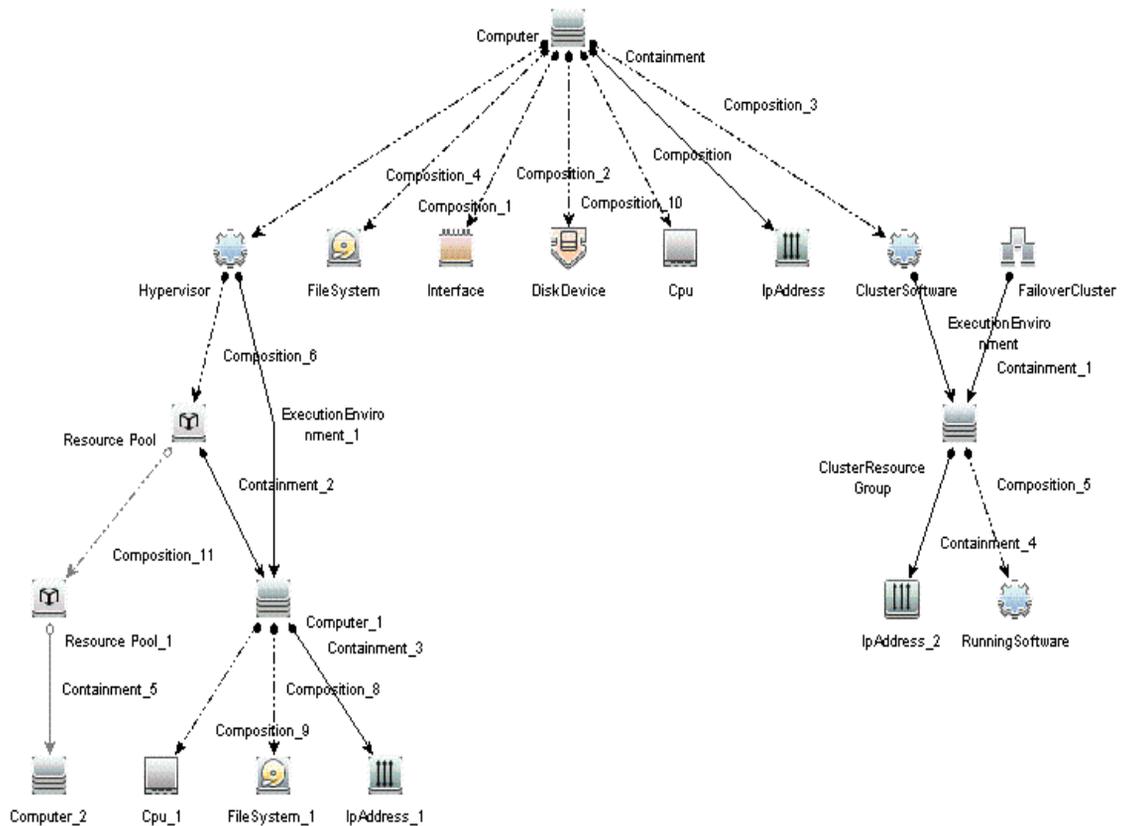


- **HACluster_Infrastructure:** This view refers to the Computer (Windows or UNIX), Cluster Software, Clustered Server, Failover Cluster, Software Element, and IP Address CI types.

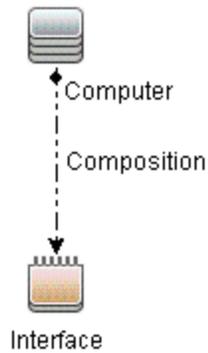


- **Infrastructure_Common:** This view represents a combined view for the HACluster_Infrastructure, Systems_Infrastructure, and Virtualization_Infrastructure views.

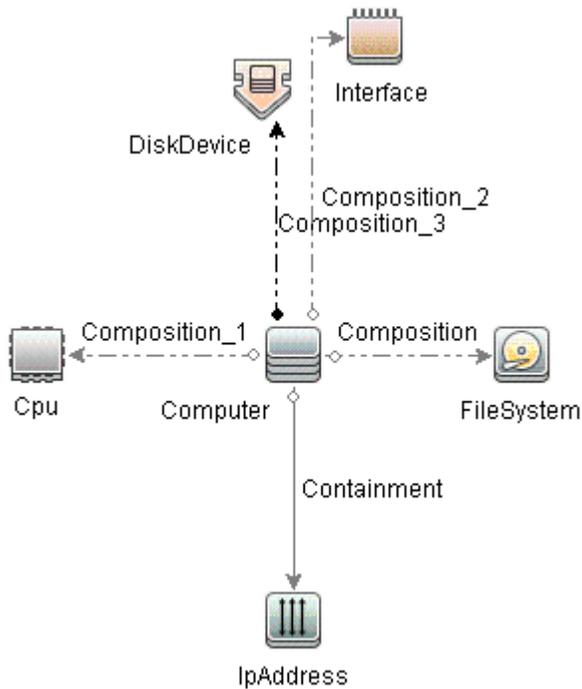
Note: CPUs and disc devices are shown only for virtualization servers.



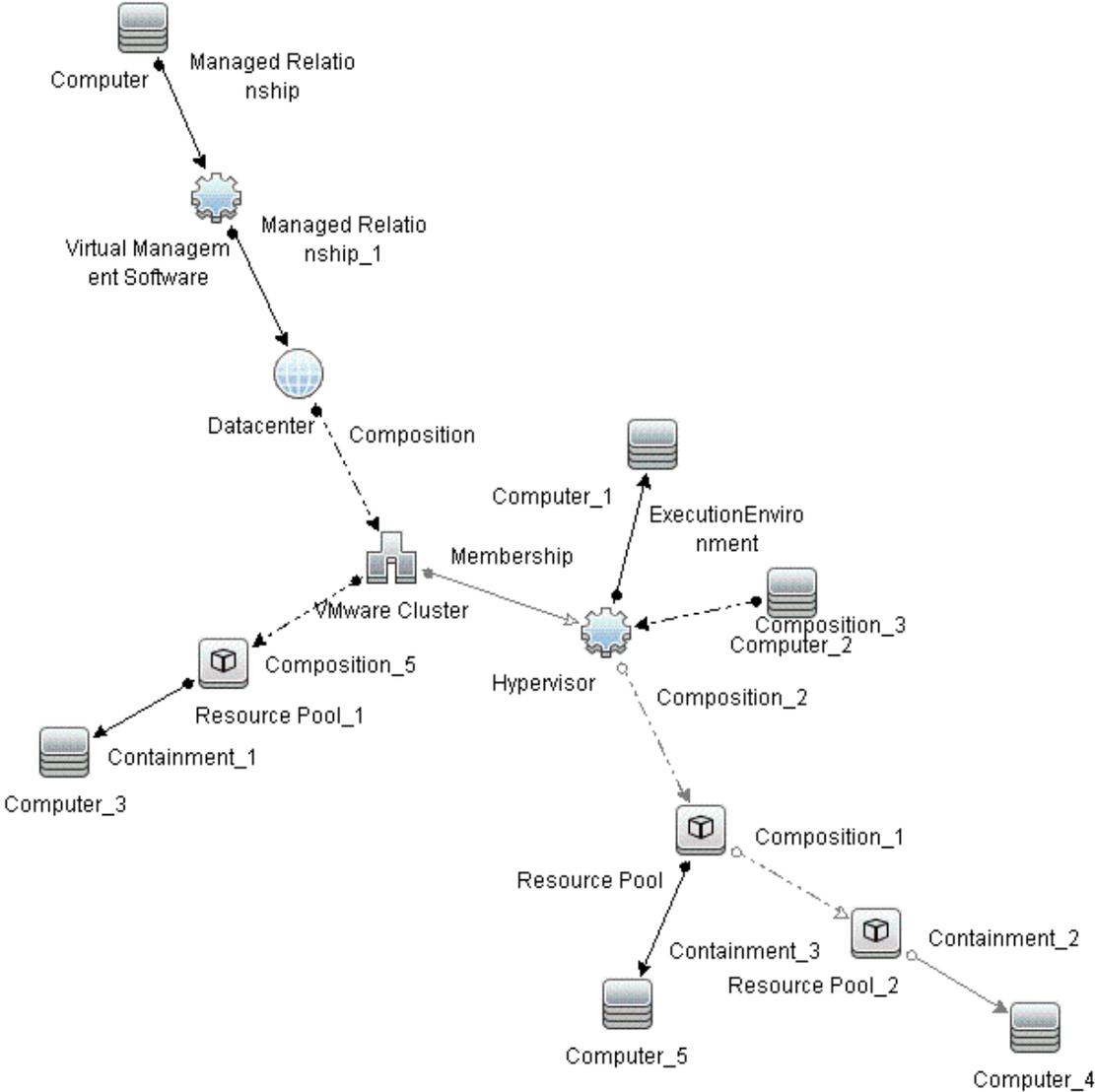
- **NetworkInterface_Infrastructure:** This view refers to the Network Interface and Computer CI types.



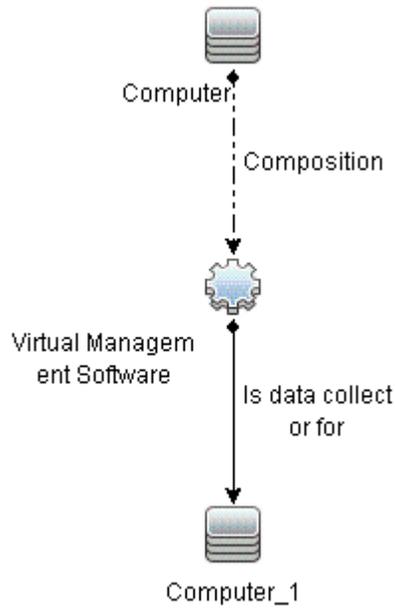
- **Systems_Infrastructure:** This view refers to the Computer (Windows or UNIX), CPU, File System, Network Interface, and IP Address CI types. The following image shows the relationship between the CI types.



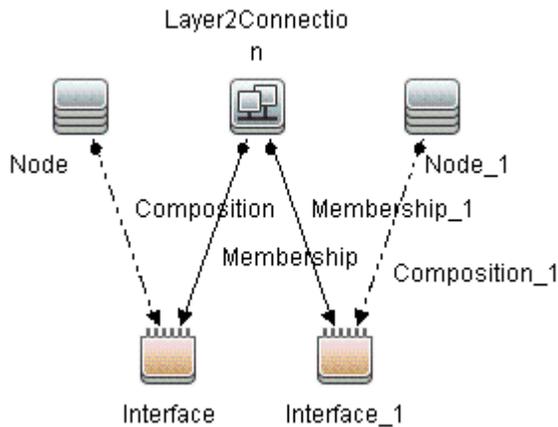
- Virtualization_Infrastructure: This view refers to the Computer and Hypervisor CI types. The following image shows the relationship between the CI types.



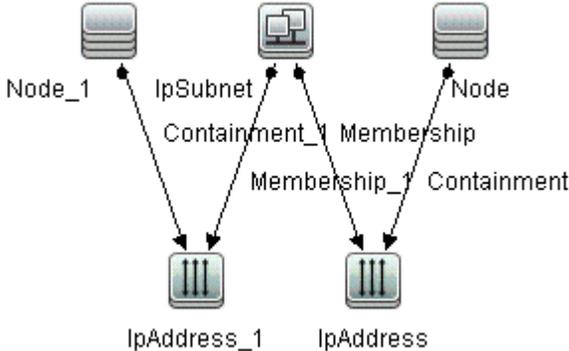
► **vMA_Infrastructure:**



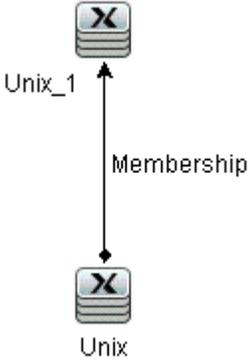
- **NNMi_Layer2:** This view displays layer 2 connectivity between servers and the switches or routers to which they are connected. The view also shows connectivity between the network switches and routers.



- ▶ **NNMi_Layer3:** This view displays layer 3 (IP Subnet) connectivity between servers and the switches or routers in the same subnet as the servers. The view also shows layer 3 (IP Subnet) connectivity between the network switches and routers.



- ▶ **Sol_Zones_Infrastructure:** This view refers to the Solaris global and non-global zones. The following images shows the relationship between the CI types.



Health Indicators

The content pack includes the following Health Indicators (HIs) to monitor Infrastructure-related events:

CI Type	HI	Description	Value
Layer2 Connection	L2Connection Status	This incident indicates that both (or all) ends of a connection are not responding to SNMP queries.	Unavailable, Available (default)
VMware Cluster	DRSStatus		Enabled (default), Disabled
Node	Ping Availability	Indicates the Processing System is reachable through ping.	Available (default), Unavailable
Node	NodeStatus	Indicates the current state of the managed node. The states Unknown, Hang, and Suspended apply only to virtual machines.	Up (default), Down, Hang, Maintenance, Suspended, Unknown
Computer	CPU Entitlement UsageLevel	Indicates the percentage of entitlement (CPU cycles allotted) used by a virtual machine. May exceed 100%.	Much Lower Than Normal Higher Than Normal Normal (default) Lower Than Normal Much Higher Than Normal

CI Type	HI	Description	Value
Computer	CPULoad	Indicates if the system is undergoing heavy processing load.	Normal (default), Bottlenecked, Overloaded, Busy, Constrained, Critical, Warning
Computer	CPURunQueue	Indicates the load on the processor job queue.	Normal (default), Overloaded, Much Lower Than Normal Higher Than Normal Lower Than Normal Much Higher Than Normal
Computer	HostDisk Utilization	Indicates the utilization level for disks.	Normal (default), Much Lower Than Normal, Higher Than Normal, Lower Than Normal, Much Higher Than Normal, Critical, Warning
Computer	InterfaceError Rate	Indicates the input error rate based on the reported change in the number of input packets and the packet error count on the interface.	High, Normal (default)

CI Type	HI	Description	Value
Computer	Interface Utilization	Indicates the network utilization based on interface speed, and the change in number of output bytes on the interface. The queried MIB (Management Information Bases) values can vary depending on the speed of the interface and whether the system supports high speed counters for the interface.	Normal (default), Higher Than Normal, Much Higher Than Normal, Much Lower Than Normal, Lower Than Normal, High, Low, Critical, Warning none
Computer	Interface DiscardRate	Indicates the output discard rate based on the change in the number of output packets on the interface and the discarded packet count. Packets may be discarded due to issues like buffer overflows, congestion, or system specific issues.	Normal (default), High

CI Type	HI	Description	Value
Computer	MemoryLoad	Indicates the memory pressure on a computer - high memory utilization and pressure to obtain more memory through paging. If left unattended the system may reach point of excessive paging and an unstable state.	Normal (default), Paging, Starving for Memory, Bottleneck, Critical, Warning
Computer	MemoryUsage Level	Indicates the memory usage level for the system.	Normal (default), Much Lower Than Normal, Much Higher Than Normal, Lower Than Normal, Higher Than Normal, NearCapacity, Low, Critical, Warning
Computer	NetworkFile ShareUsage Level	Indicates the usage level for network file shares - MS Windows Network Drives (mounts) and NFS, CIFS mounts.	Normal (default), Near Capacity
Computer	PageFile_Usage WIN	Indicates how much of the paging file capacity is used on a Window.	Normal (default), High, Near Capacity

CI Type	HI	Description	Value
Computer	Virtualization Overhead	Indicates the additional memory used by the VMware ESX/ ESXi server to store the runtime information for virtual machines. Typically there is little variation in the value. The variation depends on size of the memory and the operating system running on the virtual machine.	Normal (default), Much Lower Than Normal, Much Higher Than Normal, Lower Than Normal, Higher Than Normal
Computer	ResourceUsage	Indicates the system resource (CPU and memory) used by the processes and services running on the system.	Normal (default), High
Computer	Root_disk_Usage_level	Indicates the disk usage on primary (root) disk on system. This would refer to space utilization on root (/) filesystem on UNIX and Linux systems. This would refer to C: or whatever is defined using SystemDrive setting on Windows systems.	Normal (default), High

CI Type	HI	Description	Value
Computer	SwapUsage Level	Indicates the swap space usage level on the system.	Normal (default), NearCapacity, Much Higher Than Normal, Much Lower Than Normal, Higher Than Normal, Lower Than Normal
Computer	KernelHandles Usage	Indicates capacity utilization by the kernel handles such as file handles, process handles, semaphores, and message queues.	Normal (default), NearCapacity
Computer	BatchJobService	Indicates the availability of the batch job services on the system such as Schedule Task Service on MS Windows, and Cron services on UNIX/ Linux.	Available (default), Unavailable
Computer	EventLogging Service	Indicates the availability of event logging services on the system such as event log service on MS Windows, and syslog services on UNIX/ Linux.	Available (default), Unavailable

CI Type	HI	Description	Value
Computer	PrintService	Indicates the status of print services on the system such as the print spooler service on MS Windows, print server role services on windows 2008, and lp and cupsd services on UNIX/Linux.	Available (default), Unavailable
Computer	FileServer Service	Indicates the status of the file server services on the system such as FileServer role services on MS Windows, and NFS server and CIFS server services on UNIX/ Linux.	Available (default), Unavailable
Computer	EmailService	Indicates the status of E-Mail service on the system such as SMTP service on MS Windows, and sendmail, delivermail services on UNIX/ Linux.	Available (default), Unavailable
Computer	WebServer Service	Indicates the status of web server services on system such as IIS services on MS Windows, and Apache service on Linux/ UNIX.	Available (default), Unavailable
Computer	RPCService	Indicates the availability of the RPC service on the system.	Available (default), Unavailable

CI Type	HI	Description	Value
Computer	FirewallService	Indicates the status of firewall service on the system such as Windows Firewall service on MS Windows and iptables service on Linux.	Available (default), Unavailable
Computer	DNSService	Indicates the status of DNS (Domain Nameserver) service on the system.	Available (default), Unavailable
Computer	FTPService	Indicates the state of FTP services on the system. FTP protocol is used for transferring files between systems.	Available (default), Unavailable
Computer	DHCPService	Indicates the status of DHCP Server Service on the DHCP server system.	Available (default), Unavailable
Computer	SecureLogin Service	Indicates the availability of SSH (Secure Shell) service on the system.	Available (default), Unavailable
Unix	Filesystem Usage	Indicates the file system usage on the UNIX system.	Normal (default), High
Unix	SwapSpace Available	Indicates the swap space available on the system.	Normal (default), Depleted, Near Capacity
Windows	LogicalDisk FreeSpaceWIN	Indicates the degree of logical free disk space on the system.	Normal (default), Near Capacity

CI Type	HI	Description	Value
Windows	TerminalServer Service	Indicates the status of services for Windows Terminal Server on the MS Windows system.	Available (default), Unavailable
Cluster Resource Group	Cluster Resource Group Status	Indicates the status of the resource group in a failover cluster.	Online (default) Failed, Offline, Reached SPOF condition
CPU	CPUUsage Level	Indicates the CPU usage level.	Normal (default), Idle, Busy, Spike, Much Higher Than Normal, Much Lower Than Normal, Higher Than Normal, Lower Than Normal, High
File System	DiskUsage Level	Indicates the disk usage level.	Normal (default), NearCapacity, Low
Disk Device	DiskUtilization	Indicates the disk utilization level.	Normal (default), Much Higher Than Normal, Much Lower Than Normal, Higher Than Normal, Lower Than Normal

CI Type	HI	Description	Value
Disk Device	DiskService Time	Indicates the average of disk I/O service time.	Normal (default), Much Higher Than Normal, Much Lower Than Normal, Higher Than Normal, Lower Than Normal
Interface	InterfaceError Rate	Indicates the input error rate based on the change in the number of input packets on the interface and the packet error count.	Normal (default), High
Interface	Interface Utilization	Indicates the network utilization based on the interface speed, and the change in the number of output bytes on the interface. The queried MIB (Management Information Base) values vary based on the speed of the interface and whether the system supports high speed counters for interface.	Normal (default), Lower Than Normal, Much Lower Than Normal, High, Higher Than Normal, Much Higher Than Normal, Low, None

CI Type	HI	Description	Value
Interface	Interface DiscardRate	Indicates the output discard rate based on the change in the number of output packets on the interface and the discarded packet count. Packets may be discarded due to reasons such as receive buffer overflows, congestion, or system specific issues.	Normal (default), High
Interface	Interface Communication Status	Indicates the availability status of the interface.	Available (default), Unavailable
IpAddress	AddressStatus	Indicates the availability status of the IpAddress.	Available (default), Unavailable
Cluster Software	Cluster Software Service	Indicates the availability status of the Cluster Service.	Available (default), Unavailable
Failover Cluster	Cluster Strength	Indicates the cluster availability status based on node strength.	QuorumMet (default), NotAllNodesDown, RedundantOkay, QuorumNotMet, SPOF, AllNodesDown

CI Type	HI	Description	Value
VMware ESX Server	VMFSUsage Level	Indicates the usage level of the VMFS (Virtual Machine File System). VMFS is a clustered file system that is used by the VMware host systems to store virtual machines and virtual disk files.	Normal (default), NearCapacity
VMware ESX Server	VMwareHost NetworkUsage	Data on all network interfaces, received at or dispatched from the VMware ESX/ESXi Host (in MBs).	Normal (default), Much Higher Than Normal, Much Lower Than Normal, Higher Than Normal, Lower Than Normal
Hypervisor	Virtualization Service	Indicates the status of virtualization service running on Host such as Hyper-V service running on MS Windows 2008 Server. The service is essential for running of virtual machines.	Available (default), Unavailable

Event Type Indicators

The Content Pack includes the following Event Type Indicators (ETIs) to monitor Infrastructure-related events. The CI Type is Computer:

ETI	Description	Value
Batch Jobs	Indicates when one or more scheduled tasks/cron jobs fail on the system.	Failed
VMCreation	Indicates when a VM is created.	Occurred
VMMigration	Indicates when a VM is migrated.	Occurred
VMRemoval	Indicates when a VM is removed.	Occurred
VMRename	Indicates when a VM is renamed.	Occurred
BatchJobService	Indicates availability of the Batch Job Service (UNIX/Linux Cron, Windows Schedule Task Services)	Available Unavailabl e
DHCPService	Indicates status of the DHCP Server Service on the DHCP server system. This can be a very crucial service for many mobile users	Available Unavailabl e
DNSService	Indicates status of the DNS (Domain Nameserver) service. Multiple network dependent services could potentially fail if this service undergoes unplanned downtime	Available Unavailabl e
EventLoggingService	Indicates availability of the Even Logging service (UNIX/Linux syslog, Windows Event Logger services)	Available Unavailabl e
SecureLoginService	Indicates availability of the SSH (Secure Shell) service on the host	Available Unavailabl e
WebServerService	Indicates status of the Web Server service on the system. Associated services are IIS on Windows and Apache on Linux/UNIX	Available Unavailabl e

Correlation Rules

The content pack includes the following rules to correlate Infrastructure-related events.

For more information on how the correlation rules work, see the *Operations Manager i Concepts Guide*.

System:Computer:CPU Load >> CPU Usage Level

Description: CPU usage of one or more CPUs on the system is high as the system is in a CPU bottleneck.		
Cause		
CIT: Computer	ETI: CPU Load	Value: Bottlenecked
Symptom		
CIT: CPU	ETI: CPU Usage Level	Value: High/ Much Higher Than Normal/ Spike

System::Computer:Memory Load >> CPU Load

Description: CPU bottleneck caused by paging		
Cause		
CIT: Computer	ETI: Memory Load	Value: Paging
Symptom		
CIT: Computer	ETI: CPU Load	Value: Bottlenecked

System::Computer:Memory Load >> Memory Usage Level

Description: Memory usage on system is high as the system is in a memory bottleneck		
Cause		
CIT: Computer	ETI: Memory Load	Value: Paging

Description: Memory usage on system is high as the system is in a memory bottleneck		
Symptom		
CIT: Computer	ETI: Memory Usage Level	Value: Much Higher Than Normal/ Near Capacity

System::Computer:Memory Usage Level >> Swap Usage Level

Description: High memory usage results in swapping		
Cause		
CIT: Computer	ETI: Memory Usage Level	Value: Near Capacity
Symptom		
CI: Computer	ETI: Swap Usage Level	Value: Much Higher Than Normal/ Near Capacity

System Down >> System Applications Down

Description: Services or applications are unavailable as the system is down		
Cause		
CIT: Computer	ETI: Node Status	Value: Down/ Suspended
Symptom		
CI: Computer	ETI:	Value:
	Batch Jobs	Job Failed
	E-Mail Service	Unavailable
	Event Logging Service	Unavailable
	Firewall Service	Unavailable
	Ping Availability	Unavailable
	Print Services	Unavailable

System::Computer:Resource Usage >> CPU Usage Level

Description: Process using high amount of cpu on system causing system cpu usage high		
Cause		
CIT: Computer	ETI: Resource Usage	Value: High
Symptom		
CIT: CPU	ETI: CPU Usage Level	Value: High/ Much Higher Than Normal/ Spike

System::Computer:Resource Usage >> Memory Usage Level

Description: Process using high amount of memory on system causing system memory usage high		
Cause		
CIT: Computer	ETI: Resource Usage	Value: High
Symptom		
CIT: Computer	ETI: Memory Usage Level	Value: Higher Than Normal/ Much Higher Than Normal/ Near Capacity

System::File System:Disk Usage Level >> Swap Usage Level

Description: Swap usage caused by system drive full		
Cause		
CIT: FileSystem	ETI: Disk Usage Level	Value: Near Capacity

Description: Swap usage caused by system drive full		
Symptom		
CIT: Computer	ETI: Swap Usage Level	Value: Higher Than Normal/ Much Higher Than Normal/ Near Capacity

System::Node:PingAvailability >> NodeStatus1

Description: Ping availability of node failed because node is down		
Cause		
CIT: Computer	ETI: Ping Availability	Value: Down
Symptom		
CIT: Computer	ETI: Ping Availability	Value: Unavailable

System::File System:PingAvailability >> InterfaceCommunicationStatus

Description: Node can not be pinged because interface communication status is unavailable		
Cause		
CIT: Interface	ETI: Interface Communication Status	Value: Unavailable
Symptom		
CIT: Interface	ETI: Ping Availability	Value: Unavailable

Virtual::Computer:Memory Usage Level >> Hypervisor Memory Usage Level

Description: Hypervisor is constrained by high memory usage done by VM		
Cause		
CIT: Computer	ETI: Memory Usage Level	Value: Much Higher Than Normal

Description: Hypervisor is constrained by high memory usage done by VM		
Symptom		
CIT: Computer	ETI: Memory Usage Level	Value: Much Higher Than Normal/ Near Capacity

Virtual::Computer::CPU Usage >> Hypervisor System CPU Load

Description: A VM using high amount of physical CPU cycles on the hypervisor can cause bottleneck in Hypervisor.		
Cause		
CIT: Computer	ETI: CPU Load	Value: Bottlenecked/ Busy/ Overloaded
Symptom		
CIT: Computer	ETI: CPU Load	Value: Bottlenecked/ Busy/ Overloaded

Hypervisor::Ping Availability >> VM::Ping Availability

Description: VMs are unavailable as the hypervisor host running the VMs is down		
Cause		
CIT: Computer	ETI: Ping Availability	Value: Unavailable
Symptom		
CIT: Computer	ETI: Ping Availability	Value: Unavailable

Cluster Software Service Unavailable >> Clustered Server Offline

Description: Cluster software Services on cluster systems failing to run causes clustered servers (resource groups) to be inactive		
Cause		
CIT: ClusterSoftware	ETI: Cluster Software Service	Value: Unavailable

Description: Cluster software Services on cluster systems failing to run causes clustered servers (resource groups) to be inactive		
Symptom		
CIT: ClusterResourceGroup	ETI: Cluster Resource Group Status	Value: Offline

Cluster Nodes Down >> Cluster Resource Group Impacted

Description: When 1 or more cluster nodes are down, clustered servers (resource groups) running in failover mode on these nodes are impacted		
Cause		
CIT: Computer	ETI: Node Status	Value: Down/ Hang/ Suspended/ Unknown
Symptom		
CIT: ClusterResourceGroup	ETI: Cluster Resource Group Status	Value: Offline

Cluster Members Down >> FailoverCluster Impacted (many symptoms)

Description: When a few cluster members are unavailable, the cluster is down.		
Cause		
CIT: Computer	ETI: Node Status	Value: Down/ Hang/ Suspended/ Unknown
Symptom		
CIT: FailoverCluster	ETI: Cluster Strength	Value: All Nodes Down/ Quorum Not met/ SPOF

Cluster Member Down >> Cluster Software Service Down

Description: When the cluster member is down, the cluster software service on the node is down.		
Cause		
CIT: Computer	ETI: Node Status	Value: Down/ Suspended
Symptom		
CIT: ClusterSoftware	ETI: Cluster Software Service	Value: Unavailable

Mapping Rules

The content pack contains the following mapping rules:

CI Type: ClusterSoftware				
Name	Description	Event Filter	Indicator	Map to Indicator Value
hadUnAvailability	VCS cluster process monitor	HADMajor	Cluster Software Service	Based on Severity
hadAvailability	VCS cluster process Availability	HADNormal	Cluster Software Service	Based on Severity
hashadow Unavailability	VCS cluster process Unavailability	Hashadow Major	Cluster Software Service	Based on Severity
hashadow Availability	VCS cluster process availability	Hashadow Normal	Cluster Software Service	Based on Severity
HadUnavailability Windows	VCS cluster Windows Had process Unavailability	HadWindows Unavailable Filter	Cluster Software Service	Based on Severity

CI Type: ClusterSoftware				
HadAvailability WindowsFilter	VCS windows cluster service "Had" availability	HadWindows AvailableFilter	Cluster Software Service	Based on Severity
VCSComm UnAvailability	VCS cluster process "VCSComm" UnAvailability	VCSComm Unavailable Filter	Cluster Software Service	Based on Severity
VCSCommAvailable	VCS Cluster Windows process availability	VCSComm AvailableFilter	Cluster Software Service	Based on Severity
CmdServer UnAvailable	VCS Windows Cluster service "CmdServer" Unavailable	CmdServer UnAvailable Filter	Cluster Software Service	Based on Severity
CmdServerAvailable	VCS Windows cluster service "CmdServer" availability	CmdServer Availability Filter	Cluster Software Service	Based on Severity
clusterUnavailability	Sun cluster process Unavailability	Cluster Unavailable Filter	Cluster Software Service	Based on Severity
clusterAvailability	Sun cluster process availability	Cluster Available Filter	Cluster Software Service	Based on Severity
clurgmgrd Unavailability	Red Hat cluster process "clurgmgrd" unavailability	clurgmgrd Unavailable Filter	Cluster Software Service	Based on Severity
clurgmgrd Availability	Red Hat cluster process "clurgmgrd" availability	clurgmgrd AvailableFilter	Cluster Software Service	Based on Severity

CI Type: ClusterSoftware				
ccsdUnavailability	Red Hat cluster process /sbin/ccsd process unavailability	ccsd Unavailable Filter	Cluster Software Service	Based on Severity
ccsdAvailable	Red Hat cluster process /sbin/ccsd process availability	ccsdAvailable Filter	Cluster Software Service	Based on Severity
ClusSvcUnavailability	Microsoft cluster service "ClusSvc" unavailability	ClusSvc Unavailable Filter	Cluster Software Service	Based on Severity
ClusSvcAvailability	Microsoft cluster service "ClusSvc" availability	ClusSvc Available Filter	Cluster Software Service	Based on Severity
cmclDUnavailability	MCSG cluster process "cmclD" unavailability	cmclD Unavailable Filter	Cluster Software Service	Based on Severity
cmclDAvailability	MCSH cluster process "cmclD" availability	cmclDAvailable Filter	Cluster Software Service	Based on Severity

CI Type: Node				
Name	Description	Event Filter	Indicator	Map to Indicator Value
Ping Unavailability	Indicates failure to contact node using ping	Ping UnAvailibilty Filter	Ping Availability	Based on Severity
PingAvailability	Indicates node can be contacted using ping.	Ping UnAvailibilty Filter	Ping Availability	Based on Severity

Tool Definitions

The content pack contains the following tools of CI Type UNIX:

CI Type	Tool Name	Tool Description
Node	Ping node from NNMi server	Shows the output of a ping from the NNMi server to a selected node in a web browser. Note: This tool requires that the NNMi server name and port are correctly configured in the "HP NNMi adapter" section of the general server configuration GUI.
Node	Ping node from NNMi server (https)	Shows the output of a ping from the NNMi server to a selected node in a web browser, using https connection. Note: This tool requires that the NNMi server name and port are correctly configured in the "HP NNMi adapter" section of the general server configuration GUI.

CI Type	Tool Name	Tool Description
Node	Show Layer 2 Neighbors to related NNMi node	Shows the Layer 2 Neighbors of the node from which the corresponding NNMi incident originated. Note: This tool requires that it is started in the context of a forwarded NNMi incident, so that the message contains custom message attributes about the NNMi incident UUID, NNMi server name and the NNMi server port.
Node	Show Layer 2 Neighbors to related NNMi node (https)	Shows the Layer 2 Neighbors of the node from which the corresponding NNMi incident originated, using https connection. Note: This tool requires that it is started in the context of a forwarded NNMi incident, so that the message contains custom message attributes about the NNMi incident UUID, NNMi server name and the NNMi server port.
Node	Show Layer 3 Neighbors to related NNMi node	Shows the Layer 3 Neighbors of the node from which the corresponding NNMi incident originated. Note: This tool requires that it is started in the context of a forwarded NNMi incident, so that the message contains custom message attributes about the NNMi incident UUID, NNMi server name and the NNMi server port.
Node	Show Layer 3 Neighbors to related NNMi node (https)	Shows the Layer 3 Neighbors of the node from which the corresponding NNMi incident originated, using https connection. Note: This tool requires that it is started in the context of a forwarded NNMi incident, so that the message contains custom message attributes about the NNMi incident UUID, NNMi server name and the NNMi server port.

CI Type	Tool Name	Tool Description
Node	Show NNMi console	Shows the main console of the NNMi server in a web browser. Note: This tool requires that the NNMi server name and port are correctly configured in the "HP NNMi adapter" section of the general server configuration GUI.
Node	Show NNMi console (https)	Shows the main console of the NNMi server in a web browser, using https connection. Note: This tool requires that the NNMi server name and port are correctly configured in the "HP NNMi adapter" section of the general server configuration GUI.
Node	Show NNMi server status	Shows the status of the NNMi server processes and services in a web browser. Note: This tool requires that the NNMi server name and port are correctly configured in the "HP NNMi adapter" section of the general server configuration GUI.
Node	Show NNMi server status (https)	Shows the status of the NNMi server processes and services in a web browser, using https connection. Note: This tool requires that the NNMi server name and port are correctly configured in the "HP NNMi adapter" section of the general server configuration GUI.
Node	Show node information in NNMi	Shows the setup information of a selected node in a web browser. Note: This tool requires that the NNMi server name and port are correctly configured in the "HP NNMi adapter" section of the general server configuration GUI.

CI Type	Tool Name	Tool Description
Node	Show node information in NNMi (https)	Shows the setup information of a selected node in a web browser, using https connection. Note: This tool requires that the NNMi server name and port are correctly configured in the "HP NNMi adapter" section of the general server configuration GUI.
Node	Show related NNMi incident	Shows the corresponding NNMi incident to a selected message in a web browser. Note: This tool requires that it is started in the context of a forwarded NNMi incident, so that the message contains custom message attributes about the NNMi incident UUID, NNMi server name and the NNMi server port.
Node	Show related NNMi incident (https)	Shows the corresponding NNMi incident to a selected message in a web browser, using https connection. Note: This tool requires that it is started in the context of a forwarded NNMi incident, so that the message contains custom message attributes about the NNMi incident UUID, NNMi server name and the NNMi server port.
Node	Show related NNMi node	Shows the NNMi setup information for the node from which the corresponding NNMi incident originated. Note: This tool requires that it is started in the context of a forwarded NNMi incident, so that the message contains custom message attributes about the NNMi incident UUID, NNMi server name and the NNMi server port.

CI Type	Tool Name	Tool Description
Node	Show related NNMi node (https)	Shows the NNMi setup information for the node from which the corresponding NNMi incident originated, using https connection. Note: This tool requires that it is started in the context of a forwarded NNMi incident, so that the message contains custom message attributes about the NNMi incident UUID, NNMi server name and the NNMi server port.
Node	Traceroute to node from NNMi server	Shows the output of a traceroute from the NNMi server to a selected node in a web browser. Note: This tool requires that the NNMi server name and port are correctly configured in the "HP NNMi adapter" section of the general server configuration GUI.
Node	Traceroute to node from NNMi server (https)	Shows the output of a traceroute from the NNMi server to a selected node in a web browser, using https connection. Note: This tool requires that the NNMi server name and port are correctly configured in the "HP NNMi adapter" section of the general server configuration GUI.
UNIX	VMware List VMs	Lists the Virtual Machines configured on ESX/ESXi servers managed by vMA.
UNIX	VMware Host Info	Lists information of the ESX/ESXi servers managed by vMA.
UNIX	VMware Resource Pool Info	Lists information of the Resource Pools associated with ESX/ESXi servers managed by vMA.
UNIX	VMware List Suspended VMs	Lists suspended and powered off Virtual Machines of ESX/ESXi servers managed by vMA

Graph Templates

The content pack includes the Systems Infrastructure and Virtualization Infrastructure graph family, which is mapped to the Computer CI type.

Note: The Virtualization Infrastructure graph family is visible for all nodes under the CI type Computer, however you can launch graphs only for virtual machines.

Systems Infrastructure Graph Templates

The following table lists the graph templates for System Infrastructure.

Graph Templates for Systems Infrastructure	Metric Name
Configuration Details	GBL_SYSTEM_ID
	GBL_OSNAME
	GBL_OSRELEASE
	GBL_MACHINE_MODEL
	GBL_COLLECTOR
	GBL_NUM_CPU
	GBL_NUM_DISK
	GBL_NUM_NETWORK
	GBL_MEM_PHYS
	GBL_SWAP_SPACE_AVAIL_KB
	TBL_PROC_TABLE_AVAIL
	GBL_LOGGING_TYPES
	GBL_THRESHOLD_CPU
	GBL_THRESHOLD_PROCMEM
	GBL_THRESHOLD_DISK
	GBL_LOGFILE_VERSION
	GBL_MACHINE
	GBL_OSKERNELTYPE_INT
	GBL_MEM_AVAIL
	TBL_BUFFER_CACHE_AVAIL
GBL_OSVERSION	
MEMORY_MEMFREE	
MEMORY_AVAILABLE_MBYTES	

Graph Templates for Systems Infrastructure	Metric Name
Configuration Details	MEMORY_MEMTOTAL
	MEMORY_SWAP_AVAIL
	MEMORY_SWAP_FREE
	Free swap space available
Process Details	PROC_PROC_NAME
	PROC_PROC_CMD
	PROC_PROC_ID
	PROC_CPU_TOTAL_UTIL
	PROC_DISK_PHYS_IO_RATE
	PROC_INTEREST
	PROC_STOP_REASON
	PROC_APP_ID
	PROC_PRI
	PROC_MEM_RES
	PROC_MEM_VIRT
	PROC_CPU_USER_UTIL
	PROC_CPU_SYS_MODE_UTIL
	PROC_PARENT_PROC_ID
	PROC_USER_NAME
	PROC_RUN_TIME
	PROC_INTERVAL_ALIVE
	PROCESS_PID
	PROCESS
	PROCESS_CPU0D37
PROCESS_MEMSIZE	

Graph Templates for Systems Infrastructure	Metric Name
Process Details	PROCESS_USER
	PROCESS_PPID
	PROCESS_OD37_PROCESSOR_TIME
	PROCESS_IO_DATA_OPERATIONS_SEC
	PROCESS_PRIORITY_BASE
	PROCESS_PRIVATE_BYTES
	PROCESS_VIRTUAL_BYTES
	PROCESS_OD37_USER_TIME
	PROCESS_CREATING_PROCESS_ID
	PROCESS_ELAPSED_TIME
CPU Gauges	GBL_CPU_TOTAL_UTIL
CPU Utilization Baseline	GBL_CPU_TOTAL_UTIL
CPU Summary	GBL_CPU_INTERRUPT_UTIL
	GBL_CPU_SYS_MODE_UTIL
	GBL_CPU_USER_MODE_UTIL
	CPU_UTILIZATION_OD37SYS
	CPU_UTILIZATION_OD37USER
	PROCESSOR_OD37_INTERRUPT_TIME

Graph Templates for Systems Infrastructure	Metric Name
Disk Summary	GBL_DISK_UTIL_PEAK
	GBL_FS_SPACE_UTIL_PEAK
	GBL_DISK_PHYS_BYTE_RATE
	GBL_DISK_PHYS_IO_RATE
	GBL_DISK_LOGL_READ_RATE
	BLOCK_DEVICE_ACTIVITY_R0D43W_S
	PHYSICALDISK_DISK_BYTES_SEC
	LOGICALDISK_READS_SEC
Global CPU Forecast	GBL_CPU_TOTAL_UTIL
Global Details	GBL_CPU_TOTAL_UTIL
	GBL_ACTIVE_PROC
	GBL_PRI_QUEUE
	GBL_RUN_QUEUE
	GBL_DISK_UTIL_PEAK
	GBL_DISK_PHYS_IO_RATE
	GBL_DISK_PHYS_BYTE_RATE
	GBL_DISK_LOGL_IO_RATE
	GBL_MEM_CACHE_HIT_PCT
	GBL_MEM_PAGEOUT_RATE
	GBL_MEM_SWAPOUT_RATE
	GBL_MEM_UTIL
	GBL_MEM_USER_UTIL
	GBL_MEM_SYS_AND_CACHE_UTIL
GBL_SWAP_SPACE_UTIL	

Graph Templates for Systems Infrastructure	Metric Name
Global Details	GBL_FS_SPACE_UTIL_PEAK
	GBL_NET_PACKET_RATE
	GBL_NET_IN_PACKET_RATE
	GBL_NET_OUT_PACKET_RATE
	GBL_NFS_CALL_RATE
	GBL_NET_COLLISION_1_MIN_RATE
	GBL_NET_ERROR_1_MIN_RATE
	GBL_SYSCALL_RATE
	GBL_CPU_SYS_MODE_UTIL
	GBL_CPU_USER_MODE_UTIL
	GBL_NUM_USER
	GBL_ALIVE_PROC
	GBL_STARTED_PROC_RATE
	CPU__UTILIZATION_0D37USR
	CPU__UTILIZATION_0D37SYS
	SYSTEM__SWAPPING__AND__SWITCHING__ACTIVITY_SWPOT_S
	SYSTEM__SWAPPING__AND__SWITCHING__ACTIVITY_SWPIN_S
	PAGING__ACTIVITY_PGIN_S
	PAGE0D45OUT__AND__MEMORY__FREEING__ACTIVITIES_PGOUT_S
	5MINAVG
	MEMORY_FREEMEM
MEMORY_PERCENT__USED	
BLOCK_DEVICE_ACTIVITY_R0D43W_S	

Graph Templates for Systems Infrastructure	Metric Name
Global Details	CACHE_COPY_READ_HITS_0D37
	SYSTEM_SYSTEM_CALLS_SEC
	SYSTEM_PROCESSOR_QUEUE_LENGTH
Global History	GBL_CPU_TOTAL_UTIL
	GBL_DISK_UTIL_PEAK
	GBL_SWAP_SPACE_UTIL
	GBL_MEM_UTIL
	GBL_ACTIVE_PROC
Global Run Queue Baseline	GBL_RUN_QUEUE
	SCALLS_S
	5MINAVG
	SYSTEM_PROCESSOR_QUEUE_LENGTH
Memory Summary	GBL_MEM_UTIL
	GBL_MEM_USER_UTIL
	GBL_MEM_SYS_AND_CACHE_UTIL
	GBL_MEM_CACHE_HIT_PCT
	GBL_MEM_QUEUE
	GBL_MEM_SWAPOUT_RATE
	GBL_MEM_PAGEOUT_RATE
	GBL_MEM_PG_SCAN_RATE
	MEMORY_SWAP_FREE
	MEMORY_MEMFREE
	MEMORY_PERCENT_USED
SYSTEM_SWAPPING_AND_SWITCHING_ACTIVITY_SWPOT_S	

Graph Templates for Systems Infrastructure	Metric Name
Memory Summary	CACHE_COPY_READ_HITS_0D37
Multiple Global Forecasts	GBL_CPU_TOTAL_UTIL
	GBL_DISK_UTIL_PEAK
	GBL_SWAP_SPACE_UTIL
	GBL_RUN_QUEUE
	GBL_MEM_PAGEOUT_RATE
	GBL_NET_IN_PACKET_RATE
	GBL_NET_OUT_PACKET_RATE
	GBL_ACTIVE_PROC
	5MINAVG
	SYSTEM_PROCESSOR_QUEUE_LENGTH
Network Summary	GBL_NET_OUT_PACKET_RATE
	GBL_NET_IN_PACKET_RATE
	GBL_NET_ERROR_RATE
Seasonal CPU Forecast	GBL_CPU_TOTAL_UTIL
System Configuration	GBL_SYSTEM_ID
	GBL_MACHINE
	GBL_MACHINE_MODEL
	GBL_CPU_CLOCK
	GBL_OSNAME
	GBL_OSVERSION
	GBL_OSRELEASE
	GBL_MEM_PHYS
GBL_ACTIVE_CPU	

Graph Templates for Systems Infrastructure	Metric Name
System Configuration	GBL_NUM_CPU
	GBL_NUM_DISK
	GBL_NUM_NETWORK
	GBL_COLLECTOR
	GBL_SWAP_SPACE_AVAIL
	GBL_LOGGING_TYPES
	GBL_THRESHOLD_CPU
	GBL_GMTOFFSET
	MEMORY_SWAP_FREE
	MEMORY_MEMTOTAL
CPU Comparison	GBL_CPU_TOTAL_UTIL
Disk Throughput	BYDSK_PHYS_BYTE_RATE
	LOGICALDISK_DISK_BYTES_SEC
Individual Networks	BYNETIF_IN_BYTE_RATE
	BYNETIF_OUT_BYTE_RATE
	BYNETIF_IN_PACKET_RATE
	BYNETIF_OUT_PACKET_RATE
	NETWORK_INTERFACE_IPKTS
	NETWORK_INTERFACE_OPKTS
	NETWORK_INTERFACE_IPACKETS
	NETWORK_INTERFACE_OPACKETS
Individual CPUs	BYCPU_CPU_TOTAL_UTIL
Disk Space	FS_SPACE_UTIL

Graph Templates for Systems Infrastructure	Metric Name
Disk Details	BYDSK_DEVNAME
	BYDSK_PHYS_READ_BYTE_RATE
	BYDSK_PHYS_READ_RATE
	BYDSK_PHYS_WRITE_BYTE_RATE
	BYDSK_PHYS_WRITE_RATE
	BYDSK_UTIL
	BYDSK_REQUEST_QUEUE
	BYDSK_AVG_SERVICE_TIME
	BYDSK_LOGL_READ_RATE
	BYDSK_LOGL_WRITE_RATE
	BYDSK_DIRNAME
	BYDSK_ID
	PHYSICALDISK_DISK_READS_SEC
	PHYSICALDISK_DISK_WRITES_SEC
Filesystem Details	FS_DIRNAME
	FS_SPACE_UTIL
	FS_MAX_SIZE
	FS_SPACE_USED
	FS_SPACE_RESERVED
	FS_TYPE
	FS_DEVNAME
	FS_DEVNO
	FS_INODE_UTIL
	FS_MAX_INODES

Graph Templates for Systems Infrastructure	Metric Name
Filesystem Details	FS_BLOCK_SIZE
	FS_FRAG_SIZE
	FS_BLOCK_SIZE
	FS_FRAG_SIZE
	FILESYSTEMS_KBYTES
	FILESYSTEMS_10240D45BLOCKS
	FILESYSTEMS_USED
	FILESYSTEMS_AVAIL
	FILESYSTEMS_FILESYSTEM
CPU Details	BYCPU_ID
	BYCPU_CPU_SYS_MODE_UTIL
	BYCPU_CPU_USER_MODE_UTIL
	BYCPU_CSWITCH_RATE
	BYCPU_INTERRUPT_RATE
	BYCPU_STATE
	BYCPU_CPU_CLOCK
	BYCPU_CPU_TOTAL_UTIL
	PROCESSOR_SYSTEM
	PROCESSOR_USER
	PROCESSOR_SYSEXEC
	PROCESSOR__INFO_CPU__MHZ
	CPU__UTILIZATION_0D37SYS
	CPU__UTILIZATION_0D37USR

Graph Templates for Systems Infrastructure	Metric Name
Network Interface Details	BYNETIF_NAME
	BYNETIF_IN_BYTE_RATE
	BYNETIF_IN_PACKET_RATE
	BYNETIF_OUT_BYTE_RATE
	BYNETIF_OUT_PACKET_RATE
	BYNETIF_QUEUE
	BYNETIF_COLLISION_RATE
	BYNETIF_ERROR_RATE
	NETWORK__INTERFACE
	NETWORK__INTERFACE_RECEIVEBYTES
	NETWORK__INTERFACE_RBYTES
	NETWORK__INTERFACE_IPACKETS
	NETWORK__INTERFACE_PACKETS__RECEIVED_SEC
	NETWORK__INTERFACE_TRANSMITBYTES
	NETWORK__INTERFACE_RBYTES
	NETWORK__INTERFACE_OPACKETS
	NETWORK__INTERFACE_PACKETS__SENT_SEC
	NETWORK__INTERFACE_COLLIS
	NETWORK__INTERFACE_COLLISIONS
	NETWORK__INTERFACE_ERRS
NETWORK__STATS	
NETWORK__STATS_IPKTS	
NETWORK__STATS_OPKTS	
NETWORK__STATS_COLL	

Virtualization Infrastructure Graph Templates

The following table lists the graph templates for Virtualization Infrastructure:

Graph Templates for Virtualization Infrastructure	Metric Name
Virtualization Configurations	GBL_SYSTEM_ID
	GBL_OSNAME
	GBL_OSVERSION
	GBL_OSRELEASE
	GBL_LS_TYPE
	GBL_LS_ROLE
	GBL_NUM_LS
	GBL_NUM_CPU
	GBL_SYSTEM_ID
	GBL_OSNAME
	GBL_OSVERSION
	GBL_OSRELEASE
	GBL_LS_TYPE
	GBL_LS_ROLE
	GBL_NUM_LS
	GBL_NUM_CPU
	BYLS_LS_ID
	BYLS_LS_NAME
	BYLS_NUM_CPU
	BYLS_NUM_NETIF
	BYLS_NUM_DISK
BYLS_LS_OSTYPE	

Graph Templates for Virtualization Infrastructure	Metric Name
Virtualization Configurations	BYLS_CPU_ENTL_MIN
	BYLS_CPU_ENTL_MAX
	BYLS_MEM_ENTL_MIN
	BYLS_MEM_ENTL_MAX
CPU Entitlement by Logical Systems	BYLS_CPU_ENTL_MIN
	BYLS_CPU_ENTL_MAX
	VMWARE_GUARANTEED0D46SUMMATION0D910D93
Percentage Utilization of CPU Entitlement by Logical Systems	BYLS_CPU_ENTL_UTIL
Percentage Utilization of Total Physical CPU by Logical Systems	BYLS_CPU_PHYS_TOTAL_UTIL
	VMWARE_USAGE0D46AVERAGE0D910D93
CPU Details of Logical System	GBL_CPU_ENTL_UTIL
	GBL_CPU_PHYS_USER_MODE_UTIL
	GBL_CPU_PHYS_SYS_MODE_UTIL
	GBL_CPU_PHYS_TOTAL_UTIL
	GBL_CPU_SHARES_PRIO
	GBL_CPU_ENTL_UTIL
	GBL_CPU_PHYS_USER_MODE_UTIL
	GBL_CPU_PHYS_SYS_MODE_UTIL
	GBL_CPU_PHYS_TOTAL_UTIL
	GBL_CPU_SHARES_PRIO
	CPU_UTILIZATION_0D37SYS
	CPU_UTILIZATION_0D37USR

Graph Templates for Virtualization Infrastructure	Metric Name
CPU Summary by Logical Systems	BYLS_LS_ID
	BYLS_CPU_ENTL_UTIL
	BYLS_CPU_USER_MODE_UTIL
	BYLS_CPU_SYS_MODE_UTIL
	BYLS_CPU_PHYS_TOTAL_UTIL
	BYLS_CPU_SHARES_PRIO
	VMWARE_USAGE0D46AVERAGE0D910D93
	VMWARE_READY0D46SUMMATION0D910D93
	VMWARE_EXTRA0D46SUMMATION0D910D93
Percentage Utilization of Memory Entitlement by Logical Systems	BYLS_MEM_ENTL_UTIL
Memory Summary by Logical Systems	BYLS_LS_ID
	BYLS_MEM_ENTL_UTIL
	BYLS_MEM_PHYS_UTIL
	BYLS_MEM_SWAPPED
	BYLS_MEM_OVERHEAD
	BYLS_MEM_SHARES_PRIO
	VMWARE_ACTIVE0D46AVERAGE0D910D93
	VMWARE_USAGE0D46AVERAGE0D910D93
	VMWARE_SWAPPED0D46AVERAGE0D910D93
	VMWARE_OVERHEAD0D46AVERAGE0D910D93
CPU Entitlement Utilization Baseline	BYLS_CPU_ENTL_UTIL
VMware ESX/ESXi Host Memory Utilization	BYLS_MEM_PHYS_UTIL
	VMWARE_USAGE0D46AVERAGE0D910D93

Graph Templates for Virtualization Infrastructure	Metric Name
VMware ESX/ESXi Host Memory Utilization Baseline	BYLS_MEM_PHYS_UTIL
	VMWARE_USAGE0D46AVERAGE0D910D93
VMware ESX/ESXi Host Disk Utilization	BYLS_DISK_UTIL
	VMWARE_USAGE0D46AVERAGE0D910D93
	VMWARE_READ0D46AVERAGE0D910D93
	VMWARE_WRITE0D46AVERAGE0D910D93
VMware ESX/ESXi Host - Network MB	BYLS_NET_IN_BYTE
	BYLS_NET_OUT_BYTE
	VMWARE_USAGE0D46AVERAGE0D910D93
VMware ESX/ESXi - CPU Utilization across Resource Pools	BYLS_CPU_PHYS_TOTAL_UTIL
	VMWARE_USAGE0D46AVERAGE0D910D93

Policies Setting HIs/ETIs

The following table lists the content pack HIs/ETIs and SPI policies that set the HIs/ETIs.

HI/ETI	Policy Name	Policy Description
L2Connection Status	-	-
DRSStatus	VI-VMwareDRSEvent	The policy monitors the log file / var/opt/OV/tmp/vispi/vmeventlist.log and alerts in case of any occurrence of DRS related events.
PingAvailability	-	-

HI/ETI	Policy Name	Policy Description
NodeStatus	VI-StateMonitor	The policy monitors and reports the state of the host servers and the guest virtual machines configured on them.
	VI-VMwareDRSEvent	The policy monitors the log file / var/opt/OV/tmp/vispi/vmeventlist.log and alerts in case of any occurrence of DRS related events.
	VI-VMwareVM PoweredOnOffEvent	The policy monitors the log file / var/opt/OV/tmp/vispi/vmeventlist.log and alerts whenever a VM is powered on or powered off.
CPULoad	SI-CPUBottleneck Diagnosis	The policy detects CPU bottlenecks like exceeding the thresholds for CPU utilization percentage, processor queue length, total number of CPU on the system, and operating systems.
	VI-HostCPU UtilizationMonitor	The policy monitors CPU utilization along with ready utilization on the host machine and sends an alert in case of any violation.
	VI-VMCpuEntitlement UtilizationMonitor-AT	The policy calculates (as a percentage) the current CPU utilization and compares it to the minimum CPU entitlement utilization of virtual machines.

HI/ETI	Policy Name	Policy Description
CPUUsageLevel	SI-CPUspikeCheck	The policy monitors CPU spikes per CPU busy time in system mode, per CPU busy time in user mode, and total busy time per CPU.
	SI-PerCPU Utilization-AT	The policy monitors the utilization for each CPU on the managed node. This policy processes each CPU instance separately for every interval.
CPU Entitlement Usage Level	VI-OracleSolarisHost CPUUtilization Monitor	The policy monitors the host system's CPU utilization.
	VI-OracleSolarisZone CPUEntlUtil Monitor-AT	This policy monitors the logical system's CPU utilization against the minimum entitled CPU. Entitled CPU is the number of guaranteed processing units allocated to a logical system.
DiskUsageLevel	SI-DiskCapacity Monitor	The policy monitors capacity parameters of the disks on the managed node. For each disk, the policy checks for space utilization and free space available. It also checks for inode utilization on the Linux nodes.
InterfaceError Rate	SI-NetworkUsage AndPerformance	The policy monitors the system's network usage and shows error rates and collisions to identify potential network bottlenecks.

HI/ETI	Policy Name	Policy Description
Interface Utilization	SI-NetworkUsage AndPerformance	The policy monitors the system's network usage and shows error rates and collisions to identify potential network bottlenecks.
	SI-PerNetifInbyte Baseline-AT	The policy monitors the incoming bytes on each network interface on the managed node individually for every interval.
	SI-PerNetifOutbyte Baseline-AT	The policy monitors the network interface outbyte rate each network interface on the managed node individually for every interval.
InterfaceDiscard Rate	SI-NetworkUsage AndPerformance	This policy monitors the system's network usage and shows error rates and collisions to identify potential network bottlenecks.
MemoryUsage Level	SI-Memory Utilization-AT	The policy monitors the overall memory usage by operating systems.
	VI-VMwareHost MemoryHealth Monitor	The policy monitors the health of the host machines on VMware vMA in terms of memory utilization. It can be used to monitor the availability or utilization of the memory on the host machine.
	VI-VMwareVM MemoryUsage-AT	The policy monitors how much memory is being used by the guest virtual machines and resource pools in MBs. The policy uses a multi-instance baseline for monitoring the memory usage for virtual machines and resource pools.

HI/ETI	Policy Name	Policy Description
Virtualization Overhead	VI-VMMemoryOverheadMonitor-AT	The policy monitors the memory overhead on the VM.
ResourceUsage	SI-JavaProcessCPUUsageTracker	The policy monitors the CPU usage for the Java process running on your system.
	SI-JavaProcessMemoryUsageTracker	The policy monitors memory usage for Java process running on your system.
	SI-MSWindowsSvchostCPUUsageTracker	The policy monitors the CPU usage for the svchost processes running on your system.
	SI-MSWindowsSvchostMemoryUsageTracker	The policy monitors the memory usage for the svchost processes running on your system.

HI/ETI	Policy Name	Policy Description
MemoryLoad	SI-MemoryBottleneck Diagnosis	<p>The policy monitors the physical memory utilization and the bottlenecks. The policy first checks for memory bottleneck threshold violations, if the condition is not met it checks for memory usage threshold violations. If both conditions for memory bottleneck and memory usage, are not met, the policy checks for free page table condition.</p> <p>By default the free page table thresholds contain Microsoft recommended values on the Windows systems. In case of violation of multiple threshold values indicating a high utilization, the policy sends a message to the HPOM console with appropriate message attributes. The message also displays a list of top 10 memory intensive processes.</p>
	VI-VMwareVM MemoryPerformance Monitor	The policy monitors the memory performance of the virtual machines. It compares the memory used by the virtual machine against the amount of virtual memory entitled to it.
MemoryEntitlem entUsageLevel	VI-OracleSolarisMemor yEntlUtilMonitor-AT	The policy monitors the Solaris zone's memory utilization (for a given time period) against the minimum entitled memory. It monitors system memory (occupied by the kernel), buffer cache, and user memory.
	VI-OracleSolarisHost MemoryUtilMonitor	This policy monitors the memory utilization of host systems.

HI/ETI	Policy Name	Policy Description
SwapUsageLevel	SI-SwapCapacity Monitor	The policy monitors the swap space utilization of the system
	SI-SwapUtilization-AT	The policy monitors the overall swap space used by the systems on the managed node.
KernelHandles Usage	SI-KernelTableUsage Monitor	
BatchJobService	SI-LinuxAtdProcess Monitor	The policy monitors availability of the Linux Atd process.
	SI-RHELCronProcess Monitor	The policy monitors availability of the RHEL cron process.
	SI-SLESCronProcess Monitor	The policy monitors availability of the SLES cron process.
EventLogging Service	SI-SLESSyslogProcess Monitor	The policy monitors availability of the SLES Syslog process.
	SI-RHELSyslog ProcessMonitor	The policy monitors availability of the RHEL Syslog process.
PrintService	SI-LinuxCups ProcessMonitor	The policy monitors availability of the Linux Cups process.
	SI-MSWindows PrintServiceRole Monitor	The policy monitors availability of the Microsoft Windows Print service.
FileServer Service	SI-MSWindowsFile ServerRoleMonitor	The policy monitors availability of the Microsoft Windows FileServerRole process.
	SI-LinuxSmbServer ProcessMonitor	The policy monitors availability of the Linux Smb process.
	SI-LinuxNfsServer ProcessMonitor	The policy monitors availability of the Linux NTFS Server process.
EmailService	SI-LinuxSendmail ProcessMonitor	The policy monitors availability of the Linux Sendmail process.

HI/ETI	Policy Name	Policy Description
WebServer Service	SI-MSWindows WebServerRoleMonitor	The policy monitors availability of the Microsoft Windows WebServerRole process.
RPCService	-	-
FirewallService	-	-
DNSService	-	-
FTPService	-	-
DHCPService	-	-
SecureLogin Service	-	-
BatchJobs (ETI)	-	-
VMRename (ETI)	VI-VMwareRename Event	This policy monitors the log file / var/opt/OV/tmp/vispi/vmeventlist.log and alerts whenever a VM is renamed.
VMCreation (ETI)	VI-VMwareVM CreationRemovalEvent	This policy monitors the log file / var/opt/OV/tmp/vispi/vmeventlist.log and alerts whenever a VM is created.
VMRemoval (ETI)	VI-VMwareVM CreationRemovalEvent	This policy monitors the log file / var/opt/OV/tmp/vispi/vmeventlist.log and alerts whenever a VM is removed.
VMMigration (ETI)	VI-VMwareDRSEvent	The policy monitors the log file / var/opt/OV/tmp/vispi/vmeventlist.log and alerts in case of any occurrence of DRS related events.
FilesystemUsage	-	-
SwapSpace Available	-	-

HI/ETI	Policy Name	Policy Description
LogicalDisk FreeSpaceWIN	-	-
TerminalServer Service	-	-
ClusterResource GroupStatus	CI-ClusterResGroup Monitor	The policy monitors the state and availability of resource groups in a cluster. Before deploying this policy, make sure you have deployed the CI-ClusterDataCollector policy for cluster data collection.
CPUUsageLevel	SI-CPUSpikeCheck	The policy monitors CPU spikes per CPU busy time in system mode, per CPU busy time in user mode, and total busy time per CPU. A system experiences CPU spike when there is a sharp rise in the CPU usage immediately followed by a decrease in usage.
	SI-PerCPU Utilization-AT	The policy monitors the utilization for each CPU instance separately for every interval.
DiskUsageLevel	SI-DiskCapacity Monitor	The policy monitors capacity parameters of the disks on the managed node. For each disk, the policy checks for space utilization and free space available. It also checks for inode utilization on the Linux nodes. In case the free space availability, space utilization, or inode utilization exceeds the threshold values specified, the policy sends out an alert to the HPOM console.

HI/ETI	Policy Name	Policy Description
DiskUtilization	SI-PerDisk Utilization-AT	The policy monitors utilization for each disk on the managed node. This policy processes each disk instance separately for every interval. This policy requires HP Performance Agent to be running on the managed node.
	VI-VMwareHost DiskUtilization-AT	The policy monitors the duration for which the physical disks are used for input/output. The policy uses a multi-instance baseline for monitoring the disk input/output utilization.
InterfaceError Rate	SI-NetworkUsage AndPerformance	The policy monitors the system's network usage and shows error rates and collisions to identify potential network bottlenecks.
Interface Utilization	SI-NetworkUsage AndPerformance	This policy monitors the system's network usage and shows error rates and collisions to identify potential network bottlenecks.
	SI-PerNetifInbyte Baseline-AT	This policy monitors the incoming bytes on each network interface separately for every interval.
	SI-PerNetifOutbyte Baseline-AT	This policy monitors the network interface outgoing bytes on each network interface separately for every interval.
InterfaceDiscard Rate	SI-NetworkUsage AndPerformance	This policy monitors the system's network usage and shows error rates and collisions to identify potential network bottlenecks.
Interface Communication Status	-	-

HI/ETI	Policy Name	Policy Description
AddressStatus	-	-
ClusterSoftware Service	CI-LinuxVCS_ProcessMonitor_data	The policy monitors the state and availability of the Veritas cluster server process on RHEL and SUSE operating systems.
	CI-MCSGClusterProcessMonitor_data	The policy monitors the state and availability of HP MC/ServiceGuard Cluster process on Linux, RHEL and SLES systems. It monitors the process <i>cmcl</i> . The <i>cmcl</i> process runs on every cluster node and helps to initialize and monitor the health of the cluster.
	CI-MSWindowsClusterServiceMonitor_data	The policy checks for the state and availability of Microsoft Windows services. It monitors the Microsoft Windows services on the managed cluster nodes.
	CI-MSWindowsVCS_ProcessMonitor_data	The policy monitors the state and availability of the Veritas cluster server process or service on Microsoft Windows systems
	CI-RHClusterCCSDProcessMonitor_data	The policy monitors the state and availability of the Red Hat Cluster process on Linux, for RHEL systems. It monitors the process <i>ccsd</i> (Cluster Configuration System Daemon).
	CI-RHClusterRGManagerProcessMonitor_data	The policy monitors the state and availability of the Red Hat Cluster process on Linux, for RHEL systems. It monitors the process <i>clurgmgrd</i> (Cluster Resource Group Manager).

HI/ETI	Policy Name	Policy Description
ClusterStrength	CI-ClusterMonitor	<p>The CI-ClusterMonitor policy monitors the availability and strength of a cluster group. This is helpful to ensure high availability of services running on the cluster servers.</p> <p>Before deploying this policy, make sure you have deployed the CI-ClusterDataCollector policy for cluster data collection.</p>
VMFSUsageLevel	VI-VMwareVMFS UtilizationMonitor	<p>This policy monitors the disk space utilization on the Virtual Machine File System (VMFS) on the vMA system. VMFS represents the data storage volumes on which the VMware guest disk files are stored.</p>
Virtualization Service	VI-MSHyperVHost ServiceMonitor	<p>This policy monitors the availability of services on the host operating system of the Microsoft Hyper-V server.</p>

Operations Orchestration Flow

The following table list the Operations Orchestration (OO) flows for Infrastructure Content Pack:

OO Flows	Description	Flow input	CI Type	CI attribute	Event Attribute
ESX Server health check	Checks the health of memory and performance of CPU for VMware ESX server	omServer ESX Name	vmware_esx_server	name	Originating Server
VM health check	Checks the health of memory and performance of CPU for guest machines (VMs)	omServer VM Name	host_node		
Sanity check for VISPI	Checks the correctness of VISPI installation (VISPI 1.5 or later)	omServer VM Name	unix/nt		

When creating the mapping defined in the previous table, you can set the default values for the attributes listed in the following table:

Flow input	Description
omServerPort	Port number of the HPOM Tool WS
omServerUser	The user name for the HPOM Server that will use used in the HPOM Tool WS
omServerPassword	The password for the HPOM Server that will use used in the HPOM Tool WS

For more information about creating the mapping and Run Book automation rules, see "How to Create a Run Book Automation Rule" on page 505.

When running OO flows, the user input to provide is:

omNode: The target node with an HPOM agent.

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J2EE Content Pack

This chapter includes:

Reference

- J2EE Application Server Content Pack on page 848

Reference

J2EE Application Server Content Pack

Note: To display the impact of the database instance on J2EE Application Server, you must specify the appropriate Application IP and database instance name in the JDBC URL. These properties are used to create the link between the J2EE Application Server and database instance.

The J2EE Application Server Content Pack contains the following artifacts:

- ▶ Views on page 849
- ▶ Health Indicators on page 851
- ▶ Event Type Indicators on page 859
- ▶ Correlation Rules on page 861
- ▶ HI Assignment on page 900
- ▶ KPI Assignment on page 901
- ▶ Dependent Content Packs on page 902
- ▶ Tool Definitions on page 904
- ▶ Graph Templates for SPI for WebSphere Server on page 905
- ▶ Graph Templates for SPI for WebLogic Server on page 908
- ▶ Policies Setting ETIs on page 910
- ▶ Operations Orchestration Flow on page 914

Health Indicators

The content pack includes the following Health Indicators (HIs) to monitor J2EE related events.

CI Type	HI	Description	Value
J2EE Server	Active Sockets Count	Number of HTTP socket connections opened to the server.	High, Normal
	Application Server Load	Load on the application server.	High, Normal
	Deferred Thread Requests	The number of requests that were denied a thread for execution because of the max-threads-constraint.	High, Normal
	Http Request Average Service Time	Average time required to service an HTTP request.	High, Normal
	Http Request Total Service Time	Total time required to service HTTP requests.	High, Normal
	Http Server Active Connections	Number of connections currently open.	High, Normal
	Http Server Active Request	Child servers currently in the request processing phase.	High, Normal
	Http Server Connection Time	Total time spent servicing HTTP connections.	High, Normal
	JMS Active Connection Count	Number of active JMS connections.	High, Normal
	JMS Server Utilization	JMS Server queue utilization.	High, Normal

CI Type	HI	Description	Value
J2EE Server	Oracle Web Cache Average Latency Current Interval	Average latency for 10 second intervals to process requests for Oracle Web Cache.	High, Normal
	Oracle Web Cache Latency Since Start	Average number of seconds to process requests for Oracle Web Cache since the application Web server started.	High, Normal
	Server Sessions	Number of sessions opened to this server.	High, Normal
	Server Status	Shows the server status in terms of availability.	Unavailable, Available
	Servlets Loaded	Number of servlets currently loaded for a web application (cumulative value per server).	High, Normal
	Thread Hung Rate	Rate at which the threads are declared hung.	High, Normal
	Thread Pool Availability	The availability of the threads in the Thread Pool.	Low, Normal
	Thread Pool Utilization	The number of threads used in the server to execute tasks.	High, Normal
	Thread Request Service Time	Time a request had to wait for a thread.	High, Normal
	Thread Request Wait Time	The time (in milliseconds) a request had to wait for a thread.	High, Normal
	Threads Request Pending	Requests that are pending because they are waiting for an available thread.	High, Normal
	Transaction Application Errors	Transaction errors due to application errors.	High, Normal

CI Type	HI	Description	Value
J2EE Server	Transaction Capacity Utilization	The number of simultaneous in-progress transactions.	High, Normal
	Transaction Commit Rate	The number of transactions that were committed per second.	High, Normal
	Transaction Resource Errors	Transaction errors caused due to system resource errors.	High, Normal
	Transaction Rollback Rate	The number of transactions rolled back due to system, resource, or others.	High, Normal
	Transaction Start Rate	The number of transactions that were begun per second.	High, Normal
	Transaction System Errors	Transaction errors caused due to system errors.	High, Normal
	Transaction Time	Time taken to complete a transaction.	High, Normal
	Transaction Timeout Errors	Transaction errors caused due to transaction timeout.	High, Normal
	Transaction Timeout Rate	The number of transactions that timed out per second.	High, Normal
	Transactions Rolled Back	Number/Percentage of Transactions rolled back due to system, resource, or other errors.	High, Normal
	EJB Concurrent Lives	The average number of bean objects in the pool.	High, Normal
	EJB Utilization	The utilization of the EJB pool.	High, Normal
	Execute Queue Wait Count	The number of client requests waiting to be serviced by the execute queue.	High, Normal

CI Type	HI	Description	Value
J2EE Server	HTTP Sessions	Number of open HTTP sessions.	High, Normal
	EJB Missed Count Rate	Total number of times a failed attempt was made to get an instance from the free pool.	High, Normal
	EJB Free Pool Wait Rate	The number of times per minute no EJBs were available from the free pool.	High, Normal
	EJB Performance	The performance statistics such as cache utilization.	Low, Normal
	EJB Timeout Rate	The number of times per minute a client timed out waiting for an EJB.	High, Normal
	EJB Transaction Rollback Rate	Number of EJB Transaction Rolled back in unit time.	High, Normal
	Servlet Performance	Performance statistics such as execution time.	Low, Normal
	Servlet Requests	Number of incoming requests to the servlet.	High, Normal
	Connections in Use	Number of currently used JDBC connections.	High, Normal
	JDBC Connection Pool Wait Count	Number of clients waiting for a JDBC connection.	High, Normal
	Data Source Connection Pool Availability	Availability of JDBC connections in the connection pool.	Low, Normal
	Data Source Connection Pool Failures	Number of failed attempts to refresh a connection in the connection pool.	Critical, Normal
	Data Source Connection Pool Utilization	DataSource Connection Pool Utilization	High, Normal

CI Type	HI	Description	Value
J2EE Server	Data Source Connection Pool Performance	DataSource Connection Pool Performance	Low, Normal
	Data Source Connection Waiters	The average number of threads waiting for a connection from the connection pool.	High, Normal
	JDBC Active Connection Count	Active JDBC connections	High, Normal
	Total Number of Threads	Total number of threads for garbage collection.	High, Normal
	Total Garbage Collection Count	Number of times garbage collector has run.	High, Normal
	Total Garbage Collection Time	Total time taken for garbage collection.	High, Normal
	JVM Memory Utilization	The percentage of heap size used.	High, Normal
	Heap Free Current	Amount of free heap available.	Low, Normal
	Heap Size Current	Amount of heap in use.	High, Normal
	All Processors Average Load	Average load on all the processors on the system.	High, Normal

CI Type	HI	Description	Value
J2EE Cluster	Cluster Health	Cluster health in terms of performance.	Poor, Normal
	Cluster Incoming Message Failure Rate	The number of multicast messages that were lost from the cluster.	High, Normal
	Cluster Outgoing Message Failure Rate	The number of multicast messages that were send to the cluster.	High, Normal
	Cluster Status	Cluster Status in terms of availability.	Started, Partial Stopped, Stopped

CI Type	HI	Description	Value
JDBC Data Source	Connections in Use	Number of currently used JDBC connections.	High, Normal
	Data Source Connection Waiters	The average number of threads waiting for a connection from the connection pool.	High, Normal
	Data Source Connection Pool Availability	Availability of JDBC connections in the connection pool.	Low, Normal
	Data Source Connection Pool Failures	The number of failed attempts to refresh a connection in the connection pool.	Normal, Critical
	Data Source Connection Pool Performance	Data source connection pool performance.	Low, Normal
	Data Source Connection Pool Utilization	Data source connection pool utilization.	High, Normal
	Data Source Leaked Connections Rate	The rate of new leaked JDBC connections.	High, Normal
	JDBC Active Connections Count	Active JDBC connections	High, Normal
	JDBC Connection Pool Wait Count	The number of clients waiting for a JDBC connection.	High, Normal

CI Type	HI	Description	Value
J2EE Application	EJB Concurrent Lives	The average number of bean objects in the pool.	High, Normal
	EJB Free Pool Wait Rate	The number of times per minute no EJBs were available from the free pool.	High, Normal
	EJB Missed Count Rate	The total number of times a failed attempt was made to get an instance from the free pool.	High, Normal
	EJB Performance	The performance statistics such as cache utilization.	Low, Normal
	EJB Timeout Rate	The number of times per minute a client timed out waiting for an EJB.	High, Normal
	EJB Transaction Rollback Rate	Number of EJB Transaction Rolled back in unit time.	High, Normal
	EJB Transaction Throughput Rate	Number of EJBs Transactions completed in unit time.	High, Normal
	EJB Utilization	The utilization of the EJB pool.	High, Normal
	HTTP Sessions	Number of open HTTP sessions.	High, Normal
	Servlet Performance	The performance statistics such as execution time.	Low, Normal
	Servlet Requests	Number of incoming requests to the servlet.	High, Normal

CI Type	HI	Description	Value
JVM	All Processors Average Load	Average load on all the processors on the system.	High, Normal
	Heap Free Current	Amount of free heap available.	Low, Normal
	Heap Size Current	Amount of heap in use.	High, Normal
	JVM Memory Utilization	The percentage of heap size used.	High, Normal
	Total Garbage Collection Count	Number of times garbage collector has run.	High, Normal
	Total Garbage Collection Time	Total time taken for garbage collection.	High, Normal
	Total Number of Threads	Total number of threads for garbage collection.	High, Normal
J2EE Domain	Domain Status	The status of domain.	Normal, Poor

Event Type Indicators

The content pack includes the following Event Type Indicators (ETIs) that do not contribute to health to monitor the J2EE related events:

CI Type	ETI	Description	Value
J2EE Server	Active Sockets Count	Number of HTTP socket connections opened to the server.	High, Normal
	Execute Queue Wait Count	The number of client requests waiting to be serviced by the execute queue.	High, Normal
	Threads Request Pending	Requests that are pending because they are waiting for an available thread.	High, Normal
	Server Sessions	Number of sessions opened to this server.	High, Normal

CI Type	ETI	Description	Value
JVM	Total Garbage Collection Count	Number of times garbage collector has run.	High, Normal
	Total Garbage Collection Time	Total time taken for garbage collection.	High, Normal
	Total Number of Threads	Total number of threads used for garbage collection.	High, Normal
J2EE Application	Servlet Requests	Number of incoming requests to the servlet.	High, Normal
	HTTP Sessions	Number of open servlet sessions.	High, Normal
	EJB Concurrent Lives	The average number of bean objects in the pool.	High, Normal
JDBC	Datasource Connection Waiters	The average number of threads waiting for a connection from the connection pool.	High, Normal

Correlation Rules

The content pack in the J2EE Content Pack contains the following correlation rules.

For more information on how the correlation rules work, see the *Operations Manager i Concepts Guide*.

J2EE::Computer:CPU Load >> JVM Memory Utilization & JMS Server Utilization & Transaction System Errors & EJB Performance

Description: Computer CPU Load Impacts JVM Memory Utilization and JMS Server Utilization and Transaction System Errors and EJB Performance		
Cause		
CIT: Computer	ETI: CPU Load	Value: Overloaded
Symptom 1		
CIT: J2EE Application	ETI: EJB Performance	Value: Low
Symptom 2		
CIT: J2EE Server	ETI: EJB Performance	Value: Low
Symptom 3		
CIT: J2EE Server	ETI: JMS Server Utilization	Value: High
Symptom 3		
CIT: J2EE Server	ETI: Transaction System Errors	Value: High
Symptom 4		
CIT: JVM	ETI: JVM Memory Utilization	Value: High

J2EE::Computer:CPU Load >> Real User Transaction Performance & Real User Sessions Performance

Description: Computer CPU Load Impacts Real User Transaction Performance and Real User Sessions Performance		
Cause		
CIT: Computer	ETI: CPU Load	Value: Overloaded
Symptom 1		
CIT: Business Application	ETI: Real User Sessions Performance	Value: Critical
Symptom 2		
CIT: Business Transaction	ETI: Real User Transaction Performance event	Value: Critical

J2EE::Computer:CPU Load >> Synthetic User Transaction Performance

Description: Computer CPU Load Impacts Synthetic User Transaction Performance		
Cause		
CIT: Computer	ETI: CPU Load	Value: Overloaded
Symptom 1		
CIT: Business Transaction	ETI: Synthetic User Transaction Performance event	Value: Critical

J2EE::Computer:Memory Usage Level >> Server Status & Transaction System Errors & Thread Hung Rage

Description: Computer Memory Usage Level Impacts Server Status and Transaction System Errors and Thread Hung Rate		
Cause		
CIT: Computer	ETI: Memory Usage Level	Value: Much Higher Than Normal
Symptom 1		
CIT: J2EE Server	ETI: Server Status	Value: Unavailable
Symptom 2		
CIT: J2EE Server	ETI: Thread Hung Rate	Value: High
Symptom 3		
CIT: J2EE Server	ETI: Transaction System Errors	Value: High

J2EE::Database:CPU Usage By SQL >> Transaction Timeout Errors & Transactions Rolled Back & EJB Performance & DataSource ConnectionPool Performance

Description: Database CPU Usage By SQL Impacts Transaction Timeout Errors and Transactions Rolled Back and EJB Performance and DataSource ConnectionPool Performance		
Cause		
CIT: Database	ETI: CPU Usage by SQL	Value: High
Symptom 1		
CIT: J2EE Application	ETI: EJB Performance	Value: Low
Symptom 2		

Description: Database CPU Usage By SQL Impacts Transaction Timeout Errors and Transactions Rolled Back and EJB Performance and DataSource ConnectionPool Performance		
CIT: J2EE Server	ETI: DataSource Connection Pool Performance	Value: Low
Symptom 3		
CIT: J2EE Server	ETI: EJB Performance	Value: Low
Symptom 4		
CIT: J2EE Server	ETI: Transaction Timeout Errors	Value: High
Symptom 5		
CIT: J2EE Server	ETI: Transactions Rolled Back	Value: High
Symptom 6		
CIT: JDBC Data	ETI: Datasource Connection Pool Performance	Value: Low

J2EE::Database:Database Server Status >> DataSource ConnectionPool Availability

Description: Database Server Status Impacts DataSource ConnectionPool Availability		
Cause		
CIT: Database	ETI: Database Server Status	Value: Down
Symptom 1		
CIT: J2EE Server	ETI: Data Source Connection Pool Availability	Value: Low
Symptom 2		
CIT: JDBC Data Source	ETI: Data Source Connection Pool Availability	Value: Low

J2EE::Database:Database Server Status >> Real User Transaction Availability & Real User Sessions Availability

Description: Database Server Status Impacts Real User Transaction Availability and Real User Sessions Availability		
Cause		
CIT: Database	ETI: Database Server Status	Value: Down
Symptom 1		
CIT: Business Application	ETI: Real User Sessions Availability	Value: Critical
Symptom 2		
CIT: Business Transaction	ETI: Real User Transaction Availability event	Value: Critical

J2EE::Database:Database Server Status >> Synthetic User Transaction Availability

Description: Database Server Status Impacts Synthetic User Transaction Availability		
Cause		
CIT: Database	ETI: Database Server Status	Value: Down
Symptom 1		
CIT: Business Transaction	ETI: Synthetic User Transaction Availability event	Value: Critical

J2EE::Database:SQL Query Performance >> Transaction Timeout Errors & Transactions Rolled Back & EJB Performance & DataSource ConnectionPool Performance

Description: Database SQL Query Performance Impacts Transaction Timeout Errors and Transactions Rolled Back and EJB Performance and DataSource ConnectionPool Performance		
Cause		
CIT: Database	ETI: SQL Query Performance	Value: Low
Symptom 1		
CIT: J2EE Application	ETI: EJB Performance	Value: Low
Symptom 2		
CIT: J2EE Server	ETI: Datasource Connection Pool Performance	Value: Low
Symptom 3		
CIT: J2EE Server	ETI: EJB Performance	Value: Low
Symptom 4		
CIT: J2EE Server	ETI: Transaction Timeout Errors	Value: High
Symptom 5		
CIT: J2EE Server	ETI: Transactions Rolled Back	Value: High
Symptom 4		
CIT: JDBC Data Source	ETI: Data Source Connection Pool Performance	Value: Low

J2EE::File System:Disk Usage Level >> Server Status & Transaction Resource Errors & Transaction System Errors

Description: File System Disk Usage Level Impacts Server Status and Transaction Resource Errors and Transaction System Errors		
Cause		
CIT: FileSystem	ETI: Disk Usage Level	Value: Near Capacity
Symptom 1		
CIT: J2EE Server	ETI: Server Status	Value: Unavailable
Symptom 2		
CIT: J2EE Server	ETI: Transaction Resource Errors	Value: High
Symptom 3		
CIT: J2EE Server	ETI: Transactions System Errors	Value: High

J2EE::J2EE Application:EJB Concurrent Lives >> EJB Utilization

Description: EJB Concurrent Lives Impacts EJB Utilization		
Cause		
CIT: J2EE Application	ETI: EJB Concurrent Lives	Value: High
Symptom 1		
CIT: J2EE Application	ETI: EJB Utilization	Value: High
Symptom 2		
CIT: J2EE Server	ETI: EJB Utilization	Value: High

J2EE::J2EE Application:EJB Free Pool Wait Rate >> Servlet Performance

Description: EJB Free Pool Wait Rate Impacts Servlet Performance		
Cause		
CIT: J2EE Application	ETI: EJB Free Pool Wait Rate	Value: High
Symptom 1		
CIT: J2EE Application	ETI: Servlet Performance	Value: Low
Symptom 2		
CIT: J2EE Server	ETI: Servlet Performance	Value: Low

J2EE::J2EE Application:EJB Performance >> EJB Free Pool Wait Rate & EJB Missed Count Rate & Servlet Performance

Description: EJB Performance Impacts EJB Free Pool Wait Rate and EJB Missed Count Rate and Servlet Performance		
Cause		
CIT: J2EE Application	ETI: EJB Performance	Value: Low
Symptom 1		
CIT: J2EE Application	ETI: EJB Free Pool Wait Rate	Value: High
Symptom 2		
CIT: J2EE Application	ETI: EJB Missed Count Rate	Value: High
Symptom 3		
CIT: J2EE Application	ETI: Servlet Performance	Value: Low
Symptom 4		
CIT: J2EE Server	ETI: EJB Free Pool Wait Rate	Value: High
Symptom 5		
CIT: J2EE Server	ETI: EJB Missed Count Rate	Value: High
Symptom 6		
CIT: J2EE Server	ETI: Servlet Performance	Value: Low

J2EE::J2EE Application:EJB Timeout Rate >> Servlet Performance & EJB Transaction Throughput Rate & EJB Transaction Rollback Rate

Description: EJB Timeout Rate Impacts Servlet Performance and EJB Transaction Throughput Rate and EJB Transaction Rollback Rate		
Cause		
CIT: J2EE Application	ETI: EJB Timeout Rate	Value: High
Symptom 1		
CIT: J2EE Application	ETI: EJB Transaction Rollback Rate	Value: High
Symptom 2		
CIT: J2EE Application	ETI: EJB Transaction Throughput Rate	Value: High
Symptom 3		
CIT: J2EE Application	ETI: Servlet Performance	Value: Low
Symptom 4		
CIT: J2EE Server	ETI: EJB Transaction Rollback Rate	Value: High
Symptom 5		
CIT: J2EE Server	ETI: Servlet Performance	Value: Low

J2EE::J2EE Application:EJB Utilization >> DataSource Connection Waiters & DataSource Connection Pool Utilization

Description: EJB Utilization Impacts DataSource Connection Waiters and DataSource Connection Pool Utilization		
Cause		
CIT: J2EE Application	ETI: EJB Utilization	Value: High
Symptom 1		
CIT: J2EE Server	Data Source Connection Pool Utilization	Value: High

Description: EJB Utilization Impacts DataSource Connection Waiters and DataSource Connection Pool Utilization		
Symptom 2		
CIT: J2EE Server	ETI: Data Source Connection Waiters	Value: High
Symptom 3		
CIT: JDBC Data Source	ETI: Data Source Connection Waiters	Value: High
Symptom 4		
CIT: JDBC Data Source	ETI: Data Source Connection Pool Utilization	Value: High

J2EE::J2EE Application:HTTP Sessions >> JVM Memory Utilization

Description: J2EE Application HTTP Sessions Impacts JVM Memory Utilization		
Cause		
CIT: J2EE Application	ETI: HTTP Sessions	Value: High
Symptom 1		
CIT: J2EE Server	ETI: JVM Memory Utilization	Value: High
Symptom 2		
CIT: JVM	ETI: JVM Memory Utilization	Value: High

J2EE::J2EE Application:Servlet Requests >> InterfaceUtilization

Description: J2EE Application Servlet Requests Impacts Interface Utilization		
Cause		
CIT: J2EE Application	ETI: Servlet Requests	Value: High
Symptom		
CIT: Interface	ETI: InterfaceUtilization	Value: Much Higher Than Normal

J2EE::J2EE Application:Servlet Requests >> Real User Transaction Performance & Real User Sessions Performance

Description: J2EE Application Servlet Requests Impacts Real User Transaction Performance and Real User Sessions Performance		
Cause		
CIT: J2EE Application	ETI: Servlet Requests	Value: High
Symptom 1		
CIT: Business Application	ETI: Real User Sessions Performance	Value: Critical
Symptom 2		
CIT: Business Transaction	ETI: Real User Transaction Performance event	Value: Critical

J2EE::J2EE Application:Servlet Requests >> Synthetic User Transaction Performance

Description: J2EE Application Servlet Requests Impacts Synthetic User Transaction Performance		
Cause		
CIT: J2EE Application	ETI: Servlet Requests	Value: High
Symptom 1		
CIT: Business Application	ETI: Synthetic User Transaction Performance event	Value: Critical

J2EE::J2EE Application:Servlet Requests >> Thread Pool Utilization & Active Sockets Count & JVM Memory Utilization & HTTP Sessions & Thread Requests Pending & Servlets Loaded & Interface Discard Rate & Interface Utilization

Description: J2EE Application Servlet Requests Impacts Thread Pool Utilization and Active Sockets Count and JVM Memory Utilization and HTTP Sessions and Thread Requests Pending and Servlets Loaded and Interface Discard Rate and Interface Utilization		
Cause		
CIT: J2EE Application	ETI: Servlet Requests	Value: High
Symptom 1		
CIT: Interface	ETI: Interface Discard Rate	Value: High
Symptom 2		
CIT: Interface	ETI: Interface Utilization	Value: High
Symptom 3		
CIT: Interface	ETI: Interface Utilization	Value: Higher Than Normal
Symptom 4		
CIT: J2EE Application	ETI: HTTP Sessions	Value: High
Symptom 5		
CIT: J2EE Server	ETI: Active Sockets Count	Value: High
Symptom 6		
CIT: J2EE Server	ETI: HTTP Sessions	Value: High
Symptom 7		
CIT: J2EE Server	ETI: JVM Memory Utilization	Value: High
Symptom 8		
CIT: J2EE Server	ETI: Servlets Loaded	Value: High
Symptom 9		
CIT: J2EE Server	ETI: Thread Pool Utilization	Value: High

Description: J2EE Application Servlet Requests Impacts Thread Pool Utilization and Active Sockets Count and JVM Memory Utilization and HTTP Sessions and Thread Requests Pending and Servlets Loaded and Interface Discard Rate and Interface Utilization		
Symptom 10		
CIT: J2EE Server	ETI: Thread Requests Pending	Value: High
Symptom 11		
CIT: JVM	ETI: JVM Memory Utilization	Value: High

J2EE::J2EE Cluster:Cluster Health >> Domain Status

Description: J2EE Cluster Health Impacts Domain Status		
Cause		
CIT: J2EE Cluster	ETI: Cluster Health	Value: Poor
Symptom 1		
CIT: J2EE Domain	ETI: Domain Status	Value: Poor

J2EE::J2EE Cluster:Cluster Health >> Real User Transaction Performance & Real User Sessions Performance

Description: J2EE Cluster Health Impacts Real User Transaction Performance and Real User Sessions Performance		
Cause		
CIT: J2EE Cluster	ETI: Cluster Health	Value: Poor
Symptom 1		
CIT: Business Application	ETI: Real User Sessions Performance	Value: Critical
Symptom 2		
CIT: Business Application	ETI: Real User Transaction Performance event	Value: Critical

J2EE::J2EE Cluster:Cluster Health >> Synthetic User Transaction Performance

Description: J2EE Cluster Health Impacts Synthetic User Transaction Performance		
Cause		
CIT: J2EE Cluster	ETI: Cluster Health	Value: Poor
Symptom 1		
CIT: Business Application	ETI: Synthetic User Transaction Performance event	Value: Critical

J2EE::J2EE Cluster:Cluster Status >> Domain Status

Description: J2EE Cluster Status Impacts Domain Status		
Cause		
CIT: J2EE Cluster	ETI: Cluster Status	Value: Stopped
Symptom 1		
CIT: J2EE Domain	ETI: Domain Status	Value: Poor

J2EE::J2EE Cluster:Cluster Status >> Real User Transaction Availability & Real User Sessions Availability

Description: J2EE Cluster Status Impacts Real User Transaction Availability and Real User Sessions Availability		
Cause		
CIT: J2EE Cluster	ETI: Cluster Status	Value: Stopped
Symptom 1		
CIT: Business Application	ETI: Real User Sessions Availability	Value: Critical
Symptom 2		
CIT: Business Application	ETI: Real User Transaction Availability event	Value: Critical

J2EE::J2EE Cluster:Cluster Status >> Synthetic User Transaction Availability

Description: J2EE Cluster Status Impacts Synthetic User Transaction Availability		
Cause		
CIT: J2EE Cluster	ETI: Cluster Status	Value: Stopped
Symptom 1		
CIT: Business Transaction	ETI: Synthetic User Transaction Availability event	Value: Critical

J2EE::J2EE Server:DataSource Connection Pool Availability >> EJBPerformance & Transaction Timeout Rate & Transaction Commit Rate

Description: J2EE Server DataSource Connection Pool Availability Impacts EJBPerformance and Transaction Timeout Rate and Transaction Commit Rate		
Cause		
CIT: J2EE Server	ETI: Data Source Connection Pool Availability	Value: Low
Symptom 1		
CIT: J2EE Application	ETI: EJB Performance	Value: Low
Symptom 2		
CIT: J2EE Server	ETI: EJB Performance	Value: Low
Symptom 3		
CIT: J2EE Server	ETI: Transaction Commit Rate	Value: High
Symptom 4		
CIT: J2EE Server	ETI: Transaction Timeout Rate	Value: High

J2EE::J2EE Server:DataSource Connection Pool Performance >> EJB Performance

Description: J2EE Server DataSource Connection Pool Performance Impacts EJB Performance		
Cause		
CIT: J2EE Server	ETI: Data Source Connection Pool Performance	Value: Low
Symptom 1		
CIT: J2EE Application	ETI: EJB Performance	Value: Low
Symptom 2		
CIT: J2EE Server	ETI: EJB Performance	Value: Low

J2EE::J2EE Server:DataSource Connection Waiters >> DataSource Connection Pool Availability

Description: J2EE Server DataSource Connection Waiters Impacts DataSource Connection Pool Availability		
Cause		
CIT: J2EE Server	ETI: Data Source Connection Waiters	Value: High
Symptom 1		
CIT: J2EE Server	ETI: Data Source Connection Pool Availability	Value: Low
Symptom 2		
CIT: JDBC Data Source	ETI: Data Source Connection Pool Availability	Value: Low

**J2EE::J2EE Server:DataSource ConnectionPool Utilization >>
Transaction Capacity Utilization & JDBC Connection Pool Wait Count &
Transaction Time & Transaction Commit Rate & Transaction Start Rate
& DataSource Connection Pool Availability**

Description: J2EE Server DataSource ConnectionPool Utilization Impacts Transaction Capacity Utilization and JDBC Connection Pool Wait Count and Transaction Time and Transaction Commit Rate and Transaction Start Rate and DataSource Connection Pool Availability		
Cause		
CIT: J2EE Server	ETI: Data Source Connection Pool Utilization	Value: High
Symptom 1		
CIT: J2EE Server	ETI: Data Source Connection Pool Availability	Value: Low
Symptom 2		
CIT: J2EE Server	ETI: JDBC Connection Pool Wait Count	Value: High
Symptom 3		
CIT: J2EE Server	ETI: Transaction Capacity Utilization	Value: High
Symptom 4		
CIT: J2EE Server	ETI: Transaction Commit Rate	Value: High
Symptom 5		
CIT: J2EE Server	ETI: Transaction Start Date	Value: High
Symptom 6		
CIT: J2EE Server	ETI: Transaction Time	Value: High
Symptom 7		
CIT: JDBC Data Source	ETI: Data Source Connection Pool Availability	Value: Low

Description: J2EE Server DataSource ConnectionPool Utilization Impacts Transaction Capacity Utilization and JDBC Connection Pool Wait Count and Transaction Time and Transaction Commit Rate and Transaction Start Rate and DataSource Connection Pool Availability		
Symptom 8		
CIT: JDBC Data Source	ETI: JDBC Connection Pool Wait Count	Value: High

J2EE::J2EE Server:EJB Concurrent Lives >> EJB Utilization

Description: EJB Concurrent Lives Impacts EJB Utilization		
Cause		
CIT: J2EE Server	ETI: EJB Concurrent Lives	Value: High
Symptom 1		
CIT: J2EE Application	ETI: EJB Utilization	Value: High
Symptom 2		
CIT: J2EE Server	ETI: EJB Utilization	Value: High

J2EE::J2EE Server:EJB Free Pool Wait Rate >> Servlet Performance

Description: EJB Free Pool Wait Rate Impacts Servlet Performance		
Cause		
CIT: J2EE Server	ETI: EJB Free Pool Wait Rate	Value: High
Symptom 1		
CIT: J2EE Application	ETI: Servlet Performance	Value: Low
Symptom 2		
CIT: J2EE Server	ETI: Servlet Performance	Value: Low

J2EE::J2EE Server:EJB Performance >> EJB Free Pool Wait Rate & EJB Missed Count Rate & Servlet Performance

Description: EJB Performance Impacts EJB Free Pool Wait Rate and EJB Missed Count Rate and Servlet Performance		
Cause		
CIT: J2EE Server	ETI: EJB Performance	Value: Low
Symptom 1		
CIT: J2EE Application	ETI: EJB Free Pool Wait Rate	Value: High
Symptom 2		
CIT: J2EE Application	ETI: EJB Missed Count Rate	Value: High
Symptom 3		
CIT: J2EE Application	ETI: Servlet Performance	Value: Low
Symptom 4		
CIT: J2EE Server	ETI: EJB Free Pool Wait Rate	Value: High
Symptom 5		
CIT: J2EE Server	ETI: EJB Missed Count Rate	Value: High
Symptom 6		
CIT: J2EE Server	ETI: Servlet Performance	Value: Low

J2EE::J2EE Server:EJB Timeout Rate >> Servlet Performance & EJB Transaction Throughput Rate & EJB Transaction Rollback Rate

Description: EJB Timeout Rate Impacts Servlet Performance and EJB Transaction Throughput Rate and EJB Transaction Rollback Rate		
Cause		
CIT: J2EE Server	ETI: EJB Timeout Rate	Value: High
Symptom 1		
CIT: J2EE Application	ETI: EJB Transaction Rollback Rate	Value: High

Description: EJB Timeout Rate Impacts Servlet Performance and EJB Transaction Throughput Rate and EJB Transaction Rollback Rate		
Symptom 2		
CIT: J2EE Application	ETI: EJB Transaction Throughput Rate	Value: High
Symptom 3		
CIT: J2EE Application	ETI: EJB Transaction Rollback Rate	Value: High
Symptom 4		
CIT: J2EE Server	ETI: Servlet Performance	Value: Low

J2EE::J2EE Server:EJB Utilization >> DataSource Connection Waiters & DataSource Connection Pool Utilization

Description: EJB Utilization Impacts DataSource Connection Waiters and DataSource Connection Pool Utilization		
Cause		
CIT: J2EE Server	ETI: EJB Utilization	Value: High
Symptom 1		
CIT: J2EE Server	ETI: DataSource Connection Pool Utilization	Value: High
Symptom 2		
CIT: J2EE Server	ETI: DataSource Connection Waiters	Value: High
Symptom 3		
CIT: JDBC Data Source	ETI: DataSource Connection Waiters	Value: High
Symptom 4		
CIT: JDBC Data Source	ETI: DataSource Connection Pool Utilization	Value: High

J2EE::J2EE Server:HTTP Sessions >> JVM Memory Utilization

Description: J2EE Server HTTP Sessions Impacts JVM Memory Utilization		
Cause		
CIT: J2EE Server	ETI: HTTP Sessions	Value: High
Symptom 1		
CIT: J2EE Server	ETI: JVM Memory Utilization	Value: High
Symptom 2		
CIT: JVM	ETI: JVM Memory Utilization	Value: High

J2EE::J2EE Server:JVM Memory Utilization >> Real User Transaction Performance & Real User Sessions Performance

Description: J2EE Server Memory Utilization Impacts Real User Transaction Performance and Real User Sessions Performance		
Cause		
CIT: J2EE Server	ETI: JVM Memory Utilization	Value: High
Symptom 1		
CIT: Business Application	ETI: Real User Sessions Performance	Value: Critical
Symptom 2		
CIT: Business Application	ETI: Real User Transaction Performance event	Value: Critical
Symptom 3		
CIT: J2EE Application	ETI: EJB Transaction Rollback Rate	Value: High
Symptom 4		
CIT: J2EE Server	ETI: Servlet Performance	Value: Low

J2EE::J2EE Server:JVM Memory Utilization >> Synthetic User Transaction Performance

Description: J2EE Server Memory Utilization Impacts Synthetic User Transaction Performance		
Cause		
CIT: J2EE Server	ETI: JVM Memory Utilization	Value: High
Symptom 1		
CIT: Business Application	ETI: Synthetic User Transaction Performance event	Value: Critical

J2EE::J2EE Server:JVM Memory Utilization >> Transaction Time & Transaction System Errors & Servlet Performance

Description: J2EE Server JVMMemoryUtilization Impacts Transaction Time and Transaction System Errors and Servlet Performance		
Cause		
CIT: J2EE Server	ETI: JVM Memory Utilization	Value: High
Symptom 1		
CIT: J2EE Application	ETI: Servlet Performance	Value: Low
Symptom 2		
CIT: J2EE Server	ETI: Servlet Performance	Value: Low
Symptom 3		
CIT: J2EE Server	ETI: Transaction System Errors	Value: High
Symptom 4		
CIT: J2EE Server	ETI: Transaction Time	Value: High

J2EE::J2EE Server:Server Sessions >> JVM Memory Utilization

Description: J2EE Cluster Status Impacts Real User Transaction Availability and Synthetic User Transaction Availability and Real User Sessions Availability		
Cause		
CIT: J2EE Server	ETI: Server Sessions	Value: High
Symptom 1		
CIT: J2EE Server	ETI: JVM Memory Utilization	Value: High
Symptom 2		
CIT: JVM	ETI: JVM Memory Utilization	Value: High

J2EE::J2EE Server:Server Status >> Domain Status & Cluster Health & Cluster Status

Description: J2EE Server Status Impacts Domain Status and Cluster Health and Cluster Status		
Cause		
CIT: J2EE Server	ETI: Server Status	Value: Unavailable
Symptom 1		
CIT: J2EE Cluster	ETI: Cluster Health	Value: Poor
Symptom 2		
CIT: J2EE Cluster	ETI: Cluster Status	Value: Partial Stop
Symptom 3		
CIT: J2EE Cluster	ETI: Cluster Status	Value: Stopped

J2EE::J2EE Server:Server Status >> Real User Transaction Availability & Real User Sessions Availability

Description: J2EE Server Status Impacts Real User Transaction Availability and Real User Sessions Availability		
Cause		
CIT: J2EE Server	ETI: Server Status	Value: Unavailable
Symptom 1		
CIT: Business Application	ETI: Real User Sessions Availability	Value: Critical
Symptom 2		
CIT: Business Application	ETI: Real User Transaction Availability event	Value: Critical

J2EE::J2EE Server:Server Status >> Synthetic User Transaction Availability

Description: J2EE Server Status Impacts Synthetic User Transaction Availability		
Cause		
CIT: J2EE Server	ETI: Server Status	Value: Unavailable
Symptom 1		
CIT: Business Application	ETI: Synthetic User Transaction Availability event	Value: Critical

J2EE::J2EE Server:Servlet Requests >> Real User Transaction Performance & Real User Sessions Performance

Description: J2EE Server Servlet Requests Impacts Real User Transaction Performance and Real User Sessions Performance		
Cause		
CIT: J2EE Server	ETI: Servlet Requests	Value: High
Symptom 1		
CIT: Business Application	ETI: Real User Sessions Performance	Value: Critical
Symptom 2		
CIT: Business Application	ETI: Real User Transaction Performance event	Value: Critical

J2EE::J2EE Server:Servlet Requests >> Synthetic User Transaction Performance

Description: J2EE Server Servlet Requests Impacts Synthetic User Transaction Performance		
Cause		
CIT: J2EE Server	ETI: Servlet Requests	Value: High
Symptom 1		
CIT: Business Application	ETI: Synthetic User Transaction Performance event	Value: Critical

J2EE::J2EE Server:Servlet Requests >> Thread Pool Utilization & Active Sockets Count & JVM Memory Utilization & HTTP Sessions & Thread Requests Pending & Servlets Loaded & Interface Discard Rate & Interface Utilization

Description: J2EE Server Servlet Requests Impacts Thread Pool Utilization and Active Sockets Count and JVM Memory Utilization and HTTP Sessions and Thread Requests Pending and Servlets Loaded and Interface Discard Rate and Interface Utilization		
Cause		
CIT: J2EE Server	ETI: Servlet Requests	Value: High
Symptom 1		
CIT: Interface	ETI: Interface Discard Rate	Value: High
Symptom 2		
CIT: Interface	ETI: Interface Utilization	Value: Higher Than Normal
Symptom 3		
CIT: J2EE Server	ETI: Active Sockets Count	Value: High
Symptom 4		
CIT: J2EE Server	ETI: Active Sockets Count	Value: High

Description: J2EE Server Servlet Requests Impacts Thread Pool Utilization and Active Sockets Count and JVM Memory Utilization and HTTP Sessions and Thread Requests Pending and Servlets Loaded and Interface Discard Rate and Interface Utilization		
Symptom 5		
CIT: J2EE Server	ETI: JVM Memory Utilization	Value: High
Symptom 6		
CIT: J2EE Server	ETI: Servlets Loaded	Value: High
Symptom 7		
CIT: J2EE Server	ETI: Thread Pool Utilization	Value: High
Symptom 8		
CIT: J2EE Server	ETI: Thread Requests Pending	Value: High
Symptom 9		
CIT: JVM	ETI: JVM Memory Utilization	Value: High

J2EE::J2EE Server:Servlets Loaded >> JVM Memory Utilization

Description: J2EE Server Status Impacts Real User Transaction Availability and Synthetic User Transaction Availability and Real User Sessions Availability		
Cause		
CIT: J2EE Server	ETI: Servlets Loaded	Value: High
Symptom 1		
CIT: J2EE Server	ETI: JVM Memory Utilization	Value: High
Symptom 1		
CIT: JVM	ETI: JVM Memory Utilization	Value: High

J2EE::J2EE Server:ThreadPoolUtilization >> ExecuteQueueWaitCount & ActiveSocketsCount & ServletPerformance & DeferredThreadRequests & ThreadRequestWaitTime & ThreadRequestsPending & ThreadRequestServiceTime & ThreadPoolAvailability & JVMMemoryUtilization

Description: J2EE Server Thread Pool Utilization Impacts Execute Queue Wait Count and Active Sockets Count and Servlet Performance and Deferred Thread Requests and Thread Request Wait Time and Thread Requests Pending and Thread Request Service Time and Thread Pool Availability and JVM Memory Utilization		
Cause		
CIT: J2EE Server	ETI: Thread Pool Utilization	Value: High
Symptom 1		
CIT: J2EE Application	ETI: Servlet Performance	Value: Low
Symptom 2		
CIT: J2EE Server	ETI: Active Sockets Count	Value: High
Symptom 3		
CIT: J2EE Server	ETI: Deferred Thread Requests	Value: High
Symptom 4		
CIT: J2EE Server	ETI: Execute Queue Wait Count	Value: High
Symptom 5		
CIT: J2EE Server	ETI: JVM Memory Utilization	Value: High
Symptom 6		
CIT: J2EE Server	ETI: Servlet Performance	Value: Low
Symptom 7		
CIT: J2EE Server	ETI: Thread Pool Availability	Value: Low
Symptom 8		
CIT: J2EE Server	ETI: Thread Request Service Time	Value: High
Symptom 9		
CIT: J2EE Server	ETI: Thread Request Wait Time	Value: High

Description: J2EE Server Thread Pool Utilization Impacts Execute Queue Wait Count and Active Sockets Count and Servlet Performance and Deferred Thread Requests and Thread Request Wait Time and Thread Requests Pending and Thread Request Service Time and Thread Pool Availability and JVM Memory Utilization		
Symptom 10		
CIT: J2EE Server	ETI: Thread Requests Pending	Value: High
Symptom 11		
CIT: JVM	ETI: JVM Memory Utilization	Value: High

J2EE::J2EE Server:Total Garbage Collection Count >> CPU Load

Description: J2EE Server Total Garbage Collection Count Impacts CPU Load		
Cause		
CIT: J2EE Server	ETI: Total Garbage Collection Count	Value: High
Symptom 1		
CIT: Computer	ETI: CPU Load	Value: Overloaded

J2EE::J2EE Server:Total Garbage Collection Time >> CPU Load

Description: J2EE Server Total Garbage Collection Time Impacts CPU Load		
Cause		
CIT: J2EE Server	ETI: Total Garbage Collection Time	Value: High
Symptom 1		
CIT: Computer	ETI: CPU Load	Value: Overloaded

J2EE::J2EE Server:Total Number of Threads >> CPU Load & Memory Usage Level

Description: J2EE Server Total Number Of Threads Impacts CPU Load and Memory Usage Level		
Cause		
CIT: J2EE Server	ETI: Total Number Of Threads	Value: High
Symptom 1		
CIT: Computer	ETI: CPU Load	Value: Overloaded
Symptom 2		
CIT: Computer	ETI: Memory Usage Level	Value: Higher Than Normal
Symptom 3		
CIT: Computer	ETI: Memory Usage Level	Value: Much Higher Than Normal

J2EE::J2EE Server:Transaction Application Errors >> Transactions Rolled Back

Description: J2EE Server Transaction Application Errors Impacts Transactions Rolled Back		
Cause		
CIT: J2EE Server	ETI: Transaction Application Errors	Value: High
Symptom 1		
CIT: J2EE Server	ETI: Transactions Rolled Back	Value: High

J2EE::J2EE Server:Transaction Resource Errors >> Transactions Rolled Back

Description: J2EE Server Transaction Resource Errors Impacts Transactions Rolled Back		
Cause		
CIT: J2EE Server	ETI: Transaction Resource Errors	Value: High
Symptom 1		
CIT: J2EE Server	ETI: Transactions Rolled Back	Value: High

J2EE::J2EE Server:Transaction System Errors >> Transactions Rolled Back

Description: J2EE Server Transaction System Errors Impacts Transactions Rolled Back		
Cause		
CIT: J2EE Server	ETI: Transaction System Errors	Value: High
Symptom 1		
CIT: J2EE Server	ETI: Transactions Rolled Back	Value: High

J2EE::J2EE Server:Transaction Time >> JDBC Connection Pool Wait Count

Description: J2EE Server Transaction System Errors Impacts Transactions Rolled Back		
Cause		
CIT: J2EE Server	ETI: Transaction Time	Value: High
Symptom 1		
CIT: J2EE Server	ETI: JDBC Connection Pool Wait Count	Value: High
Symptom 2		
CIT: JDBC Data Source	ETI: JDBC Connection Pool Wait Count	Value: High

J2EE::J2EE Server:Transaction Timeout Errors >> Transactions Rolled Back

Description: J2EE Server Transaction Timeout Errors Impacts Transactions Rolled Back		
Cause		
CIT: J2EE Server	ETI: Transaction Timeout Errors	Value: High
Symptom 1		
CIT: J2EE Server	ETI: Transactions Rolled Back	Value: High

J2EE::JDBC Data Source:DataSource Connection Pool Availability >> EJBPerformance & Transaction Timeout Rate & Transaction Commit Rate

Description: JDBC DataSource Connection Pool Availability Impacts EJBPerformance and Transaction Timeout Rate and Transaction Commit Rate		
Cause		
CIT: JDBC Data Source	ETI: Data Source Connection Pool Availability	Value: Low
Symptom 1		
CIT: J2EE Application	ETI: EJB Performance	Value: Low
Symptom 2		
CIT: J2EE Server	ETI: EJB Performance	Value: Low
Symptom 3		
CIT: J2EE Server	ETI: Transaction Commit Rate	Value: High
Symptom 4		
CIT: J2EE Server	ETI: Transaction Timeout Rate	Value: High

J2EE::JDBC Data Source:DataSource Connection Pool Performance >> EJB Performance

Description: JDBC DataSource Connection Pool Performance Impacts EJB Performance		
Cause		
CIT: JDBC Data Source	ETI: Data Source Connection Pool Performance	Value: Low
Symptom 1		
CIT: J2EE Application	ETI: EJB Performance	Value: Low
Symptom 2		
CIT: J2EE Server	ETI: EJB Performance	Value: Low

J2EE::JDBC Data Source:DataSource Connection Waiters >> DataSource Connection Pool Availability

Description: JDBC DataSource Connection Waiters Impacts DataSource Connection Pool Availability		
Cause		
CIT: JDBC Data Source	ETI: Data Source Connection Waiters	Value: High
Symptom 1		
CIT: J2EE Server	ETI: Data Source Connection Pool Availability	Value: Low
Symptom 2		
CIT: JDBC Data Source	ETI: Data Source Connection Pool Availability	Value: Low

J2EE::JDBC Data Source:DataSource ConnectionPool Utilization >> Transaction Capacity Utilization & JDBC Connection Pool Wait Count & Transaction Time & Transaction Commit Rate & Transaction Start Rate & DataSource Connection Pool Availability

Description: JDBC DataSource ConnectionPool Utilization Impacts Transaction Capacity Utilization and JDBC Connection Pool Wait Count and Transaction Time and Transaction Commit Rate and Transaction Start Rate and DataSource Connection Pool Availability		
Cause		
CIT: JDBC Data Source	ETI: Data Source Connection Pool Utilization	Value: High
Symptom 1		
CIT: J2EE Server	ETI: Data Source Connection Pool Availability	Value: Low
Symptom 2		
CIT: J2EE Server	ETI: JDBC Connection Pool Wait Count	Value: High
Symptom 3		
CIT: J2EE Server	ETI: Transaction Capacity Utilization	Value: High
Symptom 4		
CIT: J2EE Server	ETI: Transaction Commit Rate	Value: High
Symptom 5		
CIT: J2EE Server	ETI: Transaction Start Rate	Value: High
Symptom 6		
CIT: J2EE Server	ETI: Transaction Time	Value: High
Symptom 7		
CIT: JDBC Data Source	ETI: DataSource Connection Pool Availability	Value: Low

Description: JDBC DataSource ConnectionPool Utilization Impacts Transaction Capacity Utilization and JDBC Connection Pool Wait Count and Transaction Time and Transaction Commit Rate and Transaction Start Rate and DataSource Connection Pool Availability		
Symptom 8		
CIT: JDBC Data Source	ETI: JDBC Connection Pool Wait Count	Value: High

J2EE::JDBC Data Source:DataSource Leaked Connections Rate >> DataSource ConnectionPool Utilization

Description: JDBC DataSource Leaked Connections Rate Impacts DataSource ConnectionPool Utilization		
Cause		
CIT: JDBC Data Source	ETI: DataSource Leaked Connections Rate	Value: High
Symptom 1		
CIT: J2EE Server	ETI: DataSource ConnectionPool Utilization	Value: High
Symptom 2		
CIT: JDBC Data Source	ETI: DataSource ConnectionPool Utilization	Value: High

J2EE::JVM:All Processors Average Load >> CPU Load

Description: JVM All Processors Average Load Impacts CPU Load		
Cause		
CIT: JVM	ETI: All Processors Average Load	Value: High
Symptom 1		
CIT: Computer	ETI: CPU Load	Value: Overloaded

J2EE::JVM:JVM Memory Utilization >> Real User Transaction Performance & Real User Sessions Performance

Description: JVM Memory Utilization Impacts Real User Transaction Performance and Synthetic User Transaction Performance and Real User Sessions Performance		
Cause		
CIT: JVM	ETI: JVM Memory Utilization	Value: High
Symptom 1		
CIT: Business Application	ETI: Real User Sessions Performance	Value: Critical
Symptom 2		
CIT: Business Application	ETI: Real User Transaction Performance event	Value: Critical

J2EE::JVM:JVM Memory Utilization >> Synthetic User Transaction Performance

Description: JVM Memory Utilization Impacts Synthetic User Transaction Performance		
Cause		
CIT: JVM	ETI: JVM Memory Utilization	Value: High
Symptom 1		
CIT: Business Application	ETI: Synthetic User Transaction Performance event	Value: Critical

J2EE::JVM:JVM Memory Utilization >> Transaction Time & Transaction System Errors & Servlet Performance

Description: JVMMemoryUtilization Impacts Transaction Time and Transaction System Errors and Servlet Performance		
Cause		
CIT: JVM	ETI: JVM Memory Utilization	Value: High

Description: JVMMemoryUtilization Impacts Transaction Time and Transaction System Errors and Servlet Performance		
Symptom 1		
CIT: J2EE Application	ETI: Servlet Performance	Value: Low
Symptom 2		
CIT: J2EE Server	ETI: Servlet Performance	Value: Low
Symptom 2		
CIT: J2EE Server	ETI: Transaction System Errors	Value: High
Symptom 3		
CIT: J2EE Server	ETI: Transaction Time	Value: High

J2EE::JVM:Total Garbage Collection Count >> CPU Load

Description: JVM Total Garbage Collection Count Impacts CPU Load		
Cause		
CIT: JVM	ETI: Total Garbage Collection Count	Value: High
Symptom 1		
CIT: Computer	ETI: CPU Load	Value: Overloaded

J2EE::JVM:Total Garbage Collection Time >> CPU Load

Description: JVM Total Garbage Collection Time Impacts CPU Load		
Cause		
CIT: JVM	ETI: Total Garbage Collection Time	Value: High
Symptom 1		
CIT: Computer	ETI: CPU Load	Value: Overloaded

J2EE::JVM:Total Number Of Threads >> CPU Load & Memory Usage Level

Description: JVM Total Number Of Threads Impacts CPU Load and Memory Usage Level		
Cause		
CIT: JVM	ETI: Total Number Of Threads	Value: High
Symptom 1		
CIT: Computer	ETI: CPU Load	Value: Constrained
Symptom 2		
CIT: Computer	ETI: Memory Usage Level	Value: Higher Than Normal

J2EE::Network Interface:Interface Communication Status >> Server Status

Description: Network Interface Communication Status Impacts Server Status		
Cause		
CIT: Interface	ETI: Interface Communication Status	Value: Unavailable
Symptom		
CIT: J2EE Server	ETI: Server Status	Value: Unavailable

J2EE::Network Interface:Interface Utilization >> Real User Transaction Performance & Real User Sessions Performance

Description: Network Interface Utilization Impacts Real User Transaction Performance and Real User Sessions Performance		
Cause		
CIT: Interface	ETI: Interface Utilization	Value: Higher Than Normal

Description: Network Interface Utilization Impacts Real User Transaction Performance and Real User Sessions Performance		
Symptom 1		
CIT: Business Application	ETI: Real User Sessions Performance	Value: Critical
Symptom 2		
CIT: Business Transaction	ETI: Real User Transaction Performance event	Value: Critical

J2EE::Network Interface:Interface Utilization >> Servlet Performance

Description: Network Interface Utilization Impacts Servlet Performance		
Cause		
CIT: Interface	ETI: Interface Utilization	Value: Higher Than Normal
Symptom 1		
CIT: J2EE Application	ETI: Servlet Performance	Value: Low
Symptom 2		
CIT: J2EE Server	ETI: Servlet Performance	Value: Low

J2EE::Network Interface:Interface Utilization >> Synthetic User Transaction Performance

Description: Network Interface Utilization Impacts Synthetic User Transaction Performance		
Cause		
CIT: Interface	ETI: Interface Utilization	Value: Higher Than Normal
Symptom 1		
CIT: Business Application	ETI: Synthetic User Transaction Performance	Value: Critical

HI Assignment

The following table lists the HI assignments for J2EE Content Pack.

HI Mapping	HI Assignment
J2EE Application	J2EE Application Mapping for HIs assignment
	J2EE Application Mapping for HIs assignment with empty monitor
J2EE Cluster	J2EE Cluster for HIs assignment
	J2EE Cluster for HIs assignment with empty monitor
J2EE Domain	J2EE Domain Mapping for HIs assignment
	J2EE Domain Mapping for HIs assignment with empty monitor
J2EE Server	J2EE Server Mapping for HIs assignment
	J2EE Server Mapping for HIs assignment with empty monitor
JDBC Data Source	JDBC Data Source Mapping for HIs assignment
	JDBC Data Source Mapping for HIs assignment with empty monitor
JVM	JVM Mapping for HIs assignment
	JVM Mapping for HIs assignment with empty monitor

KPI Assignment

The following table lists the KPI assignments for J2EE Content Pack.

CI Type	KPI Assignment
J2EE Application	J2EE Application Mapping for Service Health
	J2EE Application Mapping for SLM
J2EE Cluster	J2EE Cluster Mapping for Service Health
	J2EE Cluster Mapping for SLM
J2EE Domain	J2EE Domain Mapping for Service Health
	J2EE Domain Mapping for SLM
J2EE Server	J2EE Server Mapping for Service Health
	J2EE Server Mapping for SLM
JDBC Data Source	JDBC Data Source Mapping for Service Health
	JDBC Data Source Mapping for SLM
JVM	JVM Mapping for Service Health
	JVM Mapping for SLM

Dependent Content Packs

The J2EE Content Pack is dependent on the following Content Packs:

- HPOprInf
- HPOprOra
- HPOprMss
- EUM_BPM
- EUM_RUM
- OOTB KPIs

The J2EE Content Pack depends on EUM Content Pack for its deployment. You must deploy the EUM Content Pack in CREATE mode.

Referenced Content from other Content Packs

Indicator	CI Type	Dependent Content Pack	Content Pack Version
Real User Transaction Availability event	Business Application	EUM_RUM	1.00
Real User Transaction Performance event	Business Application	EUM_RUM	1.00
Synthetic User Transaction Availability event	Business Application	EUM_BPM	1.00
Synthetic User Transaction Performance event	Business Application	EUM_BPM	1.00
CPU Load	Computer	HPOprInf	9.10
Memory Usage Level	Computer	HPOprInf	9.10
Disk Usage Level	FileSystem	HPOprInf	9.10
Interface Communication Status	Interface	HPOprInf	9.10
Interface Discard Rate	Interface	HPOprInf	9.10
Interface Utilization	Interface	HPOprInf	9.10

Indicator	CI Type	Dependent Content Pack	Content Pack Version
CPU Usage by SQL	Database	HPOprOra	9.10
Database Server Status	Database	HPOprMss	9.10
SQL Query Performance	Database	HPOprMss	9.10

KPI	Dependent Content Pack	Content Pack Version
Software Availability (Service Health)	OOTB KPIs	1.00
Software Availability (SLM)	OOTB KPIs	1.00
Software Performance (Service Health)	OOTB KPIs	1.00
Software Performance (SLM)	OOTB KPIs	1.00

Tool Definitions

The content pack contains the following tools mapped to various CI types and Tool Category.

CI Type	Tool	Tool Category
J2EE Server	J2EE Standards, starts a web browser and connects to the J2EE Management Specifications site.	J2EE Information Tools
Weblogic AS	Get Invalid Login Attempts Count	J2EE Admin Tools
	Number of Socket Connections Opened	J2EE Operational Tools
	Percentage of Heap Space Used	J2EE Operational Tools
	View Application Activation Status	J2EE Operational Tools
	View Weblogic Domain Contents	J2EE Operational Tools
	View Weblogic Server Application Timeout	J2EE Operational Tools
	View Weblogic Server Status	J2EE Admin Tools
Websphere AS	Number of Sessions Currently Accessed	J2EE Operational Tools
	Percentage of Heap Space Used	J2EE Operational Tools
	Percentage of Time Thread Pool Used is Maximum.	J2EE Operational Tools
	View Collection Status, displays the collection status for the servers.	J2EE Admin Tools

Graph Templates for SPI for WebSphere Server

The content pack contains the SPI for WebSphere graph family mapped to the WebSphere CI type.

The following table lists the graph templates present in the SPI for WebSphere graph family and the mapped policies.

Graph Templates	Metric Name	Metric Description
ThreadPool	I013_THREADPOOLPCTMAX	Percentage of time the number of threads in pool reached the configured maximum size.
	I014_THRDPOOLCRTRT	Number of threads created per minute (used only for graphing).
	I812_THRDPOOLHUNGRT	Number of threads hung per minute.
	I813_CCRTHDPLHNGCT	Number of concurrent hung threads.
EJB Pool	I020_EJBPOOLUTIL	Percentage of beans in the pool.
	I025_EJBPOOLMISSPCT	Average percentage of time a call to retrieve an EJB from the pool failed.
EJB Activity	I022_EJBMETHCALLSRT	Number of EJB method calls per minute.
	I024_EJBENTDATAALDSTRT	Number of times an EJB was written to or loaded from the database per minute.
	I810_MSGBACKOUTRATE	Message backout rate.
	I811_RETURNDISCRDRT	Returns discard rate.
EJB Pool Size	I026_EJBCONCLIVES	Average percentage of bean objects in the pool.

Graph Templates	Metric Name	Metric Description
Servlet Session Activity	I040_SERVSESSAVERAGELIFE	Average lifetime for a servlet session.
	I041_SERVSESSACTSESS	Active servlet sessions.
Servlet Session Invalidations	I042_SERVINVSESSRT	Servlet invalidated session rate.
	I045_WEBAPPSERVREQRT	Number of request for a servlet per second
	I047_WEBAPPSERVERRRRT	Number of errors in a servlet per second.
Web Application	I048_WEBAPPSERVLOAD	Web application servlet load
	I049_WEBAPPSERVRELRT	Number of servlets reloaded for a web application per minute.
JDBC Pool Waits	I061_JDBCCONPOOLWAIT	Average percentage of threads waiting for a connection from connection pools.
	I062_JDBCCONPOOLWTTIM	Average time that a client waited for a connection in msec.
JDBC Pool Performance	I065_JDBCCONPOOLTIMRT	Number of times a client timed out waiting for a connection from the pool per minute.
	I066_JDBCCONPOOLTHRU	Number of connections allocated and returned by applications per second.
JDBC SQL Statistics	I814_PRDSTCCHDSRDRT	Prepared statement discard rate.

Graph Templates	Metric Name	Metric Description
Transaction Duration Times	I070_TRANGLOBDUR	Transaction global duration
	I071_TRANLOCDUR	Transaction local duration
	I072_TRANGLOBCOMMDUR	Transaction global commit duration
	I073_TRANLOCCOMMDUR	Transaction local commit duration
Transaction Activity	I074_TRANROLLBACKRT	Transaction rollback rate
	I075_TRANTIMEOUTRT	Transaction timeout rate
	I076_TRANCOMMITRT	Transaction commit rate
	I077_TRANTHRUPUT	Number of global and local transactions that were completed per second.
	I078_TRANSTARTRT	Transaction start rate
JVM Utilization	I005_JVMMEMUTILPCT	JVM memory utilization percent
	I807_JVMMEMFREEPCT	JVM memory free percent
	I808_JVMCPUUSAGEPCT	JVM memory CPU usage percent
	I809_GCINTERVALTIME	Garbage collection value

Graph Templates for SPI for WebLogic Server

The following table lists the graph templates present in the SPI for WebLogic graph family and the mapped policies.

Graph Templates	Metric Name	Metric Description
Transaction Performance	B070_TRANAVETIME	Transaction average time
	B076_TRANTHRURATE	Number of transactions processed per second.
	B077_TRANHEURCNT	Transaction heuristic count
	B079_TRANCAPUTIL	Transaction capacity utilization
JDBC Pool Waits	B061_JDBCCONPLWTCNT	JDBC connection pool wait count
	B063_JDBCCONLKRTSUM	Number of connections which are not closed.
ThreadPool	B010_EXQUETHRURATE	Requests services by execute queue
	B011_EXQTHRUTILPCT	Execute queue thread utilization percent
	B012_EXQUEWAITCNT	Execute queue wait count
	B283_DEFERREDREQSCNT	Number of deferred requests
	B284_REQWAITTIMTHRD	Thread request wait time
	B285_PENDINGREQCOUNT	Number of pending request
	B286_PENDINGREQPCT	Percentage of requests pending
	B287_REQMAXWAITTIME	Maximum time a request had to wait for a thread.
	B288_STANDBYTHRDCNT	Number of threads in a standby pool

Graph Templates	Metric Name	Metric Description
EJB Performance	B025_EJBPOOLWTRTSUM	Aggregate EJB free pool wait rate
	B026_EJBTIMEOUTRTSUM	EJB timeout rate
	B035_EJBTRANTHRURT	EJB transaction throughput rate
	B036_EJBTRANRBRT	EJB transaction rollback rate
EJB Pool Statistics	B822_DSTROYDTLCNT	Destroyed total count
	B823_EJBMSSDCNTRTSUM	Aggregate miss total count rate
Cluster	B080_CLSOUTMESFAILRT	Cluster Outgoing Message Failure Rate
	B081_CLSINMESFAILRT	Cluster Incoming Message Failure Rate
Server Statistics	B013_SOCKETTRAFFICRT	Socket Traffic Rate
	B014_ACTIVESOCKETCNT	Active Socket Count
	B015_SVRRESTARTSPCT	Server Restarts Percentage
	B078_CNCTRLEAKRTSUM	Connector Connections Pool Leakage
JVM Utilization	B005_JVMEMUTILPCT	JVM Memory Utilization Percent
JVM Free Memory	B819_JVMHEAPFREEMEM	JVM Heap Free Memory
Transaction Rollback Analysis	B072_TRANRESERRRPCT	Transaction Resource Error Rollback Percent
	B073_TRANAPPERRRPCT	Transaction Application Error Rollback Percent
	B074_TRANTIMERRRPCT	Transaction Time Error Rollback Percent
	B075_TRANSYSERRRPCT	Transaction System Error Rollback Percent

Graph Templates	Metric Name	Metric Description
Transaction Rollback Percent	B071_TRANROLLBACKPCT	Transaction Rollback Percent
Security	B085_INVLOGINATTCNT	Invalid Login Attempts Count

Policies Setting ETIs

The following table lists the content pack ETIs and SPI policies that set the ETIs.

ETI/Hi	Policy Name	Policy Description
Server Status	WLSSPI_0001	The server status in terms of availability.
	WBSSPI_0001	
Thread Pool Utilization	WLSSPI_0011	The number of threads used in the server to execute tasks.
	WLSSPI_0016	
Active Sockets Count	WLSSPI_0014	The number of HTTP socket connection opened to the server.
Server Sessions	WBSSPI_0041	The number of sessions opened to the server.
Servlets Loaded	WBSSPI_0048	The number of servlets currently loaded for a web application.
Thread Pool Availability	WLSSPI_0288	The availability of threads in the thread pool.
Thread Pool Utilization	WBSSPI_0212	The number of threads used in the server to execute the tasks.
Thread Hung Rate	WBSSPI_0812	The rate at which the threads are declared hung.
Transaction Time	WLSSPI_0070	Time taken to complete a transaction.

ETI/HI	Policy Name	Policy Description
Transactions Rolled Back	WLSSPI_0071	Number/Percentage of transactions rolled back due to system, resource or other errors.
Transactions Rolled Back Rate	WBSSPI_0074	Number/Percentage of transactions rolled back due to system, resource or other errors.
Transaction Timeout Rate	WBSSPI_0075	The number of transactions that timed out per second.
Transaction Commit Rate	WBSSPI_0076	The number of transactions that were committed per second.
Transaction Start Date	WBSSPI_0078	The number of transactions that were begun per second.
Transaction Capacity Utilization	WLSSPI_0079	The number of simultaneous in progress transactions.
JMS Server Utilization	WLSSPI_0251	The JMS server queue utilization.
	WLSSPI_0252	
Execute Queue Wait Count	WLSSPI_0012	The number of client requests waiting to be serviced by the execute queue.
Transaction Resource Errors	WLSSPI_0072	Transaction errors caused due to system resource errors.
Transaction Application Errors	WLSSPI_0073	Transaction errors caused due to application errors.
Transaction Timeout Errors	WLSSPI_0074	Transaction errors caused due to timeout errors.
Transaction System Errors	WLSSPI_0075	Transaction errors caused due to system errors.
Deferred Thread Requests	WLSSPI_0283	Number of threads that were denied a thread for execution because of the maximum thread constraint.

ETI/HI	Policy Name	Policy Description
Thread Request Wait Time	WLSSPI_0284	The time a request had to wait for a thread.
Threads Request Pending	WLSSPI_0286	The requests that are pending because of available threads.
Thread Request Service Time	WLSSPI_0287	The time a request had to wait for a thread.
JVM Memory Utilization	WLSSPI_0005	The percentage of heap size used.
	WBSSPI_0005	
Total Garbage Collection Count	WLSSPI_0006	The number of times garbage collector has run.
	WBSSPI_0804	
Total Garbage Collection Time	WLSSPI_0007	Total time taken for garbage collection.
	WBSSPI_0805	
Total Number of Threads	WLSSPI_0008	Total number of threads spawned for garbage collection.
	WBSSPI_0803	
All Processors Average Load	WLSSPI_0009	Average load on all the processors on the system.
	WBSSPI_0801	
Cluster Outgoing Message Failure Rate	WLSSPI_0080	The number of multicast messages to the cluster that were resent.
Cluster Incoming Message Failure Rate	WLSSPI_0081	The number of multicast messages from the cluster that were lost.
Cluster Health	WLSSPI_0082	Cluster Health in terms of performance.
Cluster Status	WBSSPI_0006	Cluster Status in terms of availability.
EJB Transaction Throughput Rate	WLSSPI_0235	Number of EJBs Transactions completed in unit time.

ETI/HI	Policy Name	Policy Description
EJB Transaction Rollback Rate	WLSSPI_0236	Number of EJB Transaction rolled back in unit time.
EJB FreePool Wait Rate	WLSSPI_0225	The number of times per minute no EJBs were available from the free pool.
EJB Concurrent Lives	WBSSPI_0226	The average number of bean objects in the pool.
EJB Timeout Rate	WLSSPI_0226	The number of times per minute a client timed out waiting for an EJB.
EJB Performance	WLSSPI_0238	The performance statistics namely cache utilization.
	WBSSPI_0221	
EJB Missed Count Rate	WLSSPI_0824	The total number of times a failed attempt was made to get an instance from the free pool.
EJB Utilization	WBSSPI_0220	The utilization of the EJB pool.
Servlet Performance	WLSSPI_0240	The performance statistics such as execution time.
	WBSSPI_0246	
Servlet Requests	WLSSPI_0242	Number of incoming requests to the servlet.
	WBSSPI_0245	
HTTP Sessions	WLSSPI_0245	Number of open servlet sessions.
JDBC Connection Pool Wait Count	WLSSPI_0061	The number of clients waiting for a JDBC connection.
Data Source Connection Waiters	WBSSPI_0261	The average number of threads waiting for a connection from the connection pool.
Data Source Connection Pool Utilization	WLSSPI_0260	DataSource connection pool utilization.
	WBSSPI_0263	
Data Source Leaked Connections Rate	WLSSPI_0263	The rate of new leaked JDBC connections.

ETI/Hi	Policy Name	Policy Description
Data Source Connection Pool Availability	WLSSPI_0264	Availability of JDBC connections in the connection pool.
	WLSSPI_0265	
	WBSSPI_0262	
	WBSSPI_0265	
Data Source Connection Pool Performance	WBSSPI_0266	DataSource connection pool performance.

Operations Orchestration Flow

The following table lists the Operations Orchestration (OO) flows for J2EE Content Pack.

Application Server Health Check and Application Server Performance Check

OO Flow	Flow Input	CI Type	CI Attribute	Event Attribute
Application Server Health Check	omServer jeeserverName	J2EEServer	J2eeserver_fullname	Originating Server
Application Server Performance Check				

When creating the mapping defined in the preceding table, you can set default values for the attributes listed in the following table.

Attribute	Description
omServerPort	Port number of the HPOM Tool WS.
omServerUser	User name for the HPOM Server.
omServerPassword	Password for the HPOM Server.

For more information about creating the mapping and a Run Book automation rule, see "How to Create a Run Book Automation Rule" on page 505.

The following are the user input values when you execute OO flow for Application Server Health Check and Application Server Performance Check.

User Input	Value
omNode	Target node with an HPOM Agent (DNS name of the HPOM managed node).
jeeserver	Valid values are wls and wbs.

JDBC Health Check

OO Flow	Flow Input	CI Type	CI Attribute	Event Attribute
JDBC Health Check	omServer instance	jdbcdatasource	name	Originating Server

When creating the mapping defined in the preceding table, you can set default values for the attributes listed in the following table.

Attribute	Description
omServerPort	Port number of the HPOM Tool WS
omServerUser	User name for the HPOM Server
omServerPassword	Password for the HPOM Server

The following are the user input values when you execute OO Flow for JDBC Health Check.

User Input	Value
omNode	Target node with an HPOM Agent (DNS name of the HPOM managed node).
jeeserver	Valid values are wls and wbs.
jeeservername	J2EE server name (full name).

34

Microsoft Content Packs

This chapter includes:

Reference

- ▶ Microsoft Active Directory Server Content Pack on page 918
- ▶ Microsoft Exchange Server Content Pack on page 960
- ▶ Microsoft Lync Server 2010 Content Pack on page 1016

Reference

Microsoft Active Directory Server Content Pack

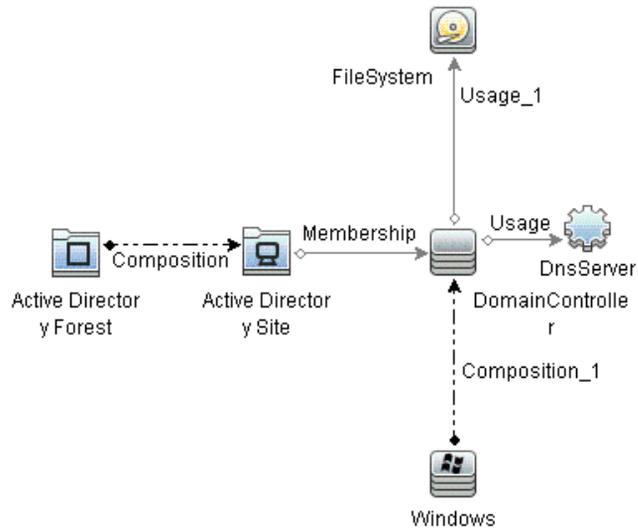
The Microsoft Active Directory Server Content Pack contains the following artifacts:

- ▶ Views on page 919
- ▶ Enrichment Rules on page 922
- ▶ Health Indicators on page 922
- ▶ Correlation Rules on page 928
- ▶ Tool Definitions on page 944
- ▶ Graph Templates on page 944
- ▶ Policies Setting ETIs on page 946
- ▶ Operations Orchestration Flow on page 955

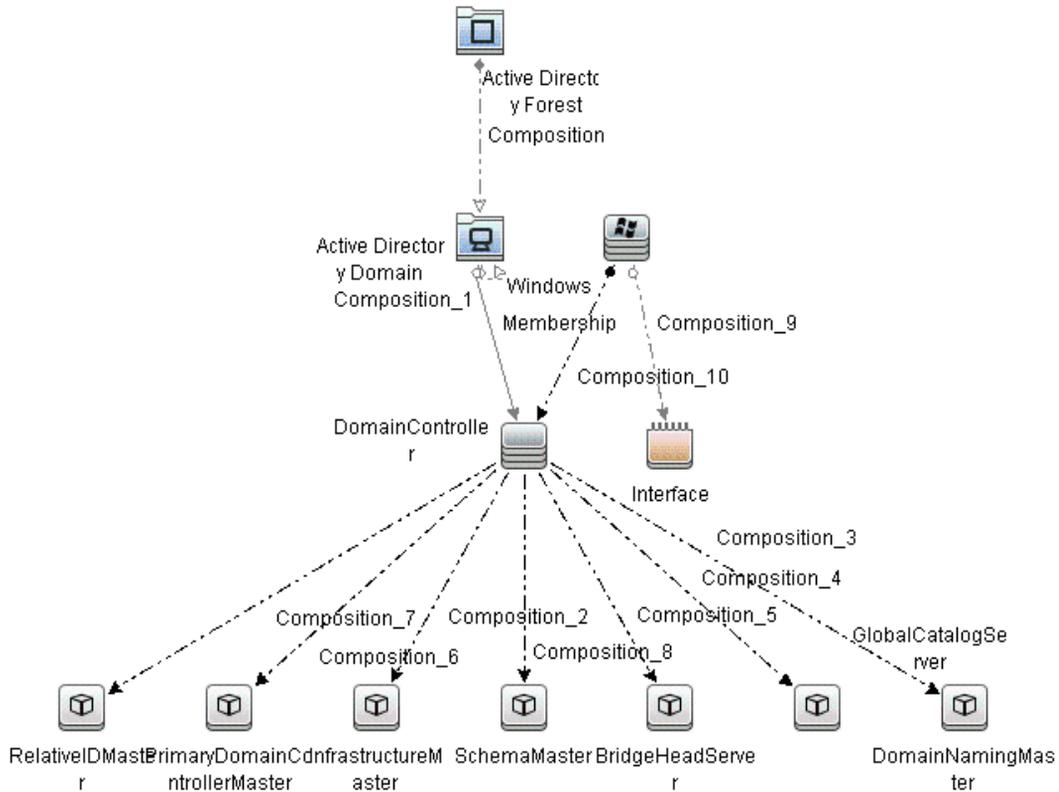
Views

The RTSM package in the Microsoft Active Directory Server Content Pack contains the following views:

- **AD_Physical_View:** This view refers to the Active Directory System, Active Directory Site, Domain Controller, DomainNamingMaster, and Computer (Windows) CI types.



- **AD_Logical_view:** This view refers to the Active Directory System, Active Directory Forest, Active Directory Domain, Domain Controller, SchemaMaster, DomainNamingMaster, PrimaryDomainControllerMaster, RelativeIDMaster, InfrastructureMaster, BridgeHeadServer, GlobalCatalogServer, and Computer CI types.



Enrichment Rules

The Microsoft Active Directory Server Content Pack contains the following Enrichment Rules:

- ▶ DomainController_Uses_DnsServer
- ▶ DomainController_Uses_Log_FileSystem
- ▶ DomainController_Uses_NTDS_FileSystem
- ▶ DomainController_Uses_SysVol_FileSystem

Health Indicators

The content pack includes the following health indicators (HIs) to monitor Active Directory-related events:

CI Type	HI	Description	Value
Domain Controller Role	Response Time	Indicates the ping response time of FSMO roles.	Normal, High, Very High
Domain Controller	Access Permissions Errors	Indicates the number of Access Permission Errors on the Domain Controller.	Normal, High, Very High
Domain Controller	CName Records Availability	Indicates the availability of CName Records on the DNS Server of the Domain Controller.	Found, Not Found
Domain Controller	DC LDAP Bind Response Time	Indicates the response time to bind to LDAP on domain controller.	Normal, High, Very High
Domain Controller	DC LDAP Query Response Time	Indicates the response time of a sample LDAP query on domain controller.	Normal, High, Very High
Domain Controller	DFRS Service State	Indicates the status of DFRS Service on the Domain Controller.	Up, Down

CI Type	HI	Description	Value
Domain Controller	DIT Disk Queue Length	Indicates the queue length of DIT disk.	Normal, High, Very High
Domain Controller	DIT Disk Space Availability	Indicates the availability of free space on DIT disk.	Normal, Low, Near Capacity
Domain Controller	DIT Log Files Disk Queue Length	Indicates the queue length of DIT Log Files disk.	Normal, High, Very High
Domain Controller	DIT Log Files Disk Space Availability	Indicates the availability of free space on DIT Log Files Disk.	Normal, Low, Near Capacity
Domain Controller	DNS Query Response	Indicates the response time of a sample DNS Query on domain controller.	Normal, High, Very high
Domain Controller	FRS Status	Indicates the status of File Replication Service.	Up, Down
Domain Controller	Host Records Availability	Indicates the availability of Host Records on the DNS Server of the Domain Controller.	Found, Not found
Domain Controller	Inbound Object Updates Remaining	Indicates the number of Inbound Object Updates remaining.	Normal, High, Very High
Domain Controller	Inter site Replication Latency	Indicates the replication latency of the Domain Controller across AD Sites.	Normal, High, Very High
Domain Controller	Intra site Replication Latency	Indicates the Replication Latency of the Domain Controller within the AD Site.	Normal, High, Very High
Domain Controller	ISM Service Status	Indicates the status of Intersite Messaging Service.	Up, Down

CI Type	HI	Description	Value
Domain Controller	KDC Service Status	Indicates the status of Kerberos Distribution Centre Service.	Up, Down
Domain Controller	Kerberos Authentication Rate	Indicates the rate of Kerberos Authentication on the Domain Controller.	Normal, High, Very High
Domain Controller	Kerberos SrvRecords Availability	Indicates the availability of Kerberos Server Records on the DNS Server.	Found, Not Found
Domain Controller	LDAP Active Threads	Indicates the number of LDAP threads which are active on the Domain Controller.	Normal, High, Very High
Domain Controller	LDAP Client Sessions	Indicates the number LDAP Client Sessions on the Domain Controller.	Normal, High, Very High
Domain Controller	LDAP SrvRecords Availability	Indicates the availability of LDAP Server Records on the DNS Server of the DomainController.	Found, Not Found
Domain Controller	Logon Errors	Indicates the number of Logon Errors on the Domain Controller.	Normal, High, Very High
Domain Controller	LSASS Page Faults Rate	Indicates rate of Page Faults for Local Security Authority Subsystem Service.	Normal, High, Very High
Domain Controller	LSASS Private Bytes	Indicates the Private Bytes used by Local Security Authority Subsystem Service on the Domain Controller.	Normal, High, Very High
Domain Controller	LSASS Processor Time	Indicates the Processor Time used by Local Security Authority Subsystem Service on the Domain Controller.	Normal, High, Very High

CI Type	HI	Description	Value
Domain Controller	LSASS Working Set	Indicates the Working Set of the Local Security Authority Subsystem Service.	Normal, High, Very High
Domain Controller	Net Logon Service State	Indicates the status of Net Logon Service on the Domain Controller.	Up, Down
Domain Controller	Non Transitive Membership Evaluations	Indicates the number of non transitive membership evaluations performed.	Normal, High, Very High
Domain Controller	Notify Queue Size	Indicates the size of notify queue.	Normal, High, Very High
Domain Controller	NTDS Service State	Indicates the status of NTDS Services on the Domain Controller.	Up, Down
Domain Controller	NTFRS Page Faults Rate	Indicates rate of Page Faults for NTFRS process.	Normal, High, Very High
Domain Controller	NTFRS Private Bytes	Indicates the Private Bytes used by the File Replication Service.	Normal, High, Very High
Domain Controller	NTFRS Processor Time	Indicates the processor time used by the File Replication Service on the Domain Controller.	Normal, High, Very High
Domain Controller	NTFRS Working Set	Indicates the Working Set of the File Replication Service on the Domain Controller.	Normal, High, Very High
Domain Controller	NTLM Authentication Rate	Indicates the rate of NTLM Authentication on the Domain Controller.	Normal, High, Very High
Domain Controller	Pending Replication Synchronizations	Indicates the number of pending replication synchronizations.	Normal, High, Very High

CI Type	HI	Description	Value
Domain Controller	SamSs Service State	Indicates the state of Security Accounts Manager Service on the Domain Controller.	Up, Down
Domain Controller	SecurityDescriptor Propagator Queue	Indicates the length of Security Descriptor Propagator Queue on the Domain Controller.	Normal, High, Very High
Domain Controller	Sysvol Connectivity	Indicates the connectivity to Sysvol folder.	Up, Down
Domain Controller	Sysvol Disk Space Availability	Indicates the availability of free space on Sysvol disk.	Normal, Low, Near Capacity
Domain Controller	Transitive Membership Evaluations	Indicates the number of Transitive Membership Evaluations performed on the Domain Controller.	Normal, High, Very High
Global Catalog	GC LDAP Bind Response Time	Indicates the response time to bind to LDAP on global catalog.	Normal, High, Very High
Global Catalog	GC LDAP Query Response Time	Indicates the response time of a sample LDAP Query on Global Catalog.	Normal, High, Very High
Global Catalog	GC Replication Latency	Indicates the replication latency on global catalog.	Normal, High, Very High
Domain Controller	Directory Read Rate	Indicates the rate of Directory Read.	Normal, High, Very High
Domain Controller	Directory Search Rate	Indicates the rate of Directory Search.	Normal, High, Very High
Domain Controller	Directory Write Rate	Indicates the rate of Directory Write.	Normal, High, Very High

CI Type	HI	Description	Value
Domain Controller	Inbound Replication Object Rate	Indicates the rate of Inbound Replication Objects.	Normal, High, Very High
Domain Controller	LDAP Connectivity	Indicates the LDAP Connectivity.	Up, Down
Domain Controller	GC Connectivity	Indicates the GC Connectivity.	Up, Down
Domain Controller	Outbound Replication Object Rate	Indicates the rate of Outbound Replication Objects.	Normal, High, Very High
Domain Controller	Synchronization Failure Rate	Indicates the rate of synchronization failures.	Normal, High, Very High
Domain Controller	Sysvol Disk Queue Length	Indicates the length of Sysvol Disk Queue.	Normal, High, Very High

Correlation Rules

The content pack includes the following rules to correlate Active Directory-related events.

For more information on how the correlation rules work, see the *Operations Manager i Concepts Guide*.

AD::DomainController:CNameRecordsAvailability >> InterSiteReplicationLatency & IntraSiteReplicationLatency

Description: CName Records Availability on the DNS Server of the Domain Controller Impacts Inter and Intra Site Replication Latency		
Cause		
CIT: Domain Controller	ETI: CName Records Availability	Value: Not Found
Symptom 1		
CIT: Domain Controller	ETI: Inter Site Replication Latency	Value: Very High
Symptom 2		
CIT: Domain Controller	ETI: Intra Site Replication Latency	Value: Very High

AD::DomainController:DIT Disk Queue Length >> DomainController Performance

Description: DIT Disk Queue Length Impacts DC Performance		
Cause		
CIT: Domain Controller	ETI: DIT Disk Queue Length	Value: Very High
Symptom 1		
CIT: Domain Controller	ETI: DC LDAP Bind Response Time	Value: Very High

Description: DIT Disk Queue Length Impacts DC Performance		
Symptom 2		
CIT: Domain Controller	ETI: DC LDAP Query Response Time	Value: Very High
Symptom 3		
CIT: Domain Controller	ETI: Inbound Object Updates Remaining	Value: Very High
Symptom 4		
CIT: Domain Controller	ETI: Pending Replication Synchronizations	Value: Very High

AD::DomainController:DIT Disk Queue Length >> GlobalCatalog Performance

Description: DIT Disk Queue Length Impacts GC Performance		
Cause		
CIT: Domain Controller	ETI: DIT Disk Queue Length	Value: Very High
Symptom 1		
CIT: Global Catalog Server	ETI: GC LDAP Bind Response Time	Value: Very High
Symptom 2		
CIT: Global Catalog Server	ETI: GC LDAP Query Response Time	Value: Very High

AD::DomainController:DIT Disk Space Availability >> DIT Disk Queue Length & Inbound Object Updates Remaining

Description: Available DIT Disk Space Impacts DIT Disk Queue Length and Inbound Object Updates Remaining		
Cause		
CIT: Domain Controller	ETI: DIT Disk Space Availability	Value: Near Capacity
Symptom 1		
CIT: Domain Controller	ETI: DIT Disk Queue Length	Value: Very High
Symptom 2		
CIT: Domain Controller	ETI: Inbound Object Updates Remaining	Value: Very High

AD::DomainController:DIT Log Files Disk Space Availability >> DIT Log Files Disk Queue Length

Description: Available Disk Space for DIT Log Files Impact DIT Log Files Disk Queue Length		
Cause		
CIT: Domain Controller	ETI: DIT Log Files Disk Space Availability	Value: Near Capacity
Symptom		
CIT: Domain Controller	ETI: DIT Log Files Disk Queue Length	Value: Very High

AD::DomainController:FRS Status >> InterSiteReplicationLatency & IntraSiteReplicationLatency

Description: File Replication Service Status Impacts DC Replication Latency		
Cause		
CIT: Domain Controller	ETI: FRS Status	Value: Down
Symptom 1		
CIT: Domain Controller	ETI: Inter Site Replication Latency	Value: Very High
Symptom 2		
CIT: Domain Controller	ETI: Intra Site Replication Latency	Value: Very High

AD::DomainController:HostRecordsAvailability >> InterSiteReplicationLatency & IntraSiteReplicationLatency

Description: Host Records Availability on the DNS Server of the Domain Controller Impacts Inter and Intra Site Replication Latency		
Cause		
CIT: Domain Controller	ETI: Host Records Availability	Value: Not Found
Symptom 1		
CIT: Domain Controller	ETI: Inter Site Replication Latency	Value: Very High
Symptom 2		
CIT: Domain Controller	ETI: Intra Site Replication Latency	Value: Very High

AD::DomainController:ISMServiceStatus >> InterSiteReplicationLatency & IntraSiteReplicationLatency

Description: ISM Service Status Impacts Inter and Intra Site Replication Latency on the Domain Controller		
Cause		
CIT: Domain Controller	ETI: ISM Service Status	Value: Down
Symptom 1		
CIT: Domain Controller	ETI: Inter Site Replication Latency	Value: Very High
Symptom 2		
CIT: Domain Controller	ETI: Intra Site Replication Latency	Value: Very High

AD::DomainController:KDCServiceStatus >> InterSiteReplicationLatency & IntraSiteReplicationLatency

Description: KDC Service Status Impacts Inter and Intra Site Replication Latency on the Domain Controller		
Cause		
CIT: Domain Controller	ETI: KDC Service Status	Value: Down
Symptom 1		
CIT: Domain Controller	ETI: Inter Site Replication Latency	Value: Very High
Symptom 2		
CIT: Domain Controller	ETI: Intra Site Replication Latency	Value: Very High

**AD::DomainController:KerberosSrvRecordsAvailability >>
InterSiteReplicationLatency & IntraSiteReplicationLatency**

Description: Kerberos Server Records Availability on the DNS Server of the Domain Controller Impacts Inter and Intra Site Replication Latency		
Cause		
CIT: Domain Controller	ETI: Kerberos Server Records Availability	Value: Not Found
Symptom 1		
CIT: Domain Controller	ETI: Inter Site Replication Latency	Value: Very High
Symptom 2		
CIT: Domain Controller	ETI: Intra Site Replication Latency	Value: Very High

**AD::DomainController:LDAPSrvRecordsAvailability >>
InterSiteReplicationLatency & IntraSiteReplicationLatency**

Description: LDAP Server Records Availability on the DNS Server of the Domain Controller Impacts Inter and Intra Site Replication Latency		
Cause		
CIT: Domain Controller	ETI: LDAP Server Records Availability	Value: Not Found
Symptom 1		
CIT: Domain Controller	ETI: Inter Site Replication Latency	Value: Very High
Symptom 2		
CIT: Domain Controller	ETI: Intra Site Replication Latency	Value: Very High

AD::DomainController:LSASS Page Faults Rate >> DomainController Performance

Description: LSASS Page Faults Rate Impacts DC Performance		
Cause		
CIT: Domain Controller	ETI: LSASS Page Faults Rate	Value: Very High
Symptom 1		
CIT: Domain Controller	ETI: DC LDAP Bind Response Time	Value: Very High
Symptom 2		
CIT: Domain Controller	ETI: DC LDAP Query Response Time	Value: Very High
Symptom 3		
CIT: Domain Controller	ETI: Inbound Object Updates Remaining	Value: Very High
Symptom 4		
CIT: Domain Controller	ETI: Pending Replication Synchronizations	Value: Very High

AD::DomainController:LSASS Page Faults Rate >> GlobalCatalog Performance

Description: LSASS Page Faults Rate Impacts GC Performance		
Cause		
CIT: Domain Controller	ETI: LSASS Page Faults Rate	Value: Very High
Symptom 1		
CIT: Global Catalog Server	ETI: GC LDAP Bind Response Time	Value: Very High
Symptom 2		
CIT: Global Catalog Server	ETI: GC LDAP Query Response Time	Value: Very High

AD::DomainController:Sysvol Connectivity >> Notify Queue Size

Description: Sysvol Connectivity Impacts Notify Queue Size		
Cause		
CIT: Domain Controller	ETI: Sysvol Connectivity	Value: Down
Symptom		
CIT: Domain Controller	ETI: Notify Queue Size	Value: Very High

AD::DomainController:Sysvol Disk Space Availability >> DC Replication Latency & Inbound Replication Object Rate

Description: Available Disk Space for Sysvol Impacts DC Replication Latency and Inbound Replication Object Rate		
Cause		
CIT: Domain Controller	ETI: Sysvol Disk Space Availability	Value: Near Capacity
Symptom 1		
CIT: Domain Controller	ETI: Inbound Replication Object Rate	Value: Very High
Symptom 2		
CIT: Domain Controller	ETI: Inter Site Replication Latency	Value: Very High
Symptom 3		
CIT: Domain Controller	ETI: Intra Site Replication Latency	Value: Very High

AD::DomainController:Sysvol Disk Queue Length >> DC Replication Latency & Inbound Replication Object Rate

Description: Sysvol Disk Queue Length Impacts REplication Latency		
Cause		
CIT: Domain Controller	ETI: Sysvol Disk Queue Length	Value: Very High
Symptom 1		
CIT: Domain Controller	ETI: Inbound Replication Object Rate	Value: Very High
Symptom 2		
CIT: Domain Controller	ETI: Inter Site Replication Latency	Value: Very High
Symptom 3		
CIT: Domain Controller	ETI: Intra Site Replication Latency	Value: Very High

AD::FileSystem:Disk Usage Level >> DomainController Performance

Description: DIT Disk Queue Length Impacts DC Performance		
Cause		
CIT: File System	ETI: Disk Usage Level	Value: Near Capacity
Symptom 1		
CIT: Domain Controller	ETI: DITDiskQueueLength	Value: Very High
Symptom 2		
CIT: Domain Controller	ETI: DIT LogFiles DiskQueue Length	Value: Very High
Symptom 3		
CIT: Domain Controller	ETI: Sysvol Disk Queue Length	Value: Very High

Description: DIT Disk Queue Length Impacts DC Performance		
Symptom 4		
CIT: Domain Controller	ETI: Pending Replication Synchronizations	Value: Very High
Symptom 5		
CIT: Domain Controller	ETI: Inbound Object Updates Remaining	Value: Very High

AD::Network Interface:Interface Utilization >> Sysvol Connectivity

Description: Network Interface Utilization impacts Sysvol Connectivity		
Cause		
CIT: Network Interface	ETI: Interface Utilization	Value: High
Symptom 1		
CIT: Domain Controller	ETI: SysvolConnectivity	Value: Down

AD::Network Interface:Interface Communication Status >> Sysvol Connectivity

Description: Network Interface Communication Status impacts Sysvol Connectivity		
Cause		
CIT: Network Interface	ETI: Interface Communication Status	Value: Critical
Symptom 1		
CIT: Domain Controller	ETI: SysvolConnectivity	Value: Down

AD::Network Interface:Network IO >> Domain Naming Master Connectivity

Description: Network IO Impacts Domain naming master connectivity		
Cause		
CIT: Network Interface	ETI: Interface Utilization	Value: High
Symptom 1		
CIT: Domain Naming Master	ETI: Response Time	Value: Very High

AD::Network Interface:Network IO >> DomainController Connectivity

Description: Network IO Impacts DomainController Connectivity		
Cause		
CIT: Network Interface	ETI: Interface Utilization	Value: High
Symptom 1		
CIT: Domain Controller	ETI: Inter Site Replication Latency	Value: Very High
Symptom 2		
CIT: Domain Controller	ETI: Intra Site Replication Latency	Value: Very High
Symptom 3		
CIT: Domain Controller	ETI: Notify Queue Size	Value: Very High

AD::Network Interface:Network IO >> DomainController Performance

Description: Network IO Impacts DomainController Performance		
Cause		
CIT: Network Interface	ETI: Interface Utilization	Value: High
Symptom 1		
CIT: Domain Controller	ETI: DC LDAP Query Response Time	Value: Very High
Symptom 2		
CIT: Domain Controller	ETI: DC LDAP Bind Response Time	Value: Very High
Symptom 3		
CIT: Domain Controller	ETI: Pending Replication Synchronizations	Value: Very High
Symptom 4		
CIT: Domain Controller	ETI: Inbound Object Updates Remaining	Value: Very High

AD::Network Interface:Network IO >> Global Catalog Performance

Description: Network IO Impacts Global Catalog Performance		
Cause		
CIT: Network Interface	ETI: Interface Utilization	Value: High
Symptom 1		
CIT: Global Catalog	ETI: GC LDAP Query Response Time	Value: Very High
Symptom 2		
CIT: Global Catalog	ETI: GC LDAP Bind Response Time	Value: Very High

AD::Network Interface:Network IO >> Infrastructure Master Connectivity

Description: Network IO Impacts Infrastructure master Connectivity		
Cause		
CIT: Network Interface	ETI: Interface Utilization	Value: High
Symptom 1		
CIT: Infrastructure Master	ETI: Response Time	Value: Very High

AD::Network Interface:Network IO >> PDC Master Connectivity

Description: Network IO Impacts PDC master Connectivity		
Cause		
CIT: Network Interface	ETI: Interface Utilization	Value: High
Symptom 1		
CIT: Primary Domain Controller Master	ETI: Response Time	Value: Very High

AD::Network Interface:Network IO >> RID Master Connectivity

Description: Network IO Impacts RID master Connectivity		
Cause		
CIT: Network Interface	ETI: Interface Utilization	Value: High
Symptom 1		
CIT: Relative ID Master	ETI: Response Time	Value: Very High

AD::Network Interface:Network IO >> Schema Master Connectivity

Description: Network IO Impacts Schema master Connectivity		
Cause		
CIT: Network Interface	ETI: Interface Utilization	Value: High
Symptom 1		
CIT: Schema Master	ETI: Response Time	Value: Very High

AD::Windows:CPU Load >> DomainController Performance

Description: CPU Load Impacts DomainController Performance		
Cause		
CIT: Windows	ETI: CPU Load	Value: Bottlenecked
Symptom 1		
CIT: Domain Controller	ETI: DC LDAP Bind Response Time	Value: Very High
Symptom 2		
CIT: Domain Controller	ETI: DC LDAP Query Response Time	Value: Very High
Symptom 3		
CIT: Domain Controller	ETI: Inbound Object Updates Remaining	Value: Very High
Symptom 4		
CIT: Domain Controller	ETI: Pending Replication Synchronizations	Value: Very High

AD::Windows:CPU Load >> GlobalCatalog Performance

Description: CPU Load Impacts Global Catalog Performance		
Cause		
CIT: Windows	ETI: CPU Load	Value: Bottlenecked
Symptom 1		
CIT: Global Catalog Server	ETI: GC LDAP Bind Response Time	Value: Very High
Symptom 2		
CIT: Global Catalog Server	ETI: GC LDAP Query Response Time	Value: Very High

AD::Windows:Logical Disk Free Space >> DomainController Performance

Description: Available Logical Disk Free Space Impacts DC Performance		
Cause		
CIT: Windows	ETI: Logical Disk Free Space	Value: Near Capacity
Symptom 1		
CIT: Domain Controller	ETI: DIT Disk Queue Length	Value: Very High
Symptom 2		
CIT: Domain Controller	ETI: DIT Log Files Disk Queue Length	Value: Very High
Symptom 3		
CIT: Domain Controller	ETI: Inbound Object Updates Remaining	Value: Very High
Symptom 4		
CIT: Domain Controller	ETI: Pending Replication Synchronizations	Value: Very High

AD::Windows:RPC Service >> DomainController Replication & Notify Queue Size

Description: RPC Service Status impacts DC Replication Latency and Notify Queue Size		
Cause		
CIT: Windows	ETI: RPC Service	Value: Unavailable
Symptom 1		
CIT: Domain Controller	ETI: Inter Site Replication Latency	Value: Very High
Symptom 2		
CIT: Domain Controller	ETI: Intra Site Replication Latency	Value: Very High
Symptom 3		
CIT: Domain Controller	ETI: Notify Queue Size	Value: Very High

Tool Definitions

Start File Replication Service: Starts the File Replication service on the Domain Controller.

Graph Templates

The following table lists the graph templates present in the content pack and mapped policies.

Graph Templates	Policy Name	Policy Description
Active Directory DNS Query Response Time Graph	ADSPI-DNS_Server_Response / ADSPI-DNS_Server_Response_2K8+	Monitors the response time given by the DNS server.
Active Directory SYSVOL Disk Queue Length Graph	ADSPI-SYSVOL_Disk QueueLength / ADSPI-SYSVOL_Disk QueueLength_2K8+	Monitors the queue length on the SYSVOL disk drive.
Active Directory SYSVOL Disk Utilization Graph	ADSPI-Sysvol_Percent Full / ADSPI-Sysvol_Percent Full_2K8+	Monitors the amount of free space on the Sysvol disk drive in terms of percentage used.
Active Directory DIT Log File Disk Queue Length Graph	ADSPI-DIT_LogFiles QueueLength / ADSPI-DIT_LogFiles QueueLength_2K8+	Monitors the queue length on the DIT log files disk drive.
Active Directory DIT Log File Disk Utilization Graph	ADSPI-DIT_LogFiles PercentFull / ADSPI-DIT_LogFiles PercentFull_2K8+	Monitors the amount of free space on the DIT log files disk drive.
Active Directory DIT File Growth Graph	ADSPI-DIT_TotalDit Size/ ADSPI-DIT_TotalDit Size_2K8+	Monitors the total amount of free space on the DIT disk drive in MB.
Active Directory DIT Disk Queue Length Graph	ADSPI-DIT_DITQueue Length / ADSPI-DIT_DITQueue Length_2K8+	Monitors the queue length on the DIT disk drive.

Graph Templates	Policy Name	Policy Description
Active Directory DIT Disk Utilization Graph	ADSPI-DIT_DITPercent Full / ADSPI-DIT_DITPercent Full_2K8+	Monitors the amount of free space on the DIT disk drive.
Active Directory Bind Response Time	ADSPI-Response_Logging / ADSPI-Response_Logging_2K8+	Logs active directory response times.
Active Directory Query Response Time	ADSPI-Response_Logging / ADSPI-Response_Logging_2K8+	Logs active directory response times.
Active Directory Replication Time by Global Catalog	ADSPI-Rep_GC_Check_and_Threshold / ADSPI-Rep_GC_Check_and_Threshold_2K8+	Calculate, store and threshold Global Catalog Replication Latency in hours.
Active Directory GC Availability	ADSPI-Response_Logging / ADSPI-Response_Logging_2K8+	Logs active directory response times.
Active Directory Replication Latency Graph	ADSPI-Rep_Monitor InterSiteReplication / ADSPI-Rep_Monitor InterSiteReplication_2K8+	Monitor InterSite Replication in Active Directory.
	ADSPI-Rep_MonitorIntraSiteReplication / ADSPI-Rep_Monitor IntraSiteReplication_2K8+	Monitor IntraSite Replication in Active Directory.

Policies Setting ETIs

The following table lists the content pack ETIs and SPI policies that set the ETIs.

Note: For more information on the measurement threshold policies and events, refer to the HP Operations Smart Plug-in for Microsoft Active Directory documentation.

ETI/Hi	Policy Name	Policy Description
Access Permissions Errors	ADSPI_SecErr Access Permissions	Checks the errors access permissions.
	ADSPI_SecErr Access Permissions_2k8+	
CName Records Availability	ADSPI-DNS_DC_CNAME_Chk	Ensures that DNS contains the expected CNAME resource records for the LDAP service.
	ADSPI-DNS_DC_CNAME_Chk_2k8+	
DC LDAP Query Response Time	ADSPI-Response Time_Query	Monitors the response time of queries made to the domain controller in seconds.
	ADSPI-Response Time_Query_2k8+	
DC LDAP Bind Response Time	ADSPI-Response Time_Bind	Monitors the bind response time of the domain controller in seconds.
	ADSPI-Response Time_Bind_2k8+	
DFSR Service State	ADSPI_DFSR_2K8+	Checks the distributed file service replication service.

ETI/HI	Policy Name	Policy Description
Directory Read Rate	ADSPI_DSReads	Number of reads every second in the Directory Service.
	ADSPI_DSReads_2K8+	
	ADSPI_GlobalCatalog Reads	Number of reads from the GC.
	ADSPI_GlobalCatalog Reads_2K8+	
Directory Search Rate	ADSPI_DSSearches	Number of searches every second in the Directory Service.
	ADSPI_DSSearches_2K8+	Number of searches every second in the Directory Service.
	ADSPI_GlobalCatalog Searches	Number of searches of the Global Catalog.
	ADSPI_GlobalCatalog Searches_2K8+	
Directory Write Rate	ADSPI_DSWrites	Number of writes every second in the Directory Service.
	ADSPI_DSWrites_2K8+	
	ADSPI_GlobalCatalog Writes	Number of writes to the GC.
	ADSPI_GlobalCatalog Writes_2K8+	
DIT Disk Space Availability	ADSPI- DIT_DIT Percent Full	Monitors the amount of free space on the DIT disk drive.
	ADSPI- DIT_DIT Percent Full _2k8+	
DIT Disk Queue Length	ADSPI- DIT_DITQueue Length	Monitors the length on the DIT disk drive.
	ADSPI- DIT_DITQueue Length _2k8+	

ETI/Hi	Policy Name	Policy Description
DIT LogFiles Disk Space Availability	ADSPI- DIT_LogFiles Percent Full	Monitors the amount of free space on the DIT log files disk drive.
	ADSPI- DIT_LogFiles Percent Full _2k8+	
DIT LogFiles Disk Queue Length	ADSPI- DIT_LogFiles Queue Length	Monitors the queue length on the DIT log files disk drive.
	ADSPI- DIT_LogFiles Queue Length _2k8+	
DNS Query Response	ADSPI- DNS_DC_ Response	Monitors the response time of DNS queries made by the domain controller in milliseconds.
	ADSPI- DNS_DC_ Response _2k8+	
FRS Status	ADSPI_ NTFRS	Checks the File replication service.
	ADSPI_ NTFRS _2k8+	
GC Connectivity	ADSPI-GC_CheckStatus	Executes a GC Query and checks the status of the GC query.
	ADSPI-GC_CheckStatus_ 2K8+	
GC LDAP Bind Response Time	ADSPI- Response Time_ GCBind	Monitors the bind response time of the global catalog on the domain controller in seconds.
	ADSPI- Response Time_ GCBind _2k8+	
GC LDAP Query Response Time	ADSPI- Response Time_ GCQuery	Monitors the response time of queries made to the global catalog domain controller in seconds.
	ADSPI- Response Time_ GCQuery _2k8+	
GC Replication Latency	ADSPI- Rep_GC_ Check_ and_ Threshold	Calculates, stores, and threshold global Catalog replication latency in hours.
	ADSPI- Rep_GC_ Check_ and_ Threshold _2k8+	

ETI/Hi	Policy Name	Policy Description
Host Records Availability	ADSPI-DNS_DC_A_Chk	Ensures that DNS contains the expected host resource records for the LDAP service.
	ADSPI-DNS_DC_A_Chk_2k8+	
Inbound Object Updates Remaining	ADSPI_ ADSRep InBound Object Updates Remaining_ 2K8+	Checks the inbound object updates remaining in packet.
	ADSPI_ ADSRepIn Bound Object Updates Remaining	
Inbound Replication Object Rate	ADSPI- Rep_Inbound Objs	Monitors the number of inbound replication objects.
	ADSPI- Rep_Inbound Objs_ 2k8+	
Inter Site Replication Latency	ADSPI- Rep_Monitor InterSite Replication	Monitors intersite replication in active directory.
	ADSPI- Rep_Monitor InterSite Replication_2k8+	
Intra Site Replication Latency	ADSPI- Rep_Monitor IntraSite Replication	Monitors intrasite replication in active directory.
	ADSPI- Rep_Monitor IntraSite Replication_2k8+	
ISM Service Status	ADSPI- Rep_ISM_ Chk	Checks the intersite messaging service.
	ADSPI- Rep_ISM_ Chk_2k8+	
KDC Service Status	ADSPI_KDC	Checks the kerberos key distribution center service.
	ADSPI_KDC_2k8+	

ETI/Hi	Policy Name	Policy Description
Kerberos Authentication Rate	ADSPI_IQKerberos Authentications _2K8+	Checks the kerberos authentications.
	ADSPI_IQKerberos Authentications	
Kerberos Srv Records Availability	ADSPI- DNS_ Kerberos_ SRV_Chk	Checks for expected DNS SRV resource records registered for the kerberos service.
	ADSPI- DNS_ Kerberos_ SRV_Chk _2k8+	
LDAP Active Threads	ADSPI_IQLDAP Active Threads _2K8+	Checks the LDAP active threads.
	ADSPI_IQLDAP Active Threads	
LDAP Client Sessions	ADSPI_IQLDAP Client Sessions _2K8+	Checks the LDAP client sessions.
	ADSPI_IQLDAP Client Sessions	
LDAP Connectivity	ADSPI-LDAP_Check Status	Executes a LDAP Query and checks the status of the LDAP query.
	ADSPI-LDAP_Check Status_2K8+	
LDAP Srv Records Availability	ADSPI- DNS_ LDAP_SRV _Chk	Ensures that DNS contains the expected SRV resource records for the LDAP service.
	ADSPI- DNS_ LDAP_SRV _Chk _2k8+	
Logon Errors	ADSPI_SecErrors Logon	Checks the errors logon.
	ADSPI_SecErrors Logon _2k8+	
LSASS Page Faults Rate	ADSPI_HMLSASS PageFaults	Checks the LSASS page faults per second.
	ADSPI_HMLSASS PageFaults _2k8+	

ETI/Hi	Policy Name	Policy Description
LSASS Private Bytes	ADSPI_ HMLSASS Private Bytes	Checks the LSASS Private Bytes.
	ADSPI_ HMLSASS Private Bytes _2k8+	
LSASS Processor Time	ADSPI_ HMLSASS Processor Time	Checks the LSASS processor time.
	ADSPI_ HMLSASS Processor Time _2k8+	
LSASS Working Set	ADSPI_ HMLSASS Working Set	Checks the LSASS working set.
	ADSPI_ HMLSASS Working Set _2k8+	
Net Logon Service State	ADSPI_ Net Logon	Checks the Net Logon service.
	ADSPI_ Net Logon _2k8+	
Non Transitive Membership Evaluations	ADSPI_ Sec NonTrans Memb Eval_ 2K8+	Checks the Non-Transitive Membership Evaluations/sec.
	ADSPI_ Sec NonTrans Memb Eval	
Notify Queue Size	ADSPI_ ADSRep Notify QueueSize_ 2K8+	Checks the notify queue size.
	ADSPI_ ADSRep Notify QueueSize	
NTDS Service State	ADSPI_ NTDS _2k8+	Checks the active directory domain service.
NTFRS Page Faults Rate	ADSPI_ HM NTFRS PageFaults	Checks the NTFRS page faults.
	ADSPI_ HM NTFRS PageFaults _2k8+	

ETI/Hi	Policy Name	Policy Description
NTFRS Private Bytes	ADSPI_HM NTFRS Private Bytes	Checks the NTFRS private bytes.
	ADSPI_HM NTFRS Private Bytes _2k8+	
NTFRS Processor Time	ADSPI_HM NTFRS Processor Time	Checks the NTFRS processor time.
	ADSPI_HM NTFRS Processor Time _2k8+	
NTFRS Working Set	ADSPI_HM NTFRS Working Set	Checks the NTFRS working set.
	ADSPI_HM NTFRS Working Set	
NTLM Authentication Rate	ADSPI_IQNTLM Authentications _2K8+	Checks the NTLM Authentications.
	ADSPI_IQNTLM Authentications	
Outbound Replication Object Rate	ADSPI-Rep_Outbound Objs	Monitors the number of outbound replication objects.
	ADSPI-Rep_Outbound Objs_2K8+	
Pending Replication Synchronizations	ADSPI_ADSPending Synchronizations_ 2K8+	Checks the pending replication synchronizations.
	ADSPI_ADSPending Synchronizations	

ETI/HI	Policy Name	Policy Description
Response Time	ADSPI- FSMO_ INFRA_Ping	Monitors the ping response time of the infrastructure FSMO in seconds.
	ADSPI- FSMO_ INFRA_Ping _2k8+	
	ADSPI-F SMO_ NAMING_ Ping	Monitors the ping response time of the domain naming FSMO in seconds.
	ADSPI-F SMO_ NAMING_ Ping _2k8+	
	ADSPI- FSMO_ PDC_Ping	Monitors the ping response time of the PDC FSMO in seconds.
	ADSPI- FSMO_ PDC_Ping _2k8+	
	ADSPI- FSMO_ RID_Ping	Monitors the ping response time of the RID FSMO in seconds.
	ADSPI- FSMO_ RID_Ping _2k8+	
	ADSPI- FSMO_ Schema_Ping	Monitors the ping response time of the schema FSMO in seconds.
	ADSPI- FSMO_ Schema_Ping _2k8+	
SamSs Service State	ADSPI_ SamSs	Checks the security account manager service.
	ADSPI_ SamSs _2k8+	
Security Descriptor Propagator Queue	ADSPI_ Sec SDPropagator Queue _2K8+	Checks the Security Descriptor Propagator Queue.
	ADSPI_ SecSD Propagator Queue	
Synchronization Failure Rate	ADSPI_ SyncSchema MissMatch	Checks the sync failures on schema mismatch.
	ADSPI_ SyncSchema MissMatch _2K8+	

ETI/Hi	Policy Name	Policy Description
Sysvol Disk Queue Length	ADSPI-SYSVOL_Disk QueueLength	Monitors the queue length on the SYSVOL disk drive.
	ADSPI-SYSVOL_Disk QueueLength_2K8+	
Sysvol Connectivity	ADSPI- Sysvol_ Connectivity	Connects to each replication partner's sysvol to validate connectivity.
	ADSPI- Sysvol_ Connectivity _2k8+	
Sysvol Disk Space Availability	ADSPI- Sysvol_ PercentFull	Monitors the amount of free space on the sysvol disk drive in terms of MB.
	ADSPI- Sysvol_ PercentFull _2k8+	
Transitive Membership Evaluations	ADSPI_ SecTrans MembEval _2K8+	Checks the Transitive Member Evaluations/sec.
	ADSPI_ SecTrans Memb Eval	

Operations Orchestration Flow

When creating the mapping, you can set default values for the attributes listed in the following table.

Attribute	Description
omServerPort	Port number of the HPOM Tool WS.
omServerUser	User name for the HPOM Server that will use used in the HPOM Tool WS.
omServerPassword	Password for the HPOM Server that will use used in the HPOM Tool WS.

For more information about creating the mapping and a Run Book automation rule, see "How to Create a Run Book Automation Rule" on page 505.

The following table lists the Microsoft Active Directory Operations Orchestration (OO) Flows:

OO Flow: Check DIT Disk Space Availability

Flow input	Mapping CI	Event Attribute
omServer	domaincontroller	Originating Server

User input when executing OO flow: Check DIT Disk Space Availability

Flow input	CI Type
omNode	Target node with an HPOM Agent.
omCmdTimeout	The timeout value to be used when running the remote command on the node. By default set to 100000.
threshold	The threshold value for the minimum disk space (in MB) that should be free (available) on the DIT disks. Default is set to 2048 MB (2 GM).

OO Flow: Check DomainController Health

Flow input	Mapping CI	Event Attribute
omServer	domaincontroller	Originating Server

User input when executing OO flow: Check DomainController Health

Flow input	CI Type
omNode	Target node with an HPOM Agent.
omCmdTimeout	The timeout value to be used when running the remote command on the node. By default set to 100000.
diskthreshold	The threshold value for the minimum disk space in MB that should be free (available) on the DIT disks. Default is set to 2048 MB (2 GB).
ldapthreshold	The threshold value for LDAP latency.

OO Flow: Check if DomainController

Flow input	Mapping CI	Event Attribute
omServer	domaincontroller	Originating Server

User input when executing OO flow: Check if DomainController

Flow input	CI Type
omNode	Target node with an HPOM Agent.
omCmdTimeout	The timeout value to be used when running the remote command on the node. By default set to 100000.
diskthreshold	The threshold value for the minimum disk space in MB that should be free (available) on the DIT disks. Default is set to 2048 MB (2 GB).
ldapthreshold	The threshold value for LDAP latency.

OO Flow: Check Replication Health

Flow input	Mapping CI	Event Attribute
omServer	domaincontroller	Originating Server

User input when executing OO flow: Check Replication Health

Flow input	CI Type
omNode	Target node with an HPOM Agent.
omCmdTimeout	The timeout value to be used when running the remote command on the node. By default set to 100000.
replicationlatency threshold	The threshold for maximum time since last replication happened from a source in milliseconds.

OO Flow: GC Query Response Time

Flow input	Mapping CI	Event Attribute
omServer	domaincontroller	Originating Server

User input when executing OO flow: GC Query Response Time

Flow input	CI Type
omNode	Target node with an HPOM Agent.
omCmdTimeout	The timeout value to be used when running the remote command on the node. By default set to 100000.

OO Flow: LDAP Query Response Time

Flow input	Mapping CI	Event Attribute
omServer	domaincontroller	Originating Server

User input when executing OO flow: LDAP Query Response Time

Flow input	CI Type
omNode	Target node with an HPOM Agent.
omCmdTimeout	The timeout value to be used when running the remote command on the node. By default set to 100000.

OO Flow: Get Replication Latency

Flow input	Mapping CI	Event Attribute
omServer	domaincontroller	Originating Server

User input when executing OO flow: Get Replication Latency

Flow input	CI Type
omNode	Target node with an HPOM Agent.
omCmdTimeout	The timeout value to be used when running the remote command on the node. By default set to 100000.
omReplication Source	The node from which is the source of the replication for the time is calculated.

Microsoft Exchange Server Content Pack

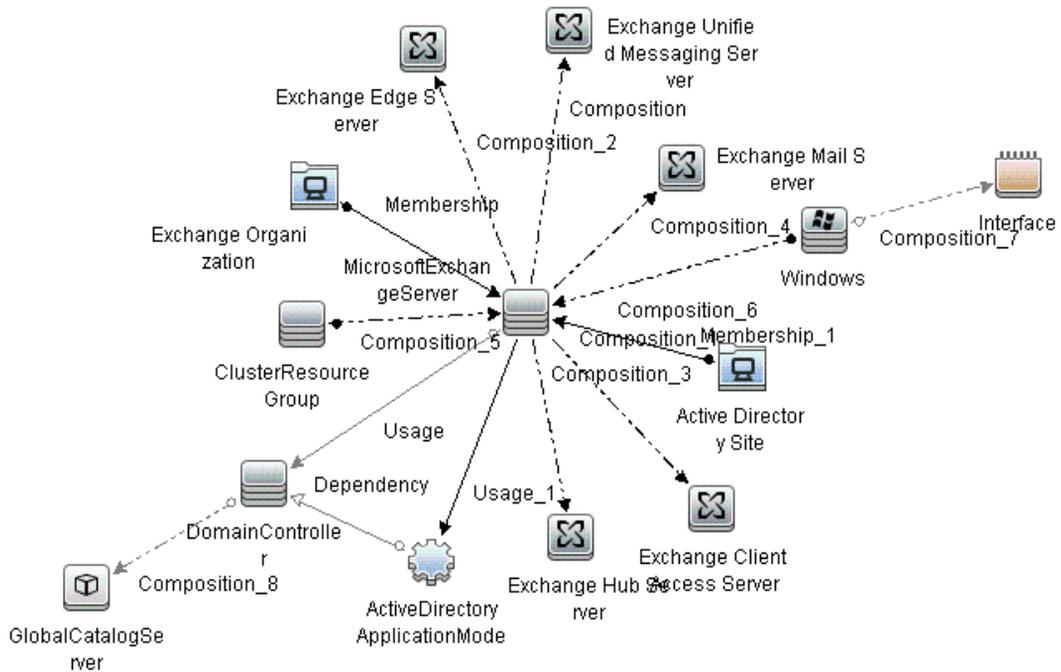
The Microsoft Exchange Server Content Pack contains the following artifacts:

- Views on page 961
- Enrichment Rules on page 966
- Health Indicators on page 966
- Event Type Indicators on page 973
- Correlation Rules on page 974
- Tool Definitions on page 1002
- Graph Templates on page 1002
- Policies Setting ETIs on page 1004
- Operations Orchestration Flow on page 1014

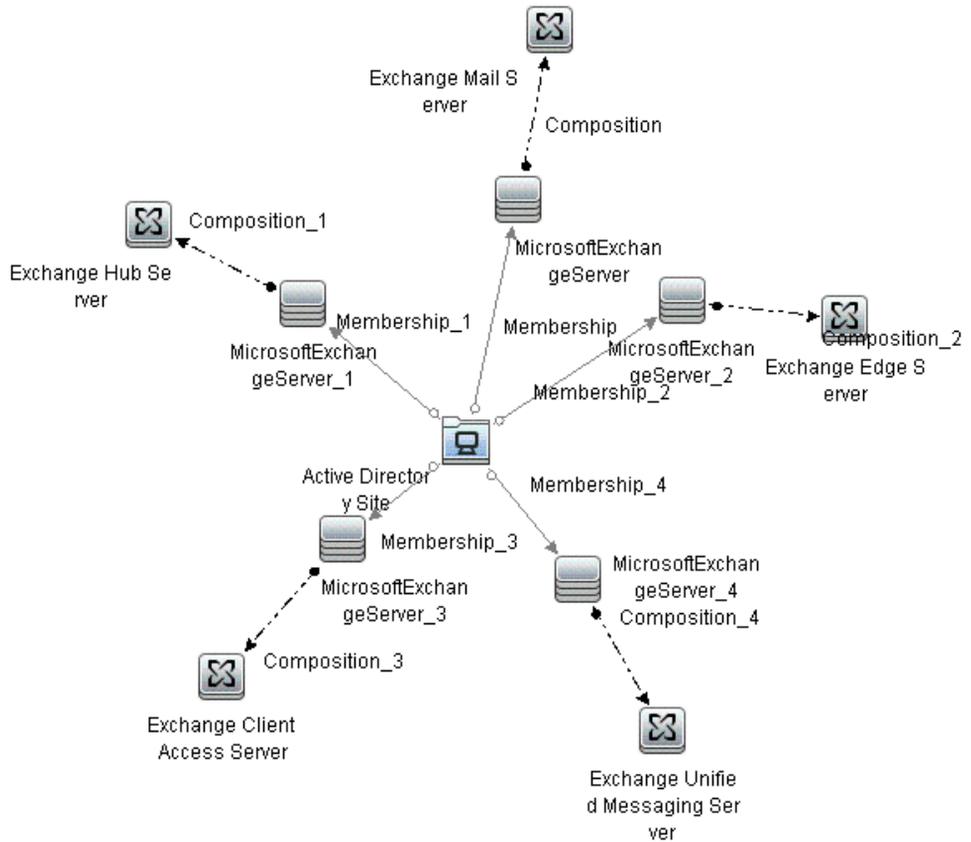
Views

The RTSM package in the Microsoft Exchange Server Content Pack contains the following views:

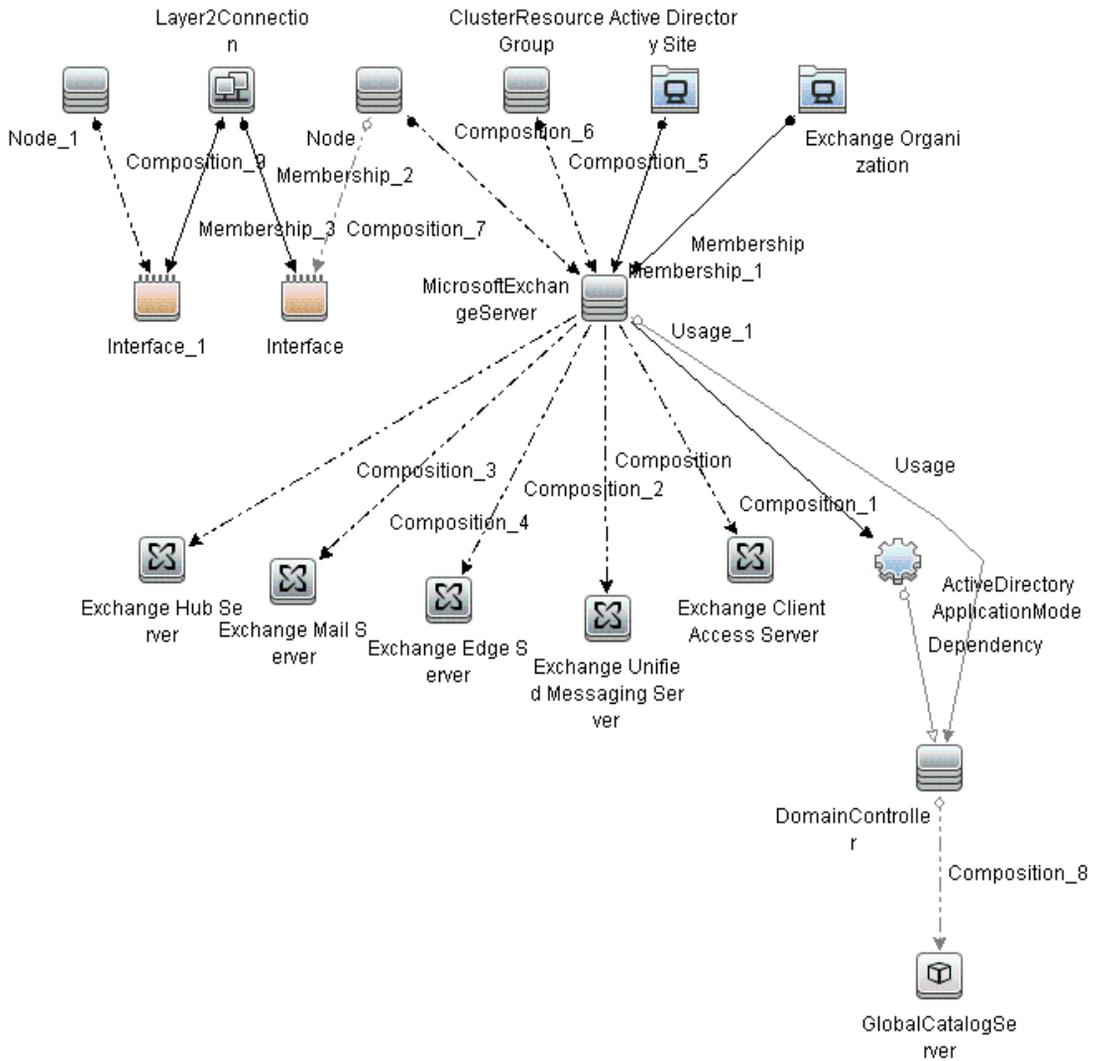
- **Exchange_Org_View:** This view refers to the Exchange System, Exchange Unified Messaging Server, Exchange Client Access Server, Exchange Edge Server, Exchange Hub Server, Microsoft Exchange Server, Active Directory Application Mode, and Computer CI types.



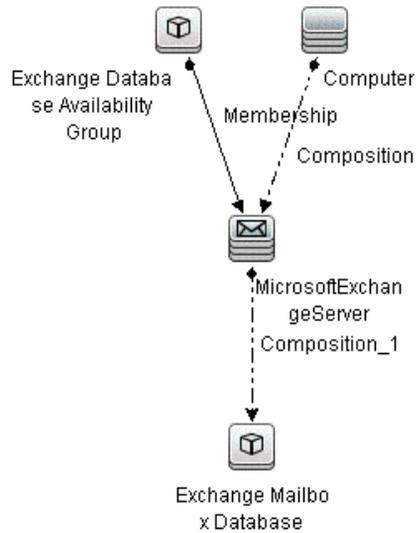
- **Exchange_Site_View:** This view refers to the Exchange System, Exchange Mail Server, Exchange Hub Server, Exchange Edge Server, Active Directory Site, and Exchange Unified Messaging Server types.



- **Exchange_Network_Deployment_View:** This view refers to the Exchange System, Exchange Mail Server, Exchange Hub Server, Exchange Edge Server, Active Directory Site, Exchange Unified Messaging Server, and Node CI types.



- **Exchange_DAG_View:** This view refers to the Exchange Organization, Exchange Database Availability Groups, Exchange Servers (which are members of the Exchange DAG), Exchange Mailbox Databases and Computer CI types.



Note: The content pack contains the CI type, Database Availability Group (DAG), to support the Exchange Server 2010. DAG is a set of up to 16 Microsoft Exchange Server 2010 Mailbox servers. These 16 servers monitor each other for failures and provide automatic database-level recovery from database, server, or network failures.

Enrichment Rules

The Microsoft Exchange Server Content Pack contains the following Enrichment Rules:

- ▶ ADAM_Depends_DomainController
- ▶ ExchangeServer_Uses_GlobalCatalog
- ▶ ExchangeServer_IsMemberOf_ActiveDirectorySite
- ▶ ExchangeServer_Uses_DomainController

Health Indicators

The content pack includes the following Health Indicators (HIs) to monitor Exchange Server-related events.

CI Type	HI	Description	Value
Exchange Client Access Server	Active Sync Connectivity	Indicates the availability of Active Sync Connections on the Exchange Client Access Server.	Up, Down
Exchange Client Access Server	Active Sync Latency	Indicates the latency in accessing a user mailbox using Active Sync.	Normal, High, Very high
Exchange Client Access Server	IMAP4 Latency	Indicates the latency in IMAP4 Connections on the Client Access Server.	Normal, High, Very high
Exchange Client Access Server	Exchange Service Host Status	Indicates the status of Microsoft Exchange Service Host.	Up, Down
Exchange Client Access Server	File Distribution Service Status	Indicates the status of Microsoft Exchange File Distribution Service.	Up, Down
Exchange Client Access Server	POP3 Latency	Indicates the latency in POP3 Connections on the Client Access Server.	Normal, High, Very high

CI Type	HI	Description	Value
Exchange Client Access Server	IMAP4 Connectivity	Indicates the availability of IMAP4 connections on the Exchange Client.	Up, Down
Exchange Client Access Server	IMAP4 Service Status	Indicates the status of Microsoft Exchange IMAP4 Service.	Up, Down
Exchange Client Access Server	IMAP4 Status	Indicates the status of IMAP4 operations on the Exchange Client Access Server.	Critical, Normal
Exchange Client Access Server	OWA Connectivity	Indicates the availability of OWA Connections on the Exchange Client Access Server.	Up, Down
Exchange Client Access Server	OWA Latency	Indicates the latency in performing OWA operations on the Exchange Client Access Server.	Normal, High, Very high
Exchange Client Access Server	POP3 Connectivity	Indicates the availability of POP3 Connections on the Exchange Client Access Server.	Up, Down
Exchange Client Access Server	POP3 Service Status	Indicates the status of Microsoft Exchange POP3 Service.	Up, Down
Exchange Client Access Server	POP3 Status	Indicates the status of POP3 Operations on the Exchange Client Access Server.	Critical, Normal
Exchange Mail Server	Exchange Service Host Status	Indicates the status of Microsoft Exchange Service Host.	Up, Down
Exchange Unified Messaging Server	File Distribution Service Status	Indicates the status of Microsoft Exchange File Distribution Service.	Up, Down
Exchange Edge Server	ADAM Service Status	Indicates the status of Microsoft Exchange ADAM Service.	Up, Down

CI Type	HI	Description	Value
Exchange Edge Server	Edge Credential Service Status	Indicates the status of credential service status for Exchange Edge Server.	Up, Down
Exchange Email Server	Active Directory Access	Indicates the status of Active Directory Accessibility from Exchange Mail Server.	Up, Down
Exchange Email Server	Average Mail Delivery Time	Indicates the Average Mail Delivery Time on the Exchange Mail Server.	Normal, High, Very high
Exchange Email Server	Average Time for PF Delivery	Indicates the average time taken for Public Folder Posts or messages to be delivered to recipients on the Exchange Mail Server.	Normal, High, Very high
Exchange Email Server	Database Instance Status	Indicates the status of Exchange Database Instance.	Critical, Normal
Exchange Email Server	Exchange Service Host Status	Indicates the status of Microsoft Exchange Service Host.	Up, Down
Exchange Email Server	Exchange Memory Status	Indicates the status of memory used and available for Microsoft Exchange Process.	Normal, Critical
Exchange Email Server	Information Store Service Status	Indicates the status of Microsoft Exchange Information Store Service.	Up, Down
Exchange Email Server	Mailbox Assistant Service Status	Indicates the status of Microsoft Exchange Mailbox Assistants Service.	Up, Down
Exchange Email Server	Mailbox Receive Queue Length	Indicates the number of messages in the Mailbox Store's Receive Queue.	Normal, High, Very high
Exchange Email Server	MailFlow Latency	Indicates the latency in Mail Flow from the given Exchange Mail Server.	Normal, High, Very high

CI Type	HI	Description	Value
Exchange Email Server	MailFlow Status	Indicates the status of Mail Flow on the Exchange Mail Server.	Up, Down
Exchange Email Server	Mail Submission Service Status	Indicates the status of Microsoft Exchange Mail Submission Service.	Up, Down
Exchange Email Server	Mapi Connectivity	Indicates the status of MAPI Connectivity on the Exchange Mail Server.	Up, Down
Exchange Email Server	Mapi Latency	Indicates the latency in MAPI Connectivity on the Exchange Mail Server.	Normal, High, Very high
Exchange Email Server	Public Receive Queue Length	Indicates the number of messages in Public Store's Receive Queue.	Normal, High, Very high
Exchange Email Server	Public Replication Queue Length	Indicates the number of Replication messages waiting to be processed.	Normal, High, Very high
Exchange Email Server	Replication Service Status	Indicates the status of Microsoft Exchange Replication Service.	Up, Down
Exchange Email Server	Search Status	Indicates the status of Search Operation.	Up, Down
Exchange Email Server	Search Latency	Indicates the latency in performing an Exchange Search.	Normal, High, Very high
Exchange Email Server	System Attendant Status	Indicates the status of Microsoft Exchange System Attendant Service.	Up, Down
Exchange Hub Server	Edge Sync Service Status	Indicates the status of Synchronization service status for Exchange Hub Server.	Up, Down

CI Type	HI	Description	Value
Exchange Mailbox Database	Available Transaction Log Disk Space	Indicates the degree of Available Free Disk Space for Exchange Transaction Logs on the Exchange Mail Server.	Near Capacity, Low, Normal
Exchange Mailbox Database	Available Database Disk Space	Indicates the space available in the Disk containing the Database.	Near Capacity, Low, Normal
MicrosoftExchangeServer	AD Topology Service Status	Indicates the status of Microsoft Exchange Active Directory Topology Service.	Up, Down
MicrosoftExchangeServer	Active Directory Access	Indicates whether the Exchange Server can access the Active Directory.	Up, Down
Exchange Server	Create Item Status	Indicates the status of Create Item operation performed using Exchange Web Services.	Up, Down
Exchange Server	Create Item Latency	Indicates the latency in performing the operation Create Item using Exchange Web Services.	Normal, High, Very high
Exchange Server	Delete Item Status	Indicates the status of Delete Item operation performed using Exchange Web Services.	Up, Down
Exchange Server	Delete Item Latency	Indicates the latency in performing the operation Delete Item using Exchange Web Services.	Normal, High, Very high
Exchange Server	GC Bind Time	Indicates the time taken to bind with the GC.	Normal, High, Very high
Exchange Server	GC Search Time	Indicates the time taken to perform GC Search.	Normal, High, Very high

CI Type	HI	Description	Value
Exchange Server	Get Folder Status	Indicates the status of Get Folder operation performed using Exchange Web Services.	Up, Down
Exchange Server	Get Folder Latency	Indicates the latency in performing the operation Get Folder using Exchange Web Services.	Normal, High, Very high
Exchange Server	Sync Folder Status	Indicates the status of Sync Folder operation performed using Exchange Web Services.	Up, Down
Exchange Server	Sync Folder Latency	Indicates the latency in performing the operation Sync Folder using Exchange Web Services.	Normal, High, Very high
Exchange Transport Server	Active Mailbox Delivery Queue Length	Indicates the number of messages in the Active Mailbox Queues.	Normal, High, Very high
Exchange Transport Server	Aggregate Delivery Queue Length	Indicates the number of messages queued for delivery in all queues.	Normal, High, Very high
Exchange Transport Server	Delayed DSN Count	Indicates the number of Delayed Delivery Status Notifications which were generated on the Exchange Transport Server. Very High Values can indicate overload.	Normal, High, Very high
Exchange Transport Server	Failed DSN Count	Indicates the number of Failure Delivery Status Notifications generated.	Normal, High, Very high
Exchange Transport Server	Largest Delivery Queue Length	Indicates the number of messages in the largest delivery queue.	Normal, High, Very high

CI Type	HI	Description	Value
Exchange Transport Server	Poison Queue Length	Indicates the length of Poison Queue on the Exchange Transport Server.	Normal, High, Very high
Exchange Transport Server	Remote Delivery Queue Length	Indicates the length of Remote Delivery Queues on the Exchange Transport Server.	Normal, High, Very high
Exchange Transport Server	Retry Non Smtip Delivery Queue Length	Indicates the number of messages in retry in the non-SMTP gateway delivery queues.	Normal, High, Very high
Exchange Transport Server	Submission Queue Length	Indicates the length of Submission Queue on the Exchange Transport Server.	Normal, High, Very high
Exchange Transport Server	Transport Service Status	Indicates the status of Microsoft Exchange Transport Service.	Up, Down
Exchange Transport Server	Unreachable Queue Length	Indicates the length of the Unreachable Queue on the Exchange Transport Server.	Normal, High, Very high
Exchange Unified Messaging Server	Speech Engine Status	Indicates the status of Microsoft Exchange Speech Engine Service.	Up, Down
	Unified Messaging Connectivity	Indicates the availability of Unified Messaging Connections on the Microsoft Exchange Unified Messaging Server.	Up, Down
	Unified Messaging Status	Indicates the status of Microsoft Exchange Unified Messaging Service.	Up, Down

Event Type Indicators

The Content Pack includes the following Event Type Indicators (ETIs) to monitor Exchange Server-related events:

CI Type	ETI	Description	Value
Exchange Hub Server	Edge Synchronization Status	Indicates the status of Edge Synchronization.	Up
	Load Exchange Topology	Indicates if Exchange Topology Information could be read or loaded from Active Directory.	Down
	Submission ThreadCount	Indicates the percentage of Submission Threads currently running on the Exchange Hub Server. If the value is Very High then no new threads will be created and mail submission will fail.	Normal, High, Very High
Exchange Mail Server	Hub Server Reachability	Indicates if Exchange Hub Servers are reachable from the Exchange Mail Server.	Up, Down
	Mail Submission Status	Indicates the status of Mail Submission on the Exchange Mail Server.	Up, Down

Correlation Rules

The content pack includes the following rules to correlate Exchange Server-related events.

For more information on how the correlation rules work, see the *Operations Manager i Concepts Guide*.

Exchange::Clustered Server:Memory Load >> Exchange Memory Status

Description: Memory Load Impacts Memory Available for Exchange		
Cause		
CIT: Cluster Resource Group	ETI: Memory Load	Value: Paging
Symptom		
CIT: Exchange Mail Server	ETI: Exchange Memory Status	Value: Critical

Exchange::Clustered Server:Memory Usage Level >> Exchange Memory Status

Description: Memory Usage Level Impacts Memory Available for Exchange		
Cause		
CIT: Cluster Resource Group	ETI: Memory Usage Level	Value: Near Capacity
Symptom		
CIT: Exchange Mail Server	ETI: Exchange Memory Status	Value: Critical

Exchange::Clustered Server:PageFile Usage >> Exchange Memory Status

Description: Page File Usage on the Computer which hosts Exchange Mail Server Impacts Exchange Memory Status		
Cause		
CIT: Cluster Resource Group	ETI: Page File Usage	Value: Near Capacity
Symptom		
CIT: Exchange Mail Server	ETI: Exchange Memory Status	Value: Critical

Exchange::Clustered Server:Ping Availability >> Hub Server Reachability & Mail Submission Status

Description: Ping Availability of Exchange Mail Server Impacts Mail Submission and Hub Server Reachability		
Cause		
CIT: Cluster Resource Group	ETI: Ping Availability	Value: Unavailable
Symptom 1		
CIT: Exchange Mail Server	ETI: Hub Server Reachability	Value: Down
Symptom 2		
CIT: Exchange Mail Server	ETI: Mail Submission Status	Value: Down

Exchange::DomainController:DC LDAP Bind Response Time >> Client Accessibility

Description: LDAP Bind Response Time Impacts Client Accessibility		
Cause		
CIT: Domain Controller	ETI: DC LDAP Bind Response Time	Value: Very High
Symptom 1		
CIT: Exchange Client Access Server	ETI: OWA Latency	Value: Very High
Symptom 2		
CIT: Exchange Client Access Server	ETI: Active Sync Latency	Value: Very High

Exchange::DomainController:DC LDAP Bind Response Time >> MailFlow Latency

Description: LDAP Bind Response Time Impacts Mail flow Latency		
Cause		
CIT: Domain Controller	ETI: DC LDAP Bind Response Time	Value: Very High
Symptom		
CIT: Exchange Client Access Server	ETI: Mail Flow Latency	Value: Very High

Exchange::DomainController:DC LDAP Bind Response Time >> Transport Queue Length

Description: LDAP Bind Response Time Impacts Transport Queue Length		
Cause		
CIT: Domain Controller	ETI: DCLDAPBindResponseTime	Value: Very High
Symptom 1		
CIT: Exchange Hub Server	ETI: Active Mailbox Delivery Queue Length	Value: Very High
Symptom 2		
CIT: Exchange Hub Server	ETI: Remote Delivery Queue Length	Value: Very High
Symptom 3		
CIT: Exchange Hub Server	ETI: Delayed DSN Count	Value: Very High
Symptom 4		
CIT: Exchange Hub Server	ETI: Submission Queue Length	Value: Very High

Exchange::DomainController:DC LDAP Query Response Time >> Client Accessibility

Description: LDAP Query Response Time Impacts Client Accessibility		
Cause		
CIT: Domain Controller	ETI: DC LDAP Query Response Time	Value: Very High
Symptom 1		
CIT: Exchange Client Access Server	ETI: OWA Latency	Value: Very High
Symptom 2		
CIT: Exchange Client Access Server	ETI: Active Sync Latency	Value: Very High

Exchange::DomainController:DC LDAP Query Response Time >> MailFlow Latency

Description: LDAP Query Response Time Impacts Mail flow Latency		
Cause		
CIT: Domain Controller	ETI: DC Query Response Time	Value: Very High
Symptom		
CIT: Exchange Mail Server	ETI: Mail Flow Latency	Value: Very High

Exchange::DomainController:DC LDAP Query Response Time >> Transport Queue Length

Description: LDAP Query Response Time Impacts Transport Queue Length		
Cause		
CIT: Domain Controller	ETI: DC LDAP Query Response Time	Value: Very High
Symptom 1		
CIT: Exchange Hub Server	ETI: Active Mailbox Delivery Queue Length	Value: Very High
Symptom 2		
CIT: Exchange Hub Server	ETI: Remote Delivery Queue Length	Value: Very High
Symptom 3		
CIT: Exchange Hub Server	ETI: Delayed DSN Count	Value: Very High
Symptom 4		
CIT: Exchange Hub Server	ETI: Submission Queue Length	Value: Very High

Exchange::Exchange Client Access Server:IMAP4 Service Status >> IMAP4 Connectivity

Description: IMAP4 Service impacts IMAP4 Connectivity		
Cause		
CIT: Exchange Client Access Server	ETI: IMAP4 Service Status	Value: Down
Symptom		
CIT: Exchange Client Access Server	ETI: IMAP4 Connectivity	Value: Down

Exchange::Exchange Client Access Server:POP3 Service Status >> POP3 Connectivity

Description: POP3 Service impacts POP3 Connectivity		
Cause		
CIT: Exchange Client Access Server	ETI: POP3 Service Status	Value: Down
Symptom		
CIT: Exchange Client Access Server	ETI: POP3 Connectivity	Value: Down

Exchange::Exchange Hub Server:Active Mailbox Delivery Queue Length >> Mail Flow Latency

Description: Active Mailbox Delivery Queue Length Impacts Mail Flow Latency		
Cause		
CIT: Exchange Hub Server	ETI: Active Mailbox Delivery Queue Length	Value: Very High
Symptom		
CIT: Exchange Mail Server	ETI: Mail Flow Latency	Value: Very High

Exchange::Exchange Hub Server:Submission Queue Length >> MailFlow Latency

Description: Submission Queue Length Impacts Mail Flow Latency		
Cause		
CIT: Exchange Hub Server	ETI: Submission Queue Length	Value: Very High
Symptom		
CIT: Exchange Mail Server	ETI: Mail Flow Latency	Value: Very High

Exchange::Exchange Hub Server:Submission Thread Count >> Mail Submission Status

Description: Submission Thread Count Impacts Mail Submission on Exchange Mail Server		
Cause		
CIT: Exchange Hub Server	ETI: Submission Thread Count	Value: Very High
Symptom		
CIT: Exchange Mail Server	ETI: Mail Submission Status	Value: Down

Exchange::Exchange Hub Server:Transport Service Status >> Mail Submission Status & Mail Flow Status

Description: Transport Service Impacts Mail Submission and Mail Flow		
Cause		
CIT: Exchange Hub Server	ETI: Transport Service Status	Value: Down
Symptom 1		
CIT: Exchange Mail Server	ETI: Mail Flow Status	Value: Down
Symptom 2		
CIT: Exchange Mail Server	ETI: Mail Submission Status	Value: Down

Exchange::Exchange Mailbox Database:Available Database Log Disk Space >> Information Store Service Status

Description: Available Database Log Disk Space Impacts Information Store Service		
Cause		
CIT: Exchange Mailbox Database	ETI: Available Database Disk Space	Value: Near Capacity
Symptom		
CIT: Exchange Mail Server	ETI: Information Store Service Status	Value: Down

Exchange::Exchange Mailbox Database:Available Database Disk Space >> Information Store Service Status

Description: Available Database Disk Space Impacts Information Store Service		
Cause		
CIT: Exchange Mailbox Database	ETI: Available Transaction Log Disk Space	Value: Down
Symptom		
CIT: Exchange Mail Server	ETI: Information Store Service Status	Value: Down

Exchange::Exchange Mail Server:Hub Server Reachability >> Mail Submission Status

Description: Hub Server Reachability Impacts Mail Submission		
Cause		
CIT: Exchange Mail Server	ETI: Hub Server Reachability	Value: Down
Symptom		
CIT: Exchange Mail Server	ETI: Mail Submission Status	Value: Down

Exchange::Exchange Mail Server:Information Store Service Status >> Client Accessibility

Description: Information Store Service Impacts Client Accessibility		
Cause		
CIT: Exchange Mail Server	ETI: Information Store Service Status	Value: Down
Symptom 1		
CIT: Exchange Client Access Server	ETI: Active Sync Connectivity	Value: Down
Symptom 2		
CIT: Exchange Client Access Server	ETI: IMAP4 Connectivity	Value: Down
Symptom 3		
CIT: Exchange Client Access Server	ETI: OWA Connectivity	Value: Down
Symptom 4		
CIT: Exchange Client Access Server	ETI: POP3 Connectivity	Value: Down

Exchange::Exchange Mail Server:Information Store Service Status >> Mail Flow Status & Mapi Connectivity

Description: Information Store Service Impacts Mail Flow and Mapi Connectivity		
Cause		
CIT: Exchange Mail Server	ETI: Information Store Service Status	Value: Down
Symptom 1		
CIT: Exchange Mail Server	ETI: Mail Flow Status	Value: Down
Symptom 2		
CIT: Exchange Mail Server	ETI: Mapi Connectivity	Value: Down

Exchange::Exchange Mail Server:Mail Submission Service Status >> Mail Flow Status

Description: Mail Submission Service Impacts Mail Flow		
Cause		
CIT: Exchange Mail Server	ETI: Mail Submission Service Status	Value: Down
Symptom		
CIT: Exchange Mail Server	ETI: Mail Flow Status	Value: Down

Exchange::Exchange Unified Messaging Server:Speech Engine Status >> Unified Messaging Status

Description: Speech Engine Service Impacts Unified Messaging Service		
Cause		
CIT: Exchange Unified Messaging Server	ETI: Speech Engine Status	Value: Down
Symptom		
CIT: Exchange Unified Messaging Server	ETI: Unified Messaging Status	Value: Down

Exchange::File System:Disk Usage Level >> Available Database Disk Space

Description: Disk Usage Level Impacts Available Database Disk space		
Cause		
CIT: FileSystem	ETI: Disk Usage Level	Value: Near Capacity
Symptom 1		
CIT: Exchange Mailbox Database	ETI: Available Database Disk Space	Value: Near Capacity
Symptom 2		
CIT: Exchange Mailbox Database	ETI: Available Transaction Log Disk Space s	Value: Near Capacity

Exchange::GlobalCatalog:GC Query Response Time >> Exchange GC Search Time

Description: GC Query Response Time Impacts Exchange GC Search		
Cause		
CIT: Global Catalog	ETI: GC LDAP Query Response Time	Value: Very High
Symptom		
CIT: MicrosoftExchangeServer	ETI: GC Search Time	Value: Very High

Exchange::Microsoft Exchange Server:AD Topology Service Status >> Client Access Services

Description: Active Directory Topology Service Impacts Client Access Services		
Cause		
CIT: MicrosoftExchangeServer	ETI: AD Topology Service Status	Value: Down
Symptom 1		
CIT: Exchange Client Access Server	ETI: File Distribution Service Status	Value: Down
Symptom 2		
CIT: Exchange Client Access Server	ETI: Exchange Service Host Status	Value: Down
Symptom 3		
CIT: Exchange Client Access Server	ETI: IMAP4 Service Status	Value: Down
Symptom 4		
CIT: Exchange Client Access Server	ETI: POP3 Service Status	Value: Down

Exchange::Microsoft Exchange Server:AD Topology Service Status >> Hub Transport Services

Description: Active Directory Topology Service Impacts Hub Transport Services		
Cause		
CIT: MicrosoftExchangeServer	ETI: AD Topology Service Status	Value: Down
Symptom 1		
CIT: Exchange Hub Server	ETI: Transport Service Status	Value: Down
Symptom 2		
CIT: Exchange Hub Server	ETI: Edge Sync Service Status	Value: Down

Exchange::Microsoft Exchange Server:AD Topology Service Status >> Mail Server Services

Description: Active Directory Topology Service Impacts Mail Server Services		
Cause		
CIT: ExchangeServer	ETI: AD Topology Service Status	Value: Down
Symptom 1		
CIT: Exchange Mail Server	ETI: Mail Submission Service Status	Value: Down
Symptom 2		
CIT: Exchange Mail Server	ETI: Mailbox Assistant Service Status	Value: Down
Symptom 3		
CIT: Exchange Mail Server	ETI: Replication Service Status	Value: Down

Description: Active Directory Topology Service Impacts Mail Server Services		
Symptom 4		
CIT: Exchange Mail Server	ETI: Exchange Service Host Status	Value: Down
Symptom 5		
CIT: Exchange Mail Server	ETI: Active Directory Access	Value: Down
Symptom 6		
CIT: Exchange Mail Server	ETI: Mapi Connectivity	Value: Down
Symptom 7		
CIT: Exchange Mail Server	ETI: Mail Flow Status	Value: Down

Exchange::Microsoft Exchange Server:AD Topology Service Status >> Unified Messaging Services

Description: Active Directory Topology Service Impacts Unified Messaging Services		
Cause		
CIT: ExchangeServer	ETI: AD Topology Service Status	Value: Down
Symptom 1		
CIT: Exchange Unified Messaging Server	ETI: File Distribution Service Status	Value: Down
Symptom 2		
CIT: Exchange Unified Messaging Server	ETI: Unified Messaging Status	Value: Down

Exchange::Microsoft Exchange Server:GC Search Time >> Client Accessibility

Description: GC Search Time Impacts Client Accessibility		
Cause		
CIT: MicrosoftExchangeServer	ETI: GC Search Time	Value: Very High
Symptom 1		
CIT: Exchange Client Access Server	ETI: OWA Latency	Value: Very High
Symptom 2		
CIT: Exchange Client Access Server	ETI: Active Sync Latency	Value: Very High

Exchange::Microsoft Exchange Server:GC Search Time >> Mail Flow Latency

Description: GC Search Time Impacts Mail Flow Latency		
Cause		
CIT: MicrosoftExchangeServer	ETI: GC Search Time	Value: Very High
Symptom		
CIT: Exchange Mail Server	ETI: Mapi Flow Latency	Value: Very High

Exchange::Microsoft Exchange Server:GC Search Time >> Transport Queue Length

Description: GC Search Time Impacts Transport Queue		
Cause		
CIT: MicrosoftExchangeServer	ETI: GC Search Time	Value: Very High

Description: GC Search Time Impacts Transport Queue		
Symptom 1		
CIT: Exchange Hub Server	ETI: Active Mailbox Delivery Queue Length	Value: Very High
Symptom 2		
CIT: Exchange Hub Server	ETI: Remote Delivery Queue Length	Value: Very High
Symptom 3		
CIT: Exchange Hub Server	ETI: Delayed DSN Count	Value: Very High
Symptom 2		
CIT: Exchange Hub Server	ETI: Submission Queue Length	Value: Very High

Exchange::Network Interface:Interface Communication Status >> Client Accessibility

Description: Network Interface Communication status impacts Client Accessibility		
Cause		
CIT: Network Interface	ETI: Interface Communication Status	Value: Unavailable
Symptom 1		
CIT: Exchange Client Access Server	ETI: IMAP4Latency	Value: Very High
Symptom 2		
CIT: Exchange Client Access Server	ETI: POP3Latency	Value: Very High
Symptom 3		
CIT: Exchange Client Access Server	ETI: IMAP4Connectivity	Value: Down

Description: Network Interface Communication status impacts Client Accessibility		
Symptom 4		
CIT: Exchange Client Access Server	ETI: POP3Connectivity	Value: Down
Symptom 5		
CIT: Exchange Client Access Server	ETI: OWAConnectivity	Value: Down
Symptom 6		
CIT: Exchange Client Access Server	ETI: ActiveSyncConnectivity	Value: Down

Exchange::Network Interface:Interface Communication Status >> Hub Server Reachability

Description: Network Interface Communication status impacts Hub Server Reachability		
Cause		
CIT: Network Interface	ETI: Interface Communication Status	Value: Unavailable
Symptom 1		
CIT: Exchange Mail Server	ETI: HubServerReachability	Value: Down

Exchange::Network Interface:Interface Communication Status >> Mailbox Queue Lengths

Description: Network Interface Communication status impacts Mailbox Queue Lengths		
Cause		
CIT: Network Interface	ETI: Interface Communication Status	Value: Unavailable
Symptom 1		
CIT: Exchange Mail Server	ETI: MailboxReceiveQueueLength	Value: Very High
Symptom 2		
CIT: Exchange Mail Server	ETI: PublicReplicationQueueLength	Value: Very High
Symptom 3		
CIT: Exchange Mail Server	ETI: PublicReceiveQueueLength	Value: Very High
Symptom 4		
CIT: Exchange Mail Server	ETI: AverageMailDeliveryTime	Value: Very High
Symptom 5		
CIT: Exchange Mail Server	ETI: AverageTimeforPFDelivery	Value: Very High

Exchange::Network Interface:Interface Communication Status >> Transport Queue Lengths

Description: Network Interface Communication status impacts Transport Queue Lengths		
Cause		
CIT: Network Interface	ETI: Interface Communication Status	Value: Unavailable
Symptom 1		
CIT: Exchange Hub Server	ETI: UnreachableQueueLength	Value: Very High
Symptom 2		
CIT: Exchange Hub Server	ETI: LargestDeliveryQueueLength	Value: Very High
Symptom 3		
CIT: Exchange Hub Server	ETI: RetryNonSmtpDelivery Queue Length	Value: Very High
Symptom 4		
CIT: Exchange Hub Server	ETI: AggregateDeliveryQueueLength	Value: Very High
Symptom 5		
CIT: Exchange Edge Server	ETI: UnreachableQueueLength	Value: Very High
Symptom 6		
CIT: Exchange Edge Server	ETI: LargestDeliveryQueueLength	Value: Very High
Symptom 7		
CIT: Exchange Edge Server	ETI: RetryNonSmtpDelivery QueueLength	Value: Very High

Description: Network Interface Communication status impacts Transport Queue Lengths		
Symptom 8		
CIT: Exchange Edge Server	ETI: AggregateDeliveryQueueLength	Value: Very High

Exchange::Network Interface:Interface Utilization >> Client Accessibility

Description: Network Interface Utilization impacts Client Accessibility		
Cause		
CIT: Network Interface	ETI: Interface Utilization	Value: High
Symptom 1		
CIT: Exchange Client Access Server	ETI: IMAP4Latency	Value: Very High
Symptom 2		
CIT: Exchange Client Access Server	ETI: POP3Latency	Value: Very High
Symptom 3		
CIT: Exchange Client Access Server	ETI: IMAP4Connectivity	Value: Down
Symptom 4		
CIT: Exchange Client Access Server	ETI: POP3Connectivity	Value: Down
Symptom 5		
CIT: Exchange Client Access Server	ETI: OWACConnectivity	Value: Down
Symptom 6		
CIT: Exchange Client Access Server	ETI: ActiveSyncConnectivity	Value: Down

Exchange::Network Interface:Interface Utilization >> Hub Server Reachability

Description: Network Interface Utilization impacts Hub Server Reachability		
Cause		
CIT: Network Interface	ETI: Interface Communication Status	Value: High
Symptom 1		
CIT: Exchange Mail Server	ETI: HubServerReachability	Value: Down

Exchange::Network Interface:Interface Utilization >> Mailbox Queue Lengths

Description: Network Interface Utilization impacts Mailbox Queue Lengths		
Cause		
CIT: Network Interface	ETI: Interface Utilization	Value: High
Symptom 1		
CIT: Exchange Mail Server	ETI: MailboxReceiveQueueLength	Value: Very High
Symptom 2		
CIT: Exchange Mail Server	ETI: PublicReplicationQueueLength	Value: Very High
Symptom 3		
CIT: Exchange Mail Server	ETI: PublicReceiveQueueLength	Value: Very High
Symptom 4		
CIT: Exchange Mail Server	ETI: AverageMailDeliveryTime	Value: Very High

Description: Network Interface Utilization impacts Mailbox Queue Lengths		
Symptom 5		
CIT: Exchange Mail Server	ETI: AverageTimeforPFDelivery	Value: Very High

Exchange::Network Interface:Interface Utilization >> Transport Queue Lengths

Description: Network Interface Utilization impacts Transport Queue Lengths		
Cause		
CIT: Network Interface	ETI: Interface Utilization	Value: High
Symptom 1		
CIT: Exchange Hub Server	ETI: UnreachableQueueLength	Value: Very High
Symptom 2		
CIT: Exchange Hub Server	ETI: LargestDeliveryQueueLength	Value: Very High
Symptom 3		
CIT: Exchange Hub Server	ETI: RetryNonSmtplibDeliveryQueueLength	Value: Very High
Symptom 4		
CIT: Exchange Hub Server	ETI: AggregateDeliveryQueueLength	Value: Very High
Symptom 5		
CIT: Exchange Edge Server	ETI: UnreachableQueueLength	Value: Very High
Symptom 6		
CIT: Exchange Edge Server	ETI: LargestDeliveryQueueLength	Value: Very High

Description: Network Interface Utilization impacts Transport Queue Lengths		
Symptom 7		
CIT: Exchange Edge Server	ETI: RetryNonSmtpDeliveryQueueLength	Value: Very High
Symptom 8		
CIT: Exchange Edge Server	ETI: AggregateDeliveryQueueLength	Value: Very High

Exchange::Network Interface:Network IO >> Client Accessibility

Description: Network IO Impacts Client Accessibility		
Cause		
CIT: Interface	ETI: Interface Utilization	Value: High
Symptom 1		
CIT: Exchange Client Access Server	ETI: Active Sync Latency	Value: Very High
Symptom 2		
CIT: Exchange Client Access Server	ETI: OWA Latency	Value: Very High

Exchange::Network Interface:Network IO >> Mail Flow Latency

Description: Network IO Impacts Mail Flow Latency		
Cause		
CIT: Interface	ETI: Interface Utilization	Value: High
Symptom		
CIT: Exchange Mail Server	ETI: MailFlowLatency	Value: Very High

Exchange::Network Interface:Network IO >> Transport Queue Length

Description: Network IO Impacts Transport Queue Length		
Cause		
CIT: Interface	ETI: Interface Utilization	Value: High
Symptom 1		
CIT: Exchange Hub Server	ETI: Active Mailbox Delivery Queue Length	Value: Very High
Symptom 2		
CIT: Exchange Hub Server	ETI: Remote Delivery Queue Length	Value: Very High
Symptom 3		
CIT: Exchange Hub Server	ETI: Delayed DSN Count	Value: Very High
Symptom 4		
CIT: Exchange Hub Server	ETI: Submission Queue Length	Value: Very High

Exchange::Windows:CPU Load >> Edge TransportQueueLength

Description: CPU Load Impacts Edge Transport Queue Length		
Cause		
CIT: Windows	ETI: CPU Load	Value: Bottlenecked
Symptom 1		
CIT: Exchange Edge Server	ETI: Submission Queue Length	Value: Very High
Symptom 2		
CIT: Exchange Edge Server	ETI: Active Mailbox Delivery Length	Value: Very High

Description: CPU Load Impacts Edge Transport Queue Length		
Symptom 3		
CIT: Exchange Edge Server	ETI: Aggregate Delivery Queue Length	Value: Very High

Exchange::Windows:CPU Load >> Hub TransportQueueLength

Description: CPU Load Impacts Hub Transport Queue Length		
Cause		
CIT: Windows	ETI: CPU Load	Value: Bottlenecked
Symptom 1		
CIT: Exchange Hub Server	ETI: Submission Queue Length	Value: Very High
Symptom 2		
CIT: Exchange Hub Server	ETI: Active Mailbox Delivery Length	Value: Very High
Symptom 3		
CIT: Exchange Hub Server	ETI: Aggregate Delivery Queue Length	Value: Very High

Exchange::Windows:CPU Load >> OWA Latency & Active Sync Latency

Description: CPU Load Impacts OWA and Active Sync Latency		
Cause		
CIT: Windows	ETI: CPU Load	Value: Bottlenecked
Symptom 1		
CIT: Exchange Client Access Server	ETI: OWA Latency	Value: Very High
Symptom 2		
CIT: Exchange Client Access Server	ETI: Active Sync Latency	Value: Very High

Exchange::Windows:Logical Disk Free Space >> Exchange Database

Description: Available Disk Space on Logical Disk Impacts Exchange Database		
Cause		
CIT: Windows	ETI: LogicalDisk Free Space	Value: Near Capacity
Symptom		
CIT: Exchange Mail Server	ETI: Database Instance Status	Value: Critical

Exchange::Windows:Memory Load >> Exchange Memory Status

Description: Memory Load Impacts Memory Available for Exchange		
Cause		
CIT: Windows	ETI: Memory Load	Value: Paging
Symptom		
CIT:Exchange Mail Server	ETI: Exchange Memory Status	Value: Critical

Exchange::Windows:Memory Usage Level >> Exchange Memory Status

Description: Memory Usage Level Impacts Memory Available for Exchange		
Cause		
CIT: Windows	ETI: Memory Usage Level	Value: Near Capacity
Symptom		
CIT: Exchange Mail Server	ETI: Exchange Memory Status	Value: Critical

Exchange::Windows:PageFile Usage >> Exchange Memory Status

Description: Page File Usage on the Computer which hosts Exchange Mail Server Impacts Exchange Memory Status		
Cause		
CIT: Windows	ETI: Page File Usage	Value: Near Capacity
Symptom		
CIT: Exchange Mail Server	ETI: Exchange Memory Status	Value: Critical

Exchange::Windows:Ping Availability >> Hub Server Reachability & Mail Submission Status

Description: Ping Availability of Hub Server Impacts Mail Submission and Hub Server Reachability		
Cause		
CIT: Windows	ETI: Ping Availability	Value: Unavailable
Symptom 1		
CIT: Exchange Mail Server	ETI: Mail Submission Status	Value: Down
Symptom 2		
CIT: Exchange Mail Server	ETI: Hub Server Reachability	Value: Down

Tool Definitions

Start MS Exchange Information Store Service: Starts the Microsoft Exchange Information service on a Microsoft Exchange Mailbox server.

Start MS Exchange Transport Service: Starts the Microsoft Exchange Transport Service on a Microsoft Exchange Transport server.

Graph Templates

The following table lists the graph templates present in the content pack and mapped policies.

Graph Templates	Policy Name	Policy Description
Virtual Memory Largest Block Size	EXSPI-8X Dc-Information Store Performance	Collect Performance Data on MExchangeIS Object
Virtual Memory Large Free Block Megabytes Usage	EXSPI-14X Dc-Information Store Performance	Collect Performance Data on MExchangeIS Object
Virtual Memory 16MB Free Block Trend		Collect Performance Data on MExchangeIS Object
Information Store Users and Connections		Collect Performance Data on MExchangeIS Object
MAPI RPC Performance		Collect Performance Data on MExchangeIS Object
MAPI RPC Latency Levels	EXSPI-8X Dc-Outlook Client	Log Outlook Client Metrics
Outlook Client RPC Performance	EXSPI-14X Dc-Outlook Client	Log Outlook Client Metrics
Outlook Client Failures		Log Outlook Client Metrics

Graph Templates	Policy Name	Policy Description
Exchange Public Folder Store EDB Database Statistics	EXSPI-8X Get Public IS Sum Data	Gets Public Folder Database Details
	EXSPI-14X Get Public IS Sum Data	
Exchange Mailbox Store EDB Database Statistics	EXSPI-8X Get Mailbox IS Sum Data	Gets Mailbox Database Details
	EXSPI-14X Get Mailbox IS Sum Data	
Transport Server Queues	EXSPI-8X Dc Transport Queues	This policy logs performance data of Transport Queues.
	EXSPI-14X Dc Transport Queues	

Policies Setting ETIs

The following table lists the content pack ETIs and SPI policies that set the ETIs.

Note: For more information on the measurement threshold policies and events, refer to the HP Operations Smart Plug-in for Microsoft Exchange Server documentation.

ETI/HI	Policy Name	Policy Description
Active Mailbox Delivery Queue Length	EXSPI-8X Edge Th-Active Mailbox Delivery Queue Length	Active Mailbox Delivery Queue Length is the number of messages in the active mailbox queues.
	EXSPI-14X Edge Th-Active Mailbox Delivery Queue Length	
	EXSPI-8X Hub Th-Active Mailbox Delivery_QLength	Alarm on Active Mailbox Delivery Queue Length perfmon counter.
	EXSPI-14X Hub Th-Active Mailbox Delivery_QLength	
ADAM Service Status	EXSPI-8X_ Check_ ADAMServiceStatus	Checks the status of Microsoft Exchange ADAM Service.
	EXSPI-14X_ Check_ ADAMServiceStatus	
AD Topology Service Status	EXSPI-8X_ Check_AD Topology Service Status	Checks the status of Microsoft Exchange Active Directory Topology Service.
	EXSPI-14X_ Check_AD Topology Service Status	

ETI/HI	Policy Name	Policy Description
Aggregate Delivery Queue Length	EXSPI-8X Edge Th-Agg Delivery QLength -All_Queues	Aggregate Delivery Queue Length -All_Queues is the number of messages queued for delivery in all queues.
	EXSPI-14X Edge Th-Agg Delivery QLength -All_Queues	
	EXSPI-8X Hub Th-Agg Del_QLength -All_ Queues	Alarm on Aggregate Delivery Queue Length -All_Queues perfmon counter.
	EXSPI-14X Hub Th-Agg Del_QLength -All_ Queues	
ActiveSync Connectivity	EXSPI-8X-Async Connectivity_Latency	Monitors the ActiveSync Latency on the Server.
	EXSPI-14X-Async Connectivity_Latency	
ActiveSync Latency	EXSPI-8X-Async Connectivity_Result	Monitors the status of ActiveSync Connectivity.
	EXSPI-14X-Async Connectivity_Result	
Average Mail Delivery Time	EXSPI-8X IS Mailbox Average Delivery Time	Information Store mailbox average delivery time.
	EXSPI-14X IS Mailbox Average Delivery Time	
Average Time for PF Delivery	EXSPI-8X IS Public Average Delivery Time	Information store public average delivery time.
	EXSPI-14X IS Public Average Delivery Time	
Database Instance Status	EXSPI-8X Information Store Db Log Threads Waiting	Alarm on information store threads waiting to write to transaction log.
	EXSPI-14X Information Store Db Log Threads Waiting	

ETI/Hi	Policy Name	Policy Description
Delayed DSN Count	EXSPI-8X Edge Th-Delay DSNs	Delay DSNs is the number of delivery status notification (DSNs) messages that have been generated.
	EXSPI-14X Edge Th-Delay DSNs	
	EXSPI-8X Hub Th-Delay DSNs	Alarm on delay DSNs perfmon counter.
	EXSPI-14X Hub Th-Delay DSNs	
Edge Credential Service Status	EXSPI-8X_ Check_EdgeCredential ServiceStatus	Checks the status of Microsoft Exchange Credential Service.
	EXSPI-14X_ Check_EdgeCredentialService Status	
Edge Sync Service Status	EXSPI-8X_ Check_HUBExchangeEdge SyncService Status	Checks the status of Microsoft Exchange EdgeSync Service.
	EXSPI-14X_ Check_HUBExchangeEdge SyncServiceStatus	
Exchange Memory Status	EXSPI-8X Information Store Memory Errors	Alarm on the number of Microsoft Exchange memory errors.
	EXSPI-14X Information Store Memory Errors	
Exchange Service Host Status	EXSPI-8X_Check_CAS ExchangeServiceHostStatus	Checks the status of Microsoft Exchange Mailbox Service Host.
	EXSPI-14X_Check_CAS ExchangeServiceHostStatus	
	EXSPI-8X_Check_MB ExchangeServiceHostStatus	Checks the status of Microsoft Exchange Mailbox Service Host.
	EXSPI-14X_Check_MB ExchangeServiceHostStatus	

ETI/HI	Policy Name	Policy Description
Failed DSN Count	EXSPI-8X Edge Th-Failure DSNs Total	Failure DNSs is the number of failure delivery status notifications (DSNs) messages that have been generated.
	EXSPI-14X Edge Th-Failure DSNs Total	
	EXSPI-8X Hub Th-FailureDSNsTotal	Alarm on failure DSNs total perfmon counter.
	EXSPI-14X Hub Th-FailureDSNsTotal	
File Distribution Service Status	EXSPI-8X_ Check_CASFileDistribution ServiceStatus	Checks the status of Microsoft Exchange File Distribution Service.
	EXSPI-14X_ Check_CASFileDistribution ServiceStatus	
	EXSPI-8X_Check_UMFile DistributionServiceStatus	Checks the status of Microsoft Exchange File Distribution Service.
	EXSPI-14X_Check_UMFile DistributionServiceStatus	
Hub Server Reachability	EXSPI-8X MExchangeMail Submission Events	Reports Microsoft Exchange mail submission events.
	EXSPI-14X MExchangeMail Submission Events	
IMPA4 Connectivity	EXSPI-8X Test Mapi Connectivity	Monitors the status of Imap Connectivity.
	EXSPI-14X Test Mapi Connectivity	
IMAP4 Latency	EXSPI-8X-IMap Connectivity_Latency	Monitors the IMAP4 Latency on the Server.
	EXSPI-14X-IMap Connectivity_Latency	

ETI/HI	Policy Name	Policy Description
IMAP4 Service Status	EXSPI-8X_Check_IMAP4 ServiceStatus	Checks the status of Microsoft Exchange IMPA4 Service.
	EXSPI-14X_Check_IMAP4 ServiceStatus	
IMAP4 Status	EXSPI-8X IMAP4 Failed Connection Rate	IMAP4 failed connections percentage.
	EXSPI-14X IMAP4 Failed Connection Rate	
Information Store Service Status	EXSPI-8X_Check_ InformationStoreService Status	Checks the status of Microsoft Exchange Information Store Service.
	EXSPI-14X_Check_ InformationStoreService Status	
Largest Delivery Queue Length	EXSPI-8X Edge Th-Largest Delivery Queue Length	Largest Delivery Queue Length is the number of messages in the largest delivery queue.
	EXSPI-14X Edge Th-Largest Delivery Queue Length	
	EXSPI-8X Hub Th-LargestDelivery_Q Length	Alarm on Largest Delivery Queue Length perfmon counter.
	EXSPI-14X Hub Th-LargestDelivery_Q Length	
Load Exchange Topology	EXSPI-8X MsExchange EdgeSync Events	Reports Microsoft Exchange edgesync events.
	EXSPI-14X MsExchange EdgeSync Events	

ETI/Hi	Policy Name	Policy Description
Mailbox Assistant Service Status	EXSPI-8X_ Check_MailboxAssistantService Status	Checks the status of Microsoft Exchange Mailbox Assistants Service.
	EXSPI-14X_ Check_MailboxAssistantService Status	
Mailbox Receive Queue Length	EXSPI-8X IS Mailbox Receive Queue Length	Checks the information store mailbox receive queue length.
Mail Submission Service Status	EXSPI-8X_ Check_MailSubmissionService Status	Checks the status of Microsoft Exchange Mail Submission Service.
	EXSPI-14X_ Check_MailSubmissionService Status	
Mail Submission Status	EXSPI-8X-MSEExchangeMail Submission Events	Reports Microsoft Exchange mail submission events.
	EXSPI-14X-MSEExchangeMail Submission Events	
Mapi Connectivity	EXSPI-8X-Mapi Connectivity_Result	Monitors the status of MAPI Connectivity.
	EXSPI-14X-Mapi Connectivity_Result	
MapiLatency	EXSPI-8X-Mapi Connectivity_Latency	Monitors the MAPI Latency on the Server.
	EXSPI-14X-Mapi Connectivity_Latency	
MailFlowLatency	EXSPI-8X-MailFlowStatus_Latency	Monitors the MailFlowLatency on the Server.

ETI/Hi	Policy Name	Policy Description
MailFlowStatus	EXSPI-8X-MailFlowStatus_Result	Monitors the status of Mail Flow.
	EXSPI-14X-MailFlowStatus_Result	
OWAConnectivity	EXSPI-8X-OwaConnectivity_Result	Monitors the status of OWA Connectivity.
	EXSPI-14X-OwaConnectivity_Result	
OWALatency	EXSPI-8X-OwaConnectivity_Latency	Monitors the OWA Latency on the Server.
	EXSPI-14X-OwaConnectivity_Latency	
Poison Queue Length	EXSPI-8X Hub Th-Poison_QLength	Alarm on poison queue length perfmon counter.
	EXSPI-14X Hub Th-Poison_QLength	
	EXSPI-8X Edge Th-Poison Queue Length	Poison message queue length is the number of messages in the poison message queue.
	EXSPI-14X Edge Th-Poison Queue Length	
POP3Connectivity	EXSPI-8X-PopConnectivity_Result	Monitors the status of Pop3 Connectivity.
	EXSPI-14X-PopConnectivity_Result	
POP3 Latency	EXSPI-8X-PopConnectivity_Latency	Monitors the status of Pop3 Latency
	EXSPI-14X-PopConnectivity_Latency	

ETI/HI	Policy Name	Policy Description
POP3 Service Status	EXSPI-8X_Check_POP3Service Status	Checks the status of Microsoft Exchange POP3 Service.
	EXSPI-14X_Check_POP3Service Status	
POP3 Status	EXSPI-8X POP3 Failed Connection Rate	POP3 failed connections percentage.
	EXSPI-14X POP3 Failed Connection Rate	
Public Receive Queue Length	EXSPI-8X IS Public Receive Queue Length	Checks the information store public receive queue length.
Public Replication Queue Length	EXSPI-8X IS Public Replication Queue Length	Checks the information store replication queue length.
	EXSPI-14X IS Public Replication Queue Length	
Remote Delivery Queue Length	EXSPI-8X Edge Th-Active Remote Delivery Queue Length	Reports the number of messages in the active remote delivery queues.
	EXSPI-14X Edge Th-Active Remote Delivery Queue Length	
	EXSPI-8X Hub Th-ActiveRemoteDelivery_QLength	Alarm on active remote delivery queue length perfmon counter.
	EXSPI-14X Hub Th-ActiveRemoteDelivery_QLength	
Replication Service Status	EXSPI-8X_Check_ReplicationServiceStatus	Checks the status of Microsoft Exchange Mailbox Replication Service.
	EXSPI-14X_Check_ReplicationServiceStatus	

ETI/HI	Policy Name	Policy Description
Retry Non Smt Delivery Queue Length	EXSPI-8X Edge Th-Retry Non-SMTP Delivery Queue Length	Retry Non-SMTP Delivery Queue Length is the number of messages in retry in the non-SMTP gateway delivery queues.
	EXSPI-14X Edge Th-Retry Non-SMTP Delivery Queue Length	
	EXSPI-8X Hub Th-RetryNon-Smt Delivery _QLength	Alarm on Retry Non-Smt Delivery Queue Length perfmon counter.
	EXSPI-14X Hub Th-RetryNon-Smt Delivery _QLength	
Speech Engine Status	EXSPI-8X_Check_Speech EngineStatus	Checks the status of Microsoft Exchange Speech Engine Service.
	EXSPI-14X_Check_Speech EngineStatus	
Submission Thread Count	EXSPI-8X MExchange Store Driver Events	Reports the events generated for the source Microsoft Exchange store driver.
	EXSPI-14X MExchange Store Driver Events	
Submission Queue Length	EXSPI-8X Edge Th-Submission Queue Length	Number of messages in the submission queue.
	EXSPI-14X Edge Th-Submission Queue Length	
	EXSPI-8X Hub Th-Submission_QLength	Alarm on submission queue length perfmon counter.
	EXSPI-14X Hub Th-Submission_QLength	
System Attendant Status	EXSPI-8X_Check_System AttendantStatus	Checks the status of Microsoft Exchange Mailbox System Attendant Service.

ETI/HI	Policy Name	Policy Description
Transport Service Status	EXSPI-8X_Check_HUB ExchangeTransportService Status	Checks the status of Microsoft Exchange Transport Service.
	EXSPI-14X_Check_HUB ExchangeTransportService Status	
	EXSPI-8X_Check_EDGE ExchangeTransportService Status	Checks the status of Microsoft Exchange Transport Service.
	EXSPI-14X_Check_EDGE ExchangeTransportService Status	
Unified Messaging Status	EXSPI-8X_Check_Unified MessagingStatus	Checks Unified Messaging service status.
	EXSPI-14X_Check_Unified MessagingStatus	
Unreachable Queue Length	EXSPI-8X Hub Th-Unreachable_QLength	Alarm on unreachable queue length perfmon counter.
	EXSPI-14X Hub Th-Unreachable_QLength	
	EXSPI-8X Edge Th-Unreachable Queue Length	Unreachable queue length is the number of messages in the unreachable queue.
	EXSPI-14X Edge Th-Unreachable Queue Length	

Operations Orchestration Flow

When creating the mapping, you can set default values for the attributes listed in the following table.

Attribute	Description
omServerPort	Port number of the HPOM Tool WS.
omServerUser	User name for the HPOM Server that will use used in the HPOM Tool WS.
omServerPassword	Password for the HPOM Server that will use used in the HPOM Tool WS.

For more information about creating the mapping and a Run Book automation rule, see "How to Create a Run Book Automation Rule" on page 505.

The following table lists the Microsoft Exchange Server Operations Orchestration (OO) Flows:

OO Flow: Check Client Access Server Health

Flow input	Mapping CI	Event Attribute
omServer	exchangeclientaccessserver	Originating Server

User input when executing OO flow: Check Client Access Server Health

Flow input	CI Type
omNode	Target node with an HPOM Agent.
omCmdTimeout	The timeout value to be used when running the remote command on the node. By default set to 100000.
threshold	The threshold for GC Query Latency in milliseconds.

OO Flow: Check Mailbox Server Health

Flow input	Mapping CI	Event Attribute
omServer	exchangemailserver	Originating Server

User input when executing OO flow: Check Mailbox Server Health

Flow input	CI Type
omNode	Target node with an HPOM Agent.
omCmdTimeout	The timeout value to be used when running the remote command on the node. By default set to 100000.
threshold	The threshold for GC Query Latency in milliseconds.
maillatency	The threshold for MailFlow Latency in milliseconds.

OO Flow: Check Replication Health

Flow input	Mapping CI	Event Attribute
omServer	exchangemailserver	Originating Server

User input when executing OO flow: Check Replication Health

Flow input	CI Type
omNode	Target node with an HPOM Agent.
omCmdTimeout	The timeout value to be used when running the remote command on the node. By default set to 100000.
threshold	The threshold for GC Query Latency in milliseconds.

Microsoft Lync Server 2010 Content Pack

The Microsoft Lync Server 2010 Content Pack contains the following artifacts:

- ▶ Configuration Item Types on page 1017
- ▶ Views on page 1021
- ▶ Enrichment Rules on page 1026
- ▶ Health Indicators on page 1026
- ▶ Event Type Indicators on page 1033
- ▶ Correlation Rules on page 1035
- ▶ Graph Templates on page 1049
- ▶ Policies Setting ETIs on page 1053

Configuration Item Types

The Microsoft Lync Server 2010 includes the following Configuration Item Types (CITs):

CIT	Description	CIT Name	Parent CIT Name
Active Directory Forest (Existing CIT in RTSM)	Active Directory Forest is a group of one or more Active Directory domains sharing a logical structure.	activedirectoryforest	Active directory (abstract)
Lync Site (New CIT)	A Lync Site is a set of connected computers that contain Microsoft Lync Server 2010 components. Each Lync Site can have one or more Lync Pools, and every pool can contain one or more Microsoft Lync Server 2010 components. The Lync Site can either be a central site or a branch site.	lynctime	Lync (Abstract class inherited from Application System)
Lync Pool (New CIT)	A Lync Pool is a group of Lync Servers. The Lync Pool has identical services running on every Lync Server in the group in order to keep the pool stabilized even if one server in the pool goes down.	lynctimepool	Lync (Abstract class inherited from Application System)

CIT	Description	CIT Name	Parent CIT Name
Lync Server (New CIT)	Microsoft Lync Server 2010 is an enterprise real-time communications server providing features such as instant messaging, peer-to-peer and multiparty voice and video calling, structured conferences (audio, video and web), file transfer, and PSTN connectivity.	lyncserver	Communication Server (Abstract class inherited from Running Software)
Lync Server Role (New CIT)	A server role is a logical group of features and components required to perform a specific function in your messaging environment. Microsoft Lync Server 2010 allows you deploy server roles that you require for your organization.	lyncserverrole (abstract)	lyncresource (Abstract class inherited from Application Resource CIT)
Front End Server (New CIT)	The Front End Server is the main server role running many basic Microsoft Lync Server 2010 functions. The Back End Servers provide the database. In any Lync Server Enterprise Edition,deploy the Front End Server along with the Back End Server.	frontendserver	lyncserverrole

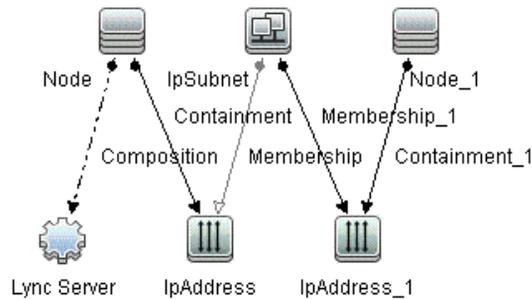
CIT	Description	CIT Name	Parent CIT Name
AV Conferencing Server (New CIT)	The AV Conferencing Server provides the audio/video conferencing functionality. This server can be placed with the Front End Server or can be deployed separately.	avconferencing server	lyncserverrole
Edge Server (New CIT)	The Edge Server allows you to communicate with external users outside the organization's firewalls.	edgeserver	lyncserverrole
Mediation Server (New CIT)	The Mediation Server is an essential component required to execute Enterprise Voice and dial-in conferencing. It mediates signaling and media between Enterprise Voice and a mediagateway.	mediation server	lyncserverrole
Monitoring Server (New CIT)	The Monitoring Server collects data, both in Enterprise Voice call and A/V conferences), regarding the quality of network media, call error records (CERs) and call detail records (CDRs).	monitoring server	lyncserverrole
Archiving Server (New CIT)	Archiving Server archives meeting and instant messaging (IM) content required for compliance reasons. Do not deploy the Archiving Server if you do not have any legal compliance reasons.	archiving server	lyncserverrole

CIT	Description	CIT Name	Parent CIT Name
Director Server (New CIT)	Directors authenticate Lync Server user requests connecting from outside the organization's firewall and route these users to their respective home pools. All unauthenticated traffic is stopped and dropped before it reaches the internal servers.	directorserver	lyncserverrole
Registrar Server (New CIT)	The Registrar Server accepts register requests from the Session Initiation Protocol (SIP) endpoints and save the registration information into a location database. This information saved is used to route signaling information to the endpoint.	registrarserver	lyncserverrole
Central Management Server (New CIT)	The Central Management store is a central database that stores configuration database for the entire Lync Server deployment. It directs replication of configuration data to the respective replica databases running on every machine and provides access to the master copy.	central management server	lyncserverrole

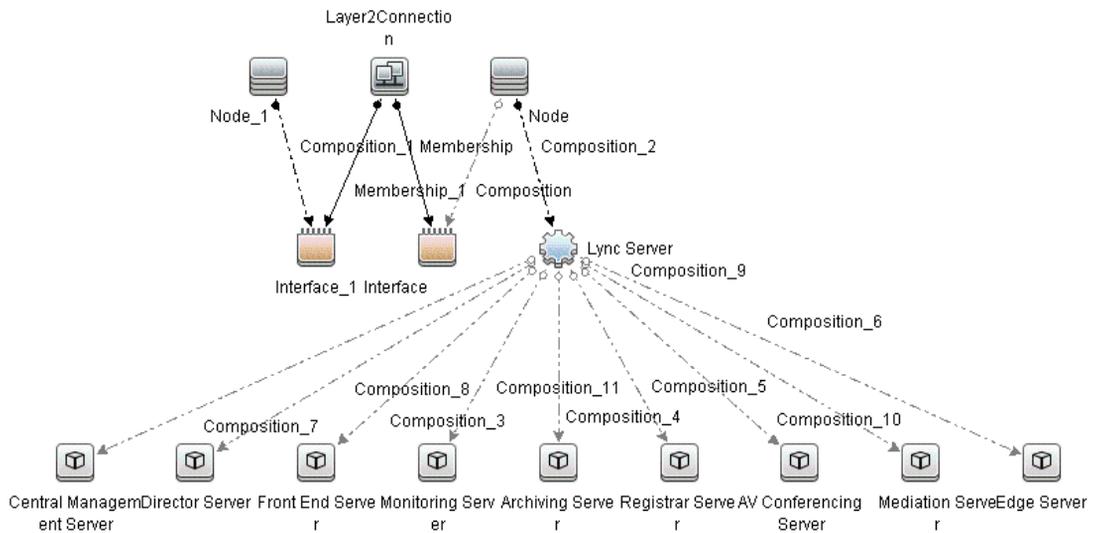
Views

The RTSM package in the Microsoft Lync Server 2010 Content Pack contains the following views:

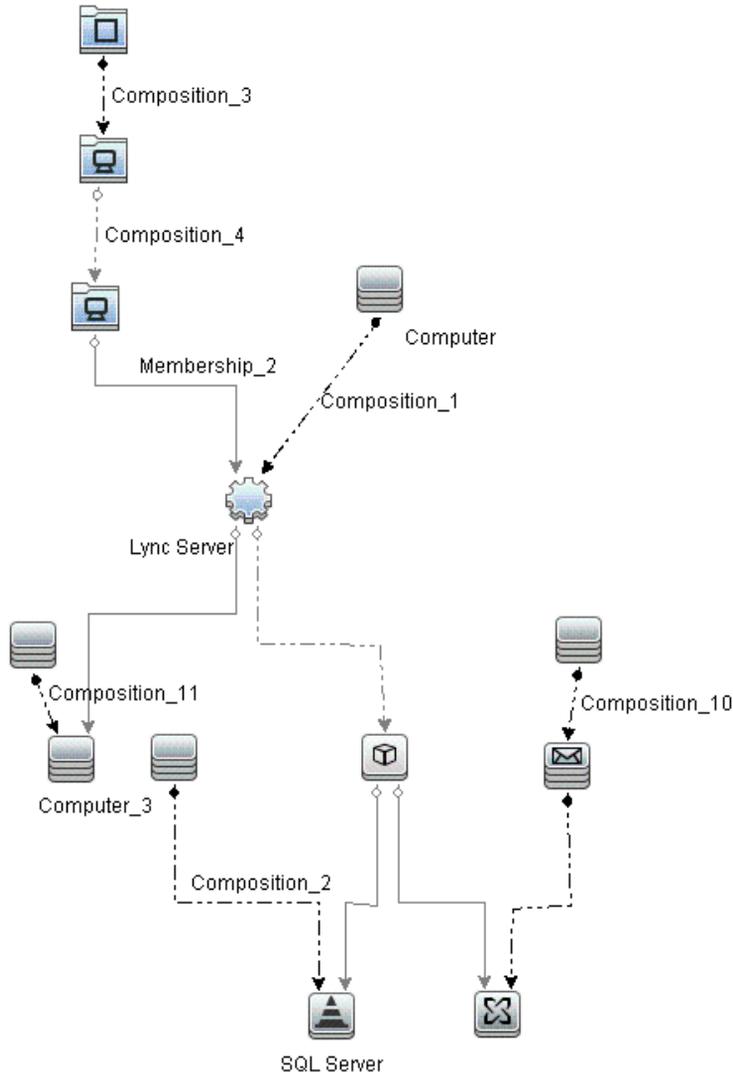
- **Lync_NetworkIP_View:** This view shows the Microsoft Lync Server, its Next Hop node, along with the IP address and the IP Subnet to which the node belongs to, and other nodes across the IP Subnet.



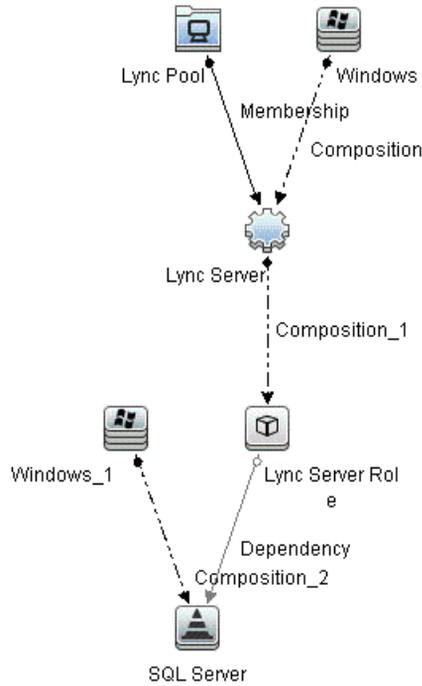
- **Lync_NetworkL2_View:** This view shows the Microsoft Lync Server along with its roles, the node on which the Lync Server is running, the node interface, by which it is connected to the network, and the Next Hop node in the Layer 2 Connection.



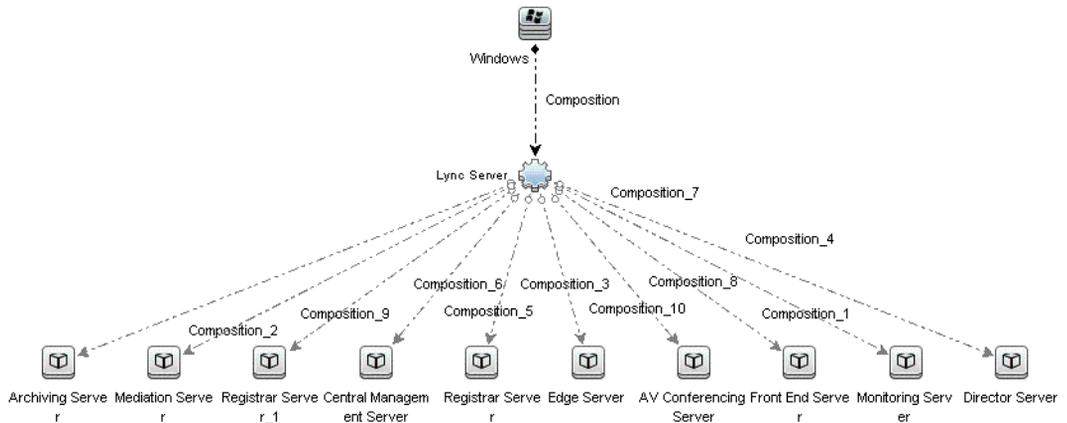
- **Lync_Org_View:** This view shows the Microsoft Lync Server organization and its components. It shows the AD forest where the Lync Servers are deployed along with the Lync Sites, the Lync Pools, and the Lync Servers and its roles. It also shows the Domain Controllers, SQL Servers and Exchange Servers on which the Lync Server has a dependency.



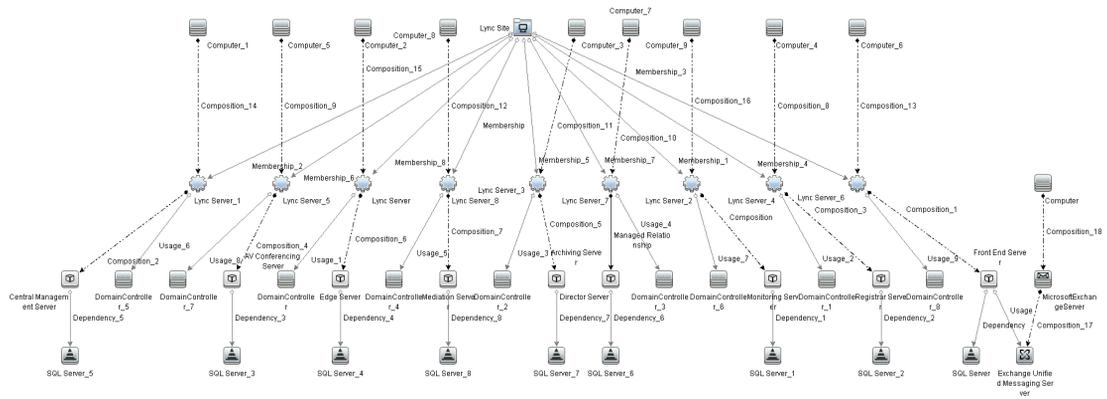
- **Lync_Pool_View:** This view shows the Lync Pools and the member Lync Server along with the server roles and the SQL Server instances used by the server.



- **Lync_Server_View:** This view shows all the Lync Servers and their roles.



► **Lync_Role_Site:** This view shows all the Lync Servers along with their roles in a given Lync Site.



Enrichment Rules

The Microsoft Lync Server 2010 Content Pack contains the following Enrichment Rules:

- ▶ CentralSite_Parent_BranchSite
- ▶ FrontEndServer_Uses_ExchangeUMServer
- ▶ LyncServer_Uses_DomainController
- ▶ LyncServerRole_Depends_SqlServer

Health Indicators

The Content Pack includes the following Health Indicators (HIs) to monitor Microsoft Lync Server 2010-related events:

CI Type	HI	Description	Value
Archiving Server	Archiving DB Latency	Indicates the DB queue latency in the Archiving Server.	Normal High Very High
Archiving Server	Archiving Service Status	Indicates the status of the Archiving Service.	Up Down
Archiving Server	Archiving DB Queue	Indicates the depth of DB Queue in Archiving Server.	Normal High Very High
Archiving Server	Archiving Server Load	Indicates the load on the Archiving Server.	Bottlenecked Overloaded Constrained Busy Normal
AV Conferencing Server	AV Conf Service Status	Indicates the status of AV Conference Service.	Up Down
AV Conferencing Server	AV Conf Server Load	Indicates the current load on the AV Conferencing Server.	Bottlenecked Overloaded Constrained Busy Normal

CI Type	HI	Description	Value
AV Conferencing Server	AV Conferencing Health	Indicates the health of AV Conferencing Server.	Normal Overloaded
AV Conferencing Server	Bandwidth Availability	Indicates the bandwidth available for AV conference.	Normal Low Very Low
AV Conferencing Server	Number Of Failed Conferences	Indicates the number of failed conferences.	Very High High Normal
AV Conferencing Server	AV Connectivity	Indicates connectivity of AV conference.	Up Down
AV Conferencing Server	Concurrent Conferences	Indicates the number of concurrent conferences occurring.	Very High High Normal
AV Conferencing Server	AV Latency	Indicates the latency of AV Conference.	Very High High Normal
AV Conferencing Server	Conference Login Latency	Indicates the latency in logging in to a conference.	Very High High Normal
Director Server	Federation Logon Failures	Indicates the logon failure rate of federated users.	Very High High Normal
Director Server	Director Service Status	Indicates the status of the Director Service.	Up Down
Director Server	Sproc Latency	Indicates the latency of processing a request in the Director Server.	Very High High Normal
Edge Server	EdgeConnectivity	Indicates the connectivity of Edge Server with the FrontEnd Server or Director Server.	Up Down

CI Type	HI	Description	Value
Edge Server	Authentication Failures	Indicates the rate of user authentication failures in Edge Server.	Very High High Normal
Edge Server	Edge AVAuth Service Status	Indicates the status of AV Authentication Service in the Edge Server.	Up Down
Edge Server	DOS Attack	Indicates whether the Edge Server is under Denial-of-Service attack.	Normal Attacked
Edge Server	Edge AV Service Status	Indicates the status of AV service in the Edge Server.	Up Down
Edge Server	Edge Access Service Status	Indicates the status of the Edge Access Service.	Up Down
Edge Server	Edge Web Conf Service Status	Indicates the status of Web Conference Service in Edge Server.	Up Down
FrontEnd Server	Outbound Tasks Queued	Indicates the number of outbound requests and responses queued.	Very High High Normal
FrontEnd Server	Response Grp Service Status	Indicates the status of Response Group Service.	Up Down
FrontEnd Server	Web Conferencing Service Status	Indicates the status of Web Conferencing Service.	Up Down
FrontEnd Server	FrontEnd Service Status	Indicates the status of the Front End Service.	Up Down
FrontEnd Server	IM Conferencing Latency	Indicates latency in creating a conference.	Very High High Normal
FrontEnd Server	Exchange UMConnectivity	Indicates the status of connectivity to the Exchange Unified Messaging Server.	Up Down

CI Type	HI	Description	Value
FrontEnd Server	Mediation Service Status	Indicates the status of Mediation Service.	Up Down
FrontEnd Server	IM Conferencing Status	Indicates the status of IM Conferencing Availability.	Up Down
FrontEnd Server	IM Conferencing Service Status	Indicates the status of IM Conferencing Service.	Up Down
FrontEnd Server	Conf Attendant Service Status	Indicates the status of Conference Attendant Service.	Up Down
FrontEnd Server	Application Sharing Service Status	Indicates the status of Application Sharing Service.	Up Down
FrontEnd Server	Request Processing Latency	Indicates the average processing time taken by the server for one request.	Very High High Normal
FrontEnd Server	Conf Announcement Service Status	Indicates the status of Conference Announcement Service.	Up Down
FrontEnd Server	CallPark Service Status	Indicates the status of Call Park Service.	Up Down
Lync Server	Server Load	Indicates if the Lync Server is undergoing heavy processing load.	Bottlenecked Overloaded Constrained Busy Normal
Lync Server	SIP Load	Indicates the load on the server due to SIP transactions.	Very High High Normal
Lync Server	Replication Service Status	Indicates the status of the Replication Service.	Up Down
Lync Server	Central Mgmt Service Status	Indicates the status of the Central Management Service.	Up Down

CI Type	HI	Description	Value
Lync Server Role	Queue Depth	Indicates the Queue Depth specific to particular role.	Very High High Normal
Lync Server Role	Backend Connectivity	Indicates the status of connectivity between the Lync Server and the back end SQL Server.	Up Down
Lync Server Role	Resource Usage	Indicates the resource usage of the a Lync Server.	Very High High Normal
Lync Server Role	Queue Latency	Indicates the Queue Length specific to particular role.	Very High High Normal
Lync Server Role	AD Connectivity	Indicates the status of AD Connectivity.	Up Down
Lync Server Role	LDAP Latency	Indicates the latency in LDAP queries.	Very High High Normal
Mediation Server	Mediation Server Health	Indicates the Health of the Mediation Server.	Normal Loaded Overloaded
Mediation Server	Exchange UM Calls Failure Rate	Indicates the rate of failure of UM Calls.	Very High High Normal
Mediation Server	Outbound Call Connectivity	Indicates the connectivity status of outbound calls.	Up Down
Mediation Server	Inbound Call Connectivity	Indicates the connectivity status for inbound calls.	Up Down
Mediation Server	Mediation Server Load	Indicates the current load on the Server.	Bottlenecked Overloaded Constrained Busy Normal

CI Type	HI	Description	Value
Mediation Server	Mediation Service Status	Indicates the service status of Mediation Service.	Up Down
Mediation Server	Voice Quality	Indicates the quality of voice in the Mediation Server.	Normal Low Very Low
Mediation Server	PSTN Connectivity	Indicates the status of connectivity with PSTN gateway.	Up Down
Monitoring Server	CDR Monitoring Service Status	Indicates the status of CDR Monitoring Service.	Up Down
Monitoring Server	Monitoring Server Load	Indicates the load on the Monitoring Server.	Bottlenecked Overloaded Constrained Busy Normal
Monitoring Server	QoE Monitoring Service Status	Indicates the status of QOE Monitoring Service.	Up Down
Registrar Server	Throttling Rate	Indicates the rate at which the Registrar Server is throttling requests.	Very High High Normal
Registrar Server	AD Connectivity Failure Rate	Indicates the rate of failures in AD Connectivity.	Very High High Normal
Registrar Server	User Registration Latency	Indicates the latency in user registration.	Very High High Normal
Registrar Server	DataCenter Resiliency	Indicates the data center resiliency status.	Up Down
Registrar Server	User Authentication Failure Rate	Indicates the rate of user authentication failures in the Registrar Server.	Very High High Normal

CI Type	HI	Description	Value
Registrar Server	Registrar Server Load	Indicates the load on the Registrar Server.	Bottlenecked Overloaded Constrained Busy Normal
Registrar Server	User Registration Status	Indicates the status of user registration.	Success Failure

Event Type Indicators

The Content Pack includes the following Event Type Indicators (ETIs) that monitor Microsoft Lync Server 2010-related events:

CI Type	ETI	Description	Value
FrontEnd Server	AudioTest Service Status	Indicates status of the Audio Test Service.	Up Down
	BandWidth Policy Service Core Status	Indicates the status of the BandWidth Policy Service Core.	Up Down
	BandWidth Policy ServiceAuth Status	Indicates the status of BandWidth Policy Service Authentication.	Up Down
	WebConf Compatibility Service Status	Indicates the status of the Web Conferencing Compatibility Service.	Up Down
	File Transfer Agent Service Status	Indicates the status of the File Transfer Agent Service.	Up Down
	AD Requests Pending	The number of requests waiting currently for Active Directory responses.	Very High High Normal
AV Conferencing Server	Concurrent Conferences	Indicates the number of concurrently occurring conferences.	Very High High Normal
	Bandwidth Availability	Indicates the bandwidth available for an AV conference.	Low Normal High

CI Type	ETI	Description	Value
Registrar	User Authentication Failure Rate	Indicates the rate of user authentication failures in the Registrar Server.	Very High High Normal
	User Registration Latency	Indicates latency in user registration.	Very High High Normal
	Data Center Resiliency	Indicates the data center resiliency status.	Up Down

Correlation Rules

The content pack includes the following rules to correlate Microsoft Lync Server 2010-related events.

For more information on how the correlation rules work, see the *Operations Manager i Concepts Guide*.

Lync::Registrar::ADConnectivity >> UserRegistration

Description: Active Directory Connectivity issues in Registrar impacts User Registration		
Cause		
CIT: Registrar Server	ETI: AD Connectivity	Value: Down
Symptom		
CIT: Registrar Server	ETI: User Registration Status	Value: Failure

Lync::Avconferencingserver::AVConferencingServiceStatus >> AVConfAvailability

Description: Status of AV Conference Service impacts availability of AV conferences on the AV Conferencing Server		
Cause		
CIT: AV Conferencing Server	ETI: AV Conf Service Status	Value: Down
Symptom 1		
CIT: AV Conferencing Server	ETI: AV Conferencing Health	Value: Overloaded
Symptom 2		
CIT: AV Conferencing Server	ETI: AV Connectivity	Value: Down
Symptom 3		
CIT: AV Conferencing Server	ETI: Number of failed conference	Value: Very High

Lync::LyncRole::Back End Connectivity >> Queue Depth

Description: Connectivity to the back end database impacts the various queues on a Microsoft Lync Server 2010		
Cause		
CIT: Lync Server Role	ETI: Backend Connectivity	Value: Down
Symptom		
CIT: Lync Server Role	ETI: Queue Depth	Value: Very High

Lync::FrontEndServer::Band Width Policy Service Core >> Band Width Policy Service Auth

Description: Status of Bandwidth Policy Service Core in frontend server impacts Bandwidth Policy Service Auth		
Cause		
CIT: Front End Server	ETI: BandWidth Policy Service Core Status	Value: Down
Symptom		
CIT: Front End Server	ETI: BandWidth Policy Service Auth Status	Value: Down

Lync::SQLServer::Database Status >> Back End Connectivity

Description: The status of the back end database impacts the status of back end connectivity on the Microsoft Lync Server 2010		
Cause		
CIT: SQL Server	ETI: Database Status	Value: Down
Symptom		
CIT: Lync Server Role	ETI: Backend Connectivity	Value: Down

Lync::SQLServer::DatabaseStatus >> FrontEndPerformance

Description: Database status on a the BackEnd Server impacts the performance of the FrontEnd server.		
Cause		
CIT: SQL Server	ETI: Database Status	Value: Down
Symptom 1		
CIT: FrontEnd Server	ETI: Queue Depth	Value: Very High
Symptom 2		
CIT: Front End Server	ETI: Outbound Tasks Queued	Value: Very High
Symptom 3		
CIT: Front End Server	ETI: Request Processing Latency	Value: Very High
Symptom 4		
CIT: Front End Server	ETI: Queue Latency	Value: Very High

Lync::DomainController::DCLDAPBindResponseTime >> LDAPLatency

Description: DC LDAP Bind Response Time in the Active Directory impacts LDAP Latency on the Lync Server Roles		
Cause		
CIT: DomainController	ETI: DC LDAP Bind Response Time	Value: Very High
Symptom		
CIT: Front End Server	ETI: LDAP Latency	Value: Very High

Lync::FrontEndServer::Front End Server Load >> Performance

Description: Load on the FrontEnd Server impacts performance		
Cause		
CIT: Lync Server	ETI: Server Load	Value: Bottlenecked
Symptom 1		
CIT: Front End Server	ETI: Resource Usage	Value: Very High
Symptom 2		
CIT: Front End Server	ETI: Outbound Tasks Queued	Value: Very High
Symptom 3		
CIT: Front End Server	ETI: Request Processing Latency	Value: Very High

Lync::FrontEndServer::Front End Service Status >> User Connectivity

Description: The status of the Front End Service on the Front End Server will impact user connectivity		
Cause		
CIT: Front End Server	ETI: Front End Service Status	Value: Down
Symptom 1		
CIT: Registrar Server	ETI: User Authentication Failure Rate	Value: Very High
Symptom 2		
CIT: Registrar Server	ETI: User Registration Status	Value: Failure

Lync::FrontEndServer::IM Conferencing Service Status >> IM Availability

Description: The status of the Instant Messaging Conference service impacts ability to host instant messaging by the Microsoft Lync Server 2010		
Cause		
CIT: Front End Server	ETI: IM Conferencing Service Status	Value: Down
Symptom 1		
CIT: Front End Server	ETI: IM Conferencing Status	Value: Down
Symptom 2		
CIT: Front End Server	ETI: IM Conferencing Latency	Value: Very High

Lync::FrontEndServer::IM Conferencing Service Status >> SIP Load

Description: The status of the IM Conferencing Service in the Front End Server impacts SIP load		
Cause		
CIT: FrontEnd Server	ETI: IM Conferencing Status	Value: Down
Symptom		
CIT: Lync Server	ETI: SIPLoad	Value: Very High

Lync::Interface::Interface Utilization >> AD Connectivity

Description: High interface utilization in the computer hosting the Microsoft Lync Server 2010 impacts the server's connectivity to the Active Directory		
Cause		
CIT: Interface	ETI: Interface Utilization	Value: High
Symptom 1		
CIT: Mediation Server	ETI: LDAP Latency	Value: Very High
Symptom 2		
CIT: Archiving Server	ETI: AD Connectivity	Value: Down

Description: High interface utilization in the computer hosting the Microsoft Lync Server 2010 impacts the server's connectivity to the Active Directory		
Symptom 3		
CIT: Registrar Server	ETI: AD Connectivity	Value: Down
Symptom 4		
CIT: Front End Server	ETI: LDAP Latency	Value: Very High
Symptom 5		
CIT: Archiving Server	ETI: LDAP Latency	Value: Very High
Symptom 6		
CIT: Central Management Server	ETI: AD Connectivity	Value: Down
Symptom 7		
CIT: Monitoring Server	ETI: LDAP Latency	Value: Very High
Symptom 8		
CIT: Mediation Server	ETI: AD Connectivity	Value: Down
Symptom 9		
CIT: Monitoring Server	ETI: AD Connectivity	Value: Down
Symptom 10		
CIT: AV Conferencing Server	ETI: AD Connectivity	Value: Down
Symptom 11		
CIT: AV Conferencing Server	ETI: LDAP Latency	Value: Very High
Symptom 12		
CIT: Registrar Server	ETI: LDAP Latency	Value: Very High
Symptom 13		
CIT: Front End Server	ETI: AD Connectivity	Value: Down

Description: High interface utilization in the computer hosting the Microsoft Lync Server 2010 impacts the server's connectivity to the Active Directory		
Symptom 14		
CIT: Director Server	ETI: LDAP Latency	Value: Very High
Symptom 15		
CIT: Director Server	ETI: AD Connectivity	Value: Down
Symptom 16		
CIT: Central Management Server	ETI: LDAP Latency	Value: Very High

Lync::Interface::Interface Utilization >> Back End Connectivity

Description: High network interface utilization on the computer hosting the Microsoft Lync Server 2010 impacts the back end connectivity of the server		
Cause		
CIT:Interface	ETI: Interface Utilization	Value: High
Symptom 1		
CIT: Registrar Server	ETI:BackEnd Connectivity	Value: Down
Symptom 2		
CIT: Mediation Server	ETI: Backend Connectivity	Value: Down
Symptom 3		
CIT: Archiving Server	ETI: Backend Connectivity	Value: Down
Symptom 4		
CIT: Front End Server	ETI: Backend Connectivity	Value: Down
Symptom 5		
CIT: AV Conferencing Server	ETI: Backend Connectivity	Value: Down

Description: High network interface utilization on the computer hosting the Microsoft Lync Server 2010 impacts the back end connectivity of the server		
Symptom 6		
CIT: Central Management Server	ETI: Backend Connectivity	Value: Down
Symptom 7		
CIT: Monitoring Server	ETI: Backend Connectivity	Value: Down
Symptom 8		
CIT: Director Server	ETI: Backend Connectivity	Value: Down
Symptom 9		
CIT: Edge Server	ETI: Backend Connectivity	Value: Down

Lync::Interface::Interface Utilization >> Director Performance

Description: Network interface utilization on the computer hosting the Director role of the Lync Server impacts the performance of the Director Server		
Cause		
CIT:Interface	ETI: Interface Utilization	Value: High
Symptom 1		
CIT: Director Server	ETI: Sproc Latency	Value: Very High
Symptom 2		
CIT: Director Server	ETI: Queue Depth	Value: Very High
Symptom 3		
CIT: Director Server	ETI: Queue Latency	Value: Very High

Lync::Interface::Interface Utilization >> Front End Performance

Description: High network interface utilization on the computer hosting the Front End role of the Lync Server impacts the performance of the Front End Server performance		
Cause		
CIT: Interface	ETI: Interface Utilization	Value: High
Symptom 1		
CIT: Front End Server	ETI: Outbound Tasks Queued	Value: Very High
Symptom 2		
CIT: Front End Server	ETI: Request Processing Latency	Value: Very High
Symptom 3		
CIT: Front End Server	ETI: Queue Depth	Value: Very High
Symptom 4		
CIT: Front End Server	ETI: Queue Latency	Value: Very High

Lync::DomainController::LDAP Connectivity >> AD Connectivity

Description: Status of LDAP Connectivity on the domain controllers impacts Active Directory connectivity in the Front End Server		
Cause		
CIT: DomainController	ETI: DC LDAP Bind Response Time	Value: Very High
Symptom		
CIT: Front End Server	ETI: AD Connectivity	Value: Down

Lync::DomainController::Logon Errors >> User Authentication Failures

Description: Logon errors in the Active Directory increases the rate of user authentication failures in the Front End Server		
Cause		
CIT: DomainController	ETI: Logon Errors	Value: Very High
Symptom		
CIT: Registrar Server	ETI: User Authentication Failure Rate	Value: Very High

Lync::Windows::Memory Load >> Front End Queue

Description: Memory load on the computer hosting the Lync Front End Server impacts the Front End Queue		
Cause		
CIT: Windows	ETI: Memory Load	Value: Bottleneck
Symptom 1		
CIT: Front End Server	ETI: Queue Depth	Value: Very High
Symptom 2		
CIT: Front End Server	ETI: Queue Latency	Value: Very High

Lync::Interface::Interface Utilization Next Hop >> AD Connectivity

Description: Interface utilization on the next hop from the Lync Server can impact the AD Connectivity		
Cause		
CIT: Interface	ETI: Interface Utilization	Value: High
Symptom 1		
CIT: Director Server	ETI: AD Connectivity	Value: Down
Symptom 2		
CIT: Edge Server	ETI: AD Connectivity	Value: Down

Description: Interface utilization on the next hop from the Lync Server can impact the AD Connectivity		
Symptom 3		
CIT: Registrar Server	ETI: AD Connectivity	Value: Down
Symptom 4		
CIT: Mediation Server	ETI: AD Connectivity	Value: Down
Symptom 5		
CIT: Monitoring Server	ETI: AD Connectivity	Value: Down
Symptom 6		
CIT: Archiving Server	ETI: AD Connectivity	Value: Down
Symptom 7		
CIT: Front End Server	ETI: AD Connectivity	Value: Down
Symptom 8		
CIT: AV Conferencing Server	ETI: AD Connectivity	Value: Down
Symptom 9		
CIT: Central Management Server	ETI: AD Connectivity	Value: Down

Lync::Interface::Interface Utilization Next Hop >> Back End Connectivity

Description: Network interface utilization on the next hop from the computer hosting the Microsoft Lync Server 2010 impacts ability to connect to the Back End Server		
Cause		
CIT: Interface	ETI: Interface Utilization	Value: High
Symptom 1		
CIT: Director Server	ETI: Backend Connectivity	Value: Down
Symptom 2		

Description: Network interface utilization on the next hop from the computer hosting the Microsoft Lync Server 2010 impacts ability to connect to the Back End Server		
CIT: Registrar Server	ETI: Backend Connectivity	Value: Down
Symptom 3		
CIT: Central Management Server	ETI: Backend Connectivity	Value: Down
Symptom 4		
CIT: Mediation Server	ETI: Backend Connectivity	Value: Down
Symptom 5		
CIT: Edge Server	ETI: Backend Connectivity	Value: Down
Symptom 6		
CIT: Monitoring Server	ETI: Backend Connectivity	Value: Down
Symptom 7		
CIT: Archiving Server	ETI: Backend Connectivity	Value: Down
Symptom 8		
CIT: AV Conferencing Server	ETI: Backend Connectivity	Value: Down
Symptom 9		
CIT: Front End Server	ETI: Backend Connectivity	Value: Down

Lync::Interface::Interface Utilization Next Hop >> Director Performance

Description: Network interface utilization on the next hop from the computer hosting the Director role of the Microsoft Lync Server 2010 impacts the performance of the Director Server		
Cause		
CIT: Interface	ETI: Interface Utilization	Value: High
Symptom 1		
CIT: Director Server	ETI: Queue Depth	Value: Very High

Description: Network interface utilization on the next hop from the computer hosting the Director role of the Microsoft Lync Server 2010 impacts the performance of the Director Server		
Symptom 2		
CIT: Director Server	ETI: Sproc Latency	Value: Very High
Symptom 3		
CIT: Director Server	ETI: Queue Latency	Value: Very High

Lync::Interface::Interface Utilization Next Hop >> Server Performance

Description: Network interface utilization on the next hop from the computer hosting the Front End role of the Microsoft Lync Server 2010 impacts the performance of the Front End Server		
Cause		
CIT: Interface	ETI: Interface Utilization	Value: High
Symptom 1		
CIT: Front End Server	ETI: Outbound Tasks Queued	Value: Very High
Symptom 2		
CIT: Front End Server	ETI: Queue Latency	Value: Very High
Symptom 3		
CIT: Front End Server	ETI: Request Processing Latency	Value: Very High
Symptom 4		
CIT: Front End Server	ETI: Queue Depth	Value: Very High

Lync::SQLServer::SQL Query Performance >> Front End Queue

Description: Performance of SQL Query in the SQL Server impacts Front End Queue in the Front End Server		
Cause		
CIT: SQL Server	ETI: SQL Query Performance	Value: Low
Symptom 1		
CIT: Front End Server	ETI: Queue Latency	Value: Very High
Symptom 2		
CIT: Front End Server	ETI: Queue Depth	Value: Very High

Lync::ExchangeUnifiedMessagingServer::Unified Messaging Status >> ExchangeUMCallsFailureRate

Description: Unified Messaging Service status in the Unified Messaging role of the Exchange Server impacts UM Call Failure Rate in the Mediation Server role of the Lync Server		
Cause		
CIT: Exchange Unified Messaging Server	ETI: Unified Messaging Status	Value: Down
Symptom 1		
CIT: Front End Server	ETI: Exchange UM Connectivity	Value: Down
Symptom 2		
CIT: Mediation Server	ETI: Exchange UM Calls Failure rate	Value: Very High

Graph Templates

The following table lists the graph templates present in the content pack and mapped policies.

Graph Templates	Policy Name	Policy Description
Front End Service CPU Statistics	LS_FrontEnd_Logging	The policy logs the metrics into the data store (CODA or HP Performance Agent) for the instances RTCSrv or _Total.
Web Conferencing Service CPU Statistics	LS_WebConf_Logging	The policy collects data for the Web Conferencing Service.
IM Conferencing Service CPU Statistics	LS_IMConf_Logging	The policy collects data for the LS IM Conferencing Service.
Audio/Video Conferencing Service CPU Statistics	LS_AVConf_Logging	The policy collects data for the Audio/Video Conferencing Service.
Access Edge Service CPU Statistics	LS_AccessEdge_Logging	The policy collects data for the Access Edge Service.
Audio/Video Edge Service CPU Statistics	LS_AVEdge_Logging	The policy collects data for the LS A/V Edge Server.
Audio/Video Authentication Service CPU Statistics	LS_AVAuth_Logging	The policy logs the metrics into the data store (CODA or HP Performance Agent) for the instances MRASSvc or _Total.
Web Conferencing Edge Service CPU Statistics	LS_WebEdge_Logging	The policy collects data for the LS Web Conferencing Edge Service.

Graph Templates	Policy Name	Policy Description
Archiving and CDR Service CPU Statistics	LS_Archiving_Logging	The policy logs the metrics into the data store (CODA or HP Performance Agent) for the counters RTCArch or _Total.
Mediation Service CPU Statistics	LS_Mediation_Logging	The policy collects data for the ls Mediation Service.
Front End Service Memory Statistics	LS_FrontEnd_Logging	The policy logs the metrics into the data store (CODA or HP Performance Agent) for the instances RTCSrv or _Total.
Web Conferencing Service Memory Statistics	LS_WebConf_Logging	The policy collects data for the Web Conferencing Service.
IM Conferencing Service Memory Statistics	LS_IMConf_Logging	The policy collects data for the LS IM Conferencing Service.
Audio/Video Conferencing Service Memory Statistics	LS_AVConf_Logging	The policy collects data for the Audio/Video Conferencing Service.
Access Edge Service Memory Statistics	LS_AccessEdge_Logging	The policy collects data for the Access Edge Service.
Audio/Video Edge Service Memory Statistics	LS_AVEdge_Logging	The policy collects data for the LS A/V Edge Server.

Graph Templates	Policy Name	Policy Description
Audio/Video Authentication Service Memory Statistics	LS_AVAuth_Logging	The policy logs the metrics into the data store (CODA or HP Performance Agent) for the instances MRASSvc or _Total.
Web Conferencing Edge Service Memory Statistics	LS_WebEdge_Logging	The policy collects data for the LS Web Conferencing Edge Service.
Archiving and CDR Service Memory Statistics	LS_Archiving_Logging	The policy logs the metrics into the data store (CODA or HP Performance Agent) for the counters RTCArch or _Total.
Mediation Service Memory Statistics	LS_Mediation_Logging	The policy collects data for the ls Mediation Service.
SQL Back End Latency Experienced by Front End Server	LS_FrontEnd_Data Logging	The policy collects data for the LS Front End Server.
Average Holding Time for Incoming Messages on Front End Server	LS_FrontEnd_Data Logging	
Front End Server Availability and Connectivity	LS_FrontEnd_Data Logging	
Sends Outstanding on Front End Server	LS_FrontEnd_Data Logging	
Average Incoming Message Processing Time on Access Edge Server	LS_AccessEdge_DataLogging	The policy collects data for the Access Edge Server.

Graph Templates	Policy Name	Policy Description
Client Request Errors and Timed Out Sessions over UDP on Audio/Video Edge Server	LS_AVEdge_Data Logging	The policy collects data for the LS A/V Edge Server.
Client Request Errors and Timed Out Sessions over TCP on Audio/Video Edge Server	LS_AVEdge_Data Logging	
Authentication failures/sec on Audio/Video Edge Server	LS_AVEdge_Data Logging	

Policies Setting ETIs

The following table lists the content pack ETIs and SPI policies that set the ETIs.

For more information on the measurement threshold policies and events, refer to the HP Operations Smart Plug-in for Microsoft Lync Server 2010 documentation.

ETI/Hi	Policy Name	Policy Description
Archiving Service Status	LS_Check_ArchivingService Status	Indicates the status of Archiving Service.
ArchivingDB Latency	LS_Archiving_AvgNoOf BlkedClientThreads	Indicates the queue latency in Archiving Server.
ArchivingDB queue	LS_Archiving_AvgTime RequestHeldInDB	Indicates the depth of DB Queue in Archiving Server.
AVConfService Status	LS_Check_AVConfService Status	Indicates the status of AV conference Service.
AVConferencing Health	LS_AVConf_MCUHealth State	Indicates the health of AV Conferencing Server.
Concurrent Conferences	LS_AVConf_NumberOf ActiveConferences	Indicates the number of Concurrent Conference occurring.
NumberofFailed conference	LS_AVConf_NoOfAddConf Failed	Indicates the number of failed conference.
DIRECTORService Status	LS_Check_DirectorService Status	Indicates the status of Director Service.
SprocLatency	LS_Director_SprocLatency	Indicates latency in request processing.
EdgeAccessServiceS tatus	LS_Check_AccessEdge ServiceStatus	Indicates the status of Edge Access Service.
EdgeAVService Status	LS_Check_AVEdgeService Status	Indicates the status of AV service in Edge Server.

ETI/Hi	Policy Name	Policy Description
EdgeAVAuth ServiceStatus	LS_Check_AVAuthService Status	Indicates the status of AV Authentication Service in Edge Server.
EdgeWebConf ServiceStatus	LS_Check_WebEdgeService Status	Indicates the status of Web Conference Service in Edge Server.
Authentication Failures	LS_AVEdge_TCP AuthenticationFailures PerSec	Indicates the rate of User Authentication Failures in Edge Server.
	LS_AVEdge_UDP AuthenticationFailures PerSec	
DOSAttack	LS_AccessEdge_RateOfCnx RefusedDueToSrvOverload	Indicates whether the Edge Server is under Denial of Service Attack.
	LS_AccessEdge_AboveLimit ConnectionsDropped	
	LS_AccessEdge_NoOfSrvCnx DisDueToThrottling	
IMConferencing Latency	Synthetic transaction	Latency in creating a Conference.
IMConferencing Status	LS_Check_IMConfService Status	Status of IM Conferencing Availability.
FrontEndService Status	LS_Check_FrontEndService Status	Indicates the status of the Front End Service.
IMConferencing ServiceStatus	LS_Check_IMConfService Status	Indicates the status of IM Conferencing Service.
AudioTestService Status	LS_Check_AudioTestService Status	Indicates the status Of Audio Test Service.
BandWidthPolicyS erviceCoreStatus	LS_Check_BandwidthCore ServiceStatus	Indicates the status of BandWidth Policy Service Core.

ETI/Hi	Policy Name	Policy Description
BandWidthPolicyServiceAuthStatus	LS_Check_BandwidthAuthServiceStatus	Indicates the status of BandWidth Policy Service Authentication.
ApplicationSharingServiceStatus	LS_Check_AppSharingServiceStatus	Indicates the status of Application Sharing Service.
WebConferencingServiceStatus	LS_Check_WebConfServiceStatus	Indicates the status of Web Conferencing Service.
WebConfCompatibilityServiceStatus	LS_Check_WebConfCompatibilityServiceStatus	Indicates the status of Web Conferencing Compatibility Service.
FileTransferAgentServiceStatus	LS_Check_FileTransferAgentServiceStatus	Indicates the status of File Transfer Agent Service.
ConfAttendantServiceStatus	LS_Check_ConfAttendantServiceStatus	Indicates the status of Conference Attendant Service.
ConfAnnouncementServiceStatus	LS_Check_ConfAnnouncementServiceStatus	Indicates the status of Conference Announcement Service.
QueueLatency	LS_Registrar_QueueLatency	Indicates the Queue Length specific to particular role.
	LS_FrontEnd_QueueLatency	
	LS_CallDetailRecording_QueueLatency	
	LS_AccessEdge_EventsQueueLength	
QueueDepth	LS_Registrar_QueueDepth	Indicates the Queue Depth specific to particular role.
ReplicationServiceStatus	LS_Check_ReplicaServiceStatus	Indicates the status of the Replication Service.
CentralMgmtServiceStatus	LS_Check_MasterReplicatorAgentServiceStatus	Indicates the status of the Central Management Service.

ETI/Hi	Policy Name	Policy Description
SIPLoad	S_AccessEdge_AvgIncomingMsgProcessingTime	Indicates the load on the server due to SIP transactions.
MediationService Status	LS_Check_MediationService Status	Indicates the service status of Mediation Service.
MediationServer Health	LS_Mediation_LoadCall FailureIndex	Indicates the Health of Mediation Server.
NumberofCall Failures	LS_Mediation_NoOfMedia CnxCheckFailures	Indicates the rate of call failures in Mediation Server.
	LS_Mediation_NoOfCalls FailedFromProxy	
QoEMonitoring ServiceStatus	LS_Check_Quality MonitoringServiceStatus	Indicates the status of QOE Monitoring Service.
CDRMonitoring ServiceStatus	LS_Check_CallDetail RecordingServiceStatus	Indicates the status of CDR monitoring Service.
ThrottlingRate	LS_Registrar_Throttled Requests	Indicates the rate at which the registrar server is throttling requests.
ResponseGrp ServiceStatus	LS_Check_ResponseGroup ServiceStatus	Indicates the status of Response Group Service.
CallParkService Status	LS_Check_CallParkService Status	Indicates the status of Call Park Service.
MediationService Status	LS_Check_MediationService Status	Indicates the status of Mediation Service.
ADRequests Pending	LS_FrontEnd_NoOfRequests WaitingOnAD	The number of request waiting currently for Active Directory responses.
RequestProcessing Latency	LS_FrontEnd_HoldingTime ForIncMsgs	The average processing time taken by the server for one request.

ETI/HI	Policy Name	Policy Description
OutboundTasks Queued	LS_FrontEnd_Sends Outstanding	This policy monitors the number of outbound requests and responses queued.
ADConnectivity	LS_Check_Monitor_AD Status	Indicates if any of the Domain Controllers are reachable from the given Lync Server Role.
	LS_Check_Arch_ADStatus	
	LS_Check_Director_AD Status	
	LS_Check_AVConf_AD Status	
	LS_Check_FrontEnd_AD Status	
	LS_Check_Mediation_AD Status	
LDAPLatency	LS_Director_SearchLatency LS_FrontEnd_SearchLatency	Indicates the time taken to execute an LDAP query from the Lync Server Role.

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