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for the Windows operating system

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RTSM Modeling

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hp

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PART II: MODELING

Table of Contents

Welcome to This Guide

This guide explains how to configure and work with an IT model that enables you to build a topology of your system. You populate the model with configuration items and their relationships, and then use the model to measure and manage critical business processes.

This chapter includes:

➤ How This Guide Is Organized on page 13

➤ Who Should Read This Guide on page 14

➤ How Do I Find the Information That I Need? on page 14

➤ Additional Online Resources on page 17

➤ Documentation Updates on page 17

How This Guide Is Organized

The guide contains the following chapters:

Part I   Introduction to RTSM

Introduces the RTSM and provides general information about Topology Query Lanaguage, the CI Selector, and Topology Map.

Part II   Modeling

Describes how to model your business environment by defining views and by building TQL queries that retrieve the required information from the RTSM; describes how to view and modify the definitions of configuration item types (CITs) defined in the RTSM and the relationships that define the connections between them.

Part III   RTSM Data Model

Includes documents that explain and quantify the BTO Data Model (BDM) version 1.1.1 and the CMS data model.

Part IV   Reference Information

Contains general reference information.

Who Should Read This Guide

This guide is intended for the following users:

➤ Business Service Management administrators

➤ Business Service Management platform administrators

➤ Business Service Management application administrators

➤ Business Service Management data collector administrators

Readers of this guide should be knowledgeable about enterprise system administration, have familiarity with ITIL concepts, and be knowledgeable about Business Service Management in general and the Run-time Service Model (RTSM) technology specifically.

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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.

Topic Type	Description	Usage
Tasks	**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: ➤ **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.	➤ 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.
	Use-case Scenario Tasks. Examples of how to perform a task for a specific situation.	Learn how a task could be performed in a realistic scenario.
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.

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Part I

Introduction to RTSM

1

Topology Query Language

This chapter includes:

Concepts

Tasks

Reference

Concepts

🍀 Topology Query Language (TQL) Overview

Topology Query Language (TQL) is a language and tool for discovering, organizing, and managing IT infrastructure data. It enables you to create TQL queries that retrieve business service data from the RTSM. TQL queries also help you to display the data in a visual representation that facilitates data monitoring and managing.

This section includes the following topics:

➤ "Topology Query Language" on page 22

➤ "The Roles of TQL" on page 23

Topology Query Language

TQL extends the standard SQL language by adding two important capabilities:

➤ TQL enables you to draw conceptual relationships between configuration items (CIs), which represent their actual interdependencies. Using predefined operators, the different types of interconnections (relationships) that exist between CIs can be established, and consequently the infrastructure design and performance are more accurately represented. This representation serves as a basis and a model for the discovery, arrangement, query, and management of complex infrastructures.

➤ TQL includes a graphical aspect, consisting of visual symbols and syntax, that represents the resources and their interconnections. This visualization of an IT infrastructure simplifies the understanding, monitoring, and managing of the IT business operations.

The Roles of TQL

TQL plays several roles:

➤ Builds a business service model that defines and delineates the interconnection between IT assets that function together as business services. The business service model guides the discovery and identification of these business services, from the ever-increasing number and complexity of infrastructure resources. After the resources that comprise the business services are discovered, the business service model structures the way they are organized and managed in the RTSM.

➤ Constantly searches the RTSM for changes that occur in the state of managed resources. When such changes are detected, the relevant subsystems are informed and updated.

➤ Creates queries that retrieve business service data from the RTSM, and displays the data in a visual representation that facilitates data monitoring and managing.

Creating TQL Queries in the RTSM Managers

The following managers enable you to create TQL queries that retrieve specific data from the RTSM and to display that data:

➤ **Impact Analysis Manager**. An Impact rule simulates how infrastructure changes can impact your system and enables you to determine the true origin of a problem and its business impact. During rule creation, you define the base TQL query type, which can be a new query or an existing query. For details, see "Impact Analysis Manager" on page 421.

➤ **Enrichment Manager**. An Enrichment rule enables enlarging the RTSM, deleting CI instances from the RTSM, or updating the attributes of a CI that already exists in the RTSM. During rule creation, you define the base TQL query type, which can be a new query or an existing query. For details, see "Enrichment Manager" on page 489.

➤ **Modeling Studio.** You can build a new TQL query using the TQL Query Editor or you can build a new query while defining a new view, template, or perspective using the Pattern View Editor. You can also define the topology report settings for any view in the Pattern View Editor. For details, see "Modeling Studio" on page 319.

Viewing TQL Query Results

You view the resulting data in a visual representation in IT Universe Manager. The queries define the structure of the resulting topology map. The view displays only those CIs and relationships that meet the query definition. You can also view the results of a query by clicking the **Preview** button in the toolbar to open a preview display identical to IT Universe Manager. For more details about IT Universe Manager, see "IT Universe Manager" on page 221.

TQL Query Types and Priorities

When you define a TQL query, you define the type of the TQL query in the Type field of the Query Definition Properties dialog box. The following query types are available:

➤ **View.** TQL queries used as the basis for pattern views.

➤ **Integration.** TQL queries used for integrations.

➤ **Discovery.** TQL queries used as the basis for DFM patterns.

➤ **Template Query.** TQL queries used as the basis for templates.

➤ **Perspective Query.** TQL queries used as the basis for perspectives.

➤ **Impact Analysis.** TQL queries used as the basis for Impact rules. This is the default type for queries created in Impact Analysis Manager.

➤ **Enrichment.** TQL queries used as the basis for Enrichment rules. This is the default type for queries created in Enrichment Manager.

You cannot change the type of an existing TQL query.

If a query imported though an integration is not assigned a type, it is considered a hidden query and does not appear in the query list in the Modeling Studio. To display hidden queries in the query list, change the setting for hidden queries in the User Preferences dialog box, under General. For details, see "User Preferences Dialog Box" on page 99.

You can also set the priority level of a TQL query, which determines how often the query is rerun automatically to include updated information. The following priorities are available:

➤ Low

➤ Medium

➤ High

➤ Express

➤ Not Active

If you set the priority of a TQL query to **Not active**, the query becomes inactive and is not run automatically, however it can be used for manually building a view.

Compound Relationship

A compound relationship represents a path in the topological graph. You use a compound relationship to define the allowed steps in the path between the source and the target CIs.

Each row represents one of the allowed steps in the path leading from the source CI to the target CI in the topology map.

Source	Relationship	Target
IpSubnet	Membership	Node
Node	Containment	IpAddress

For an example of a compound definition, see "Define a Compound Relationship – Scenario" on page 32. For details on defining compound relationships, see "Add/Edit Compound Relationship Dialog Box" on page 54.

🔶 Join Relationship

A join relationship is a logical connection that represents the relationship between two CIs (and which appears only in the topology map containing the TQL query results). It does not exist in the RTSM. A join relationship is created by defining an attribute for each query node, whose values are used for comparison.

The TQL results retrieve all CIs whose attribute values meet the conditions defined in the join definition.

For example, you can create a join definition that links all **node** CIs connected to **IP Address** CIs whose **Created by** attribute values are equal (see the example below).

Node	Operator	IpAddress
Created By	Equal	Created By

Each join definition represents one condition defined for the join relationship.

Note: You can define multiple conditions.

For an example of a join definition, see "Define a Join Relationship – Scenario" on page 35. For details on defining join relationships, see "Add/Edit Join Relationship Dialog Box" on page 58.

🍥 Subgraph Definition

A subgraph definition enables you to create a graph that represents additional TQL query data related to a specific CI. The DFM job searches for the results from both the TQL query and the subgraph definitions. The query recursively retrieves all related CIs for a defined depth matching the definition of the subgraph. For details on defining subgraph definitions, see "Subgraph Definition Dialog Box" on page 97.

In the graph, you can define the relationship that is connected to a specific query node. For example, if one of the query nodes is of type node, you can specify different relationships for Windows, router, and IP Address. You can also define attribute conditions for query nodes. For details, see "Subgraph Condition Definition Dialog Box" on page 95.

DFM jobs retrieve data that meets the criteria defined in the subgraph.

For an example of a subgraph definition, see "Create a Subgraph Definition – Scenario" on page 37.

🍥 The ALLOW_VOLATILITY Qualifier

This qualifier is used to mark attributes that enable minor deviations to their value. For example, there is probably no need to report a small disk size change (from 8.00008 to 8.00009 GB).

When updating an attribute that is marked with this qualifier, HP Business Service Management checks the new value against the old value. This check is performed on the server as part of the record update. If the difference between the two values is lower that the allowed deviation, an update is not performed (the action is considered a false update).

This qualifier must contain one of the following data items that hold the allowed deviation:

➤ **ALLOWED_DEVIATION_FIX**. The type of deviation is the same as the attribute type for numeric attributes, and the integer type for date attributes. Deviation is measured by a fixed value, of the same unit as the attribute value. (For date attributes, the deviation is measured in seconds.)

➤ **ALLOWED_DEVIATION_PERCENT**. Deviation is measured by percentage. For date values, the percentage is checked against the millisecond date representation. This data item type is always integer, and the value range is 0 to 100.

To deactivate the qualifier:

Access the Infrastructure Settings Manager (**Admin** > **Platform** > **Setup and Maintenance** > **Infrastructure Settings**). Locate the **Allow Volatility** option. Change the value to **False**.

Tasks

🗝 Define a TQL Query

This task describes how to create a TQL query in the Modeling Studio.

Note: You can also create a TQL query during the procedure for creating Impact rules, Enrichment rules, Views, Templates, and Perspectives.

This task includes the following steps:

➤ "Create a TQL Query" on page 29

➤ "Add Query Nodes and Relationships to the Query" on page 29

1 Create a TQL Query

In the Modeling Studio, select **New** > **Query** to open the TQL Query Editor. For details, see "TQL Query Editor" on page 414.

2 Add Query Nodes and Relationships to the Query

Add the TQL query nodes and relationships that define the query. The TQL query nodes represent the CITs, as defined in the CI Type Manager, and the relationships represent the connections between them. Relationships are defined one at a time for each pair of TQL query nodes in the query. For details, see "Add Query Nodes and Relationships to a TQL Query" on page 30.

Note: You can also define a self-relationship from a query node to itself.

Example of a TQL Query Definition:

The direction of the relationship indicates which query node is dependent on the other. The following example displays two nodes, an IP Service Endpoint, and a Client Port, which are linked to one another via a client/server connection. The TQL query results must comply with the direction of the arrows.
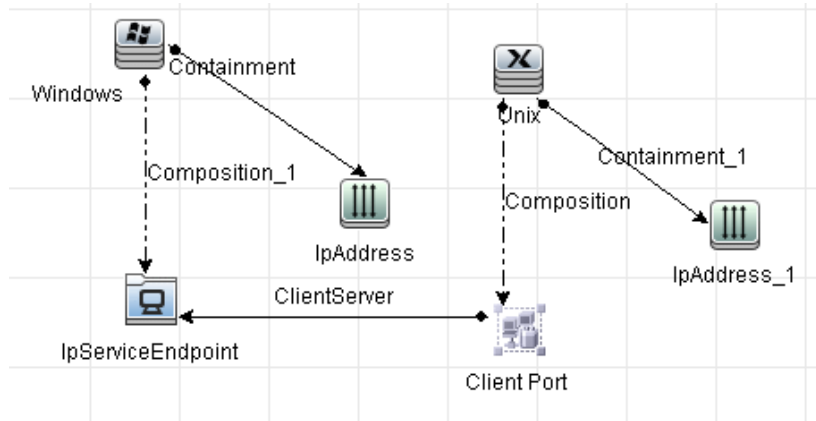
Note: A TQL query is subject to certain validation restrictions. For details, see "Troubleshooting and Limitations" on page 99.

Add Query Nodes and Relationships to a TQL Query

This section explains how to add query nodes and relationships to a TQL query. It is relevant for Impact Analysis Manager, Enrichment Manager, and the Modeling Studio.

Note: For TQL queries to be valid, they must comply with certain restrictions. For details, see "Troubleshooting and Limitations" on page 99.

To add query nodes and relationships to a TQL query:

1 In Impact Analysis Manager or Enrichment manager, select the required query from the tree in the left pane or click the **New** button to create one.

In the Modeling Studio, select the Resources tab in the left pane, select Queries as the Resource type, and select the required query from the tree or click **New** > **Query** to create a new one.

2 In Impact Analysis Manager or Enrichment manager, click and drag one or more required TQL query nodes from the tree displayed in the CI Type Selector, onto the editing pane. In the Modeling Studio, select the CI Types tab in the left pane and drag the required TQL query nodes from the tree onto the editing pane. These are the TQL query nodes that are included in the query.

3 To add a relationship between two query nodes:

➤ Select the required TQL query nodes by holding down CTRL and clicking the TQL query nodes, right-click and select **Add Relationship**. The Add Relationship dialog box opens. Select the required relationship. For details, see "Add/Edit Relationship Dialog Box" on page 61.

or

➤ Click the **Create Relationship** icon and draw a line between the required query nodes. The Select Relationship Type dialog box opens. Select the required relationship type. For details, see "Select Relationship Type Dialog Box" on page 94.

4 Click **OK**. The selected query nodes are linked by the relationship you have selected.

🔧 Define a Compound Relationship – Scenario

This section describes how to define the allowed steps that form a compound relationship between a **IP Subnet** CI and an **IP Address** CI.

Note: To reach the required result, you must implement each one of the following steps.

To define a compound relationship between a IP Subnet CI and an IP Address CI:

1 Create a TQL query of type view and drag the following query nodes onto the editing pane:

➤ IP Subnet

➤ IP Address

2 Right-click the **IP Subnet** and **IP Address** query nodes and select **Add Compound Relationship** to open the Add Compound Relationship dialog box.

3 Click the **Add** button. In Enrichment Manager and Impact Analysis Manager, the Add Triplet dialog box opens. In the Modeling Studio, a row is added to the table. Make the following selections:

➤ From the **Source** list, select **IP Subnet**.

➤ From the **Target** list, select **Node**.

➤ From the **Relationship** list, select **Membership**.

➤ Select the required **Relationship** direction.

In Enrichment Manager and Impact Analysis Manager, click **OK** to save your changes.

4 Click the **Add** button again and make the following selections:

➤ From the **Source** list, select **Node**.

➤ From the **Target** list, select **IP Address**.

➤ From the **Relationship** list, select **Containment**.

➤ Select the required **Relationship** direction.

In Enrichment Manager and Impact Analysis Manager, click **OK** to save your changes.

The following shows an example of compound definitions following the changes:

Source	Relationship	Target
IpSubnet	Membership	Node
Node	Containment	IpAddress

5 Click **OK** to save your changes.

The TQL query in the editing pane now looks like this:
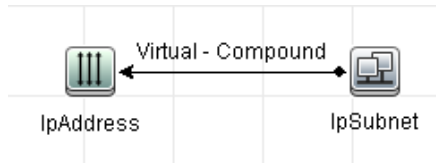
6 Create a view based on your TQL query and save it.

7 Go to the required view in IT Universe Manager to view the results. If you did not select the **Show full path between source and target CIs** option, then the results display the names of the relationships that link the CIs as **Virtual-Compound** rather than the actual names of the relationships. See the illustration below:
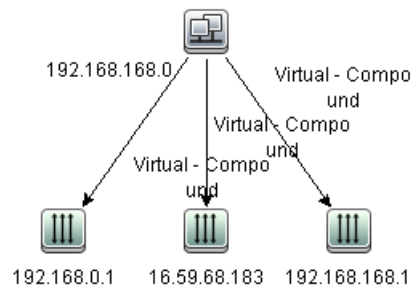
You can double-click the **Virtual - Compound** relationship in IT Universe Manager to open the Link Map, which displays the CIs and relationships that comprise the allowed steps used to link the **IP Subnet** and **IP Address** CIs.
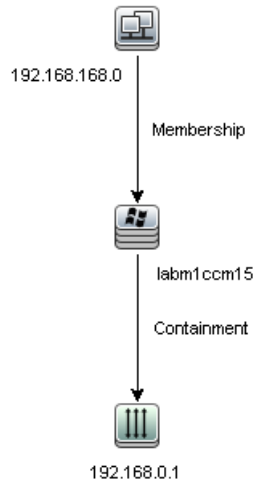
In the example above, the **192.168.168.0** (IP Subnet) CI is linked to the **192.168.0.1** (IP Address) CI through the **labm1ccm15** (Node) CI.

If you selected the **Show full path between source and target CIs** option, then the results in IT Universe Manager display the actual names of the relationships that link the CIs and the full path between the source and target CIs. See the illustration below:
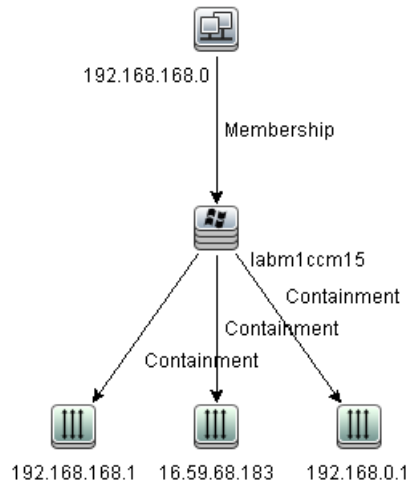
🖋 Define a Join Relationship – Scenario

This section explains how to define a join relationship that links **Node** CIs to **IP Address** CIs whose **Created by** attribute values are equal.

Note: To reach the required result, you must implement each one of the following steps.

To define a join relationship that links all IP Address and Node CIs whose Created by attribute values are equal:

1 Create a TQL query and drag the following query nodes from the CI Type Selector onto the editing pane:

➤ Node

➤ IP Address

2 Select the **Node** and **IP Address** query nodes and right-click to open the Add Join Relationship dialog box.

3 Click the **Add** button to add a row to the table and do the following:

➤ In the **Node Attribute** box, select **Created by**.

➤ In the **Operator** box, select **Equal**.

➤ In the **IP Address Attribute** box, select **Created by**.

In Enrichment Manager and Impact Analysis Manager, you make these selections in the Join Relationship Condition dialog box.

The Join Definition area now looks like this.

Node	Operator	IpAddress
Created By	Equal	Created By

4 Click **OK** to save your changes.

The TQL query in the editing pane now looks like this:
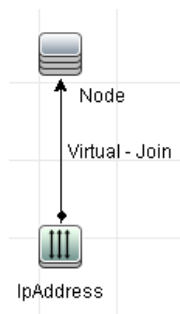
🔨 Create a Subgraph Definition – Scenario

This section describes how to create a subgraph definition. In this example, the TQL query results retrieve all CIs that are connected to a Business Service CI by a **Containment** relationship up to a depth of 3.

Note: To reach the required result, you must implement each one of the following steps.

To create this sample subgraph definition:

1 Create a TQL query and drag a query node of type **Business Service** onto the editing pane.

2 Right-click the Business Service query node and select **Subgraph Definition** to open the Subgraph Definition dialog box.

3 Click the **Add** button. In Enrichment Manager and Impact Analysis Manager, the Add Triplet dialog box opens. In the Modeling Studio, a row is added to the table. Make the following selections:

➤ From the **Source** drop-down list, select **Managed Object**.

➤ From the **Target** drop-down list, select **Managed Object**.

➤ From the **Relationship** drop-down list, select **Containment**.

➤ Set the direction of the relationship as left to right.

In Enrichment Manager and Impact Analysis Manager, click **OK** to save your changes.

The Subgraph Definition dialog box now looks like this.

Source	Relationship	Target	Relationship Direction
🔲 Managed Object	🔲 Containment	🔲 Managed Object	➡

4 Set the **Depth** setting to **3**.

5 Click **OK** in the Subgraph Definition dialog box.

Go to the required view in IT Universe Manager to view the results.
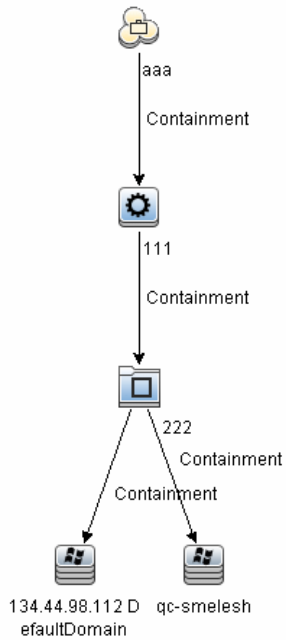
The results show the Business Service CI **aaa** and all of the CIs linked to it in succession by Containment relationships down to three levels.

Reference

�− Shortcut Menu Options

This section includes a list of TQL query shortcut menu options (listed alphabetically):

UI Elements (A-Z)	Description
Add Calculated Relationship	Enables you to create a calculated relationship. ➤ For details on how to create a calculated relationship, see "Triplets Page" on page 475. ➤ For details about Impact Modeling, see "Impact Modeling" on page 105
Add Compound Relationship	Enables you to define the connection between two query nodes using a compound relationship. For details, see "Add/Edit Compound Relationship Dialog Box" on page 54.
Add Join Relationship	Enables you to define join relationships. You create them by defining an attribute for each query node, These query node values are used for comparison during federation. For details, see "Add/Edit Join Relationship Dialog Box" on page 58.
Add Related Query Node Wizard	Displays the Add Related Query Node Wizard dialog box which enables you to build a TQL query. For details, see "Add Related Query Node Wizard" on page 63.

UI Elements (A-Z)	Description
Add Relationship	Enables you to create a relationship for your query nodes by selecting it from a predefined list. Displays the Add Relationship dialog box. For details, see "Add/Edit Relationship Dialog Box" on page 61. **Note**: In Enrichment Manager, this option adds an Enrichment relationship to the rule when working in **Enrichment** mode. Applicable for regular and Enrichment query nodes. For details, see "Enrichment Manager" on page 489. Added relationships are denoted by an added ⊞ indicator.
Add to Hierarchy	Adds the selected query node to the hierarchy as a separate query node. **Note:** Only relevant for the Modeling Studio.
Add to Model Output	Designates the selected query node as output for the pattern-based model. **Note:** Only relevant for pattern-based models in the Modeling Studio.
Change Query Node/Relationship Type	Displays the Change Query Node Type dialog box. Enables you to change the CI type of the query node after you have created it. For details, see "Change Query Node/Relationship Type Dialog Box" on page 361. **Note**: Only relevant for the Modeling Studio.
Clear	Available by right-clicking a query node or relationship when working in **Enrichment** mode in the Enrichment Manager. Clears the query node/relationship's Enrichment rule definition. For details, see "Enrichment Manager" on page 489. Appears only if you have updated or deleted a query node/relationship using an Enrichment rule. **Note:** Only relevant for Enrichment Manager.

UI Elements (A-Z)	Description
Copy/Paste	Copy/paste an existing TQL query node/relationship in the same query or into another TQL query.
	The copied TQL query node/relationship includes all TQL definitions.
	You can copy and paste relationships provided that the TQL query nodes to which the relationships are connected are also selected. A relationship on its own cannot be copied without its connecting TQL query nodes.
	You can select multiple TQL query nodes/relationships as well.
	Note: The Paste option is available only after using the **Copy** option to copy an existing TQL query node/relationship.
Define Impacted	Define which query node in the TQL query is the trigger Impact Analysis query node and which query nodes are impacted by the changes that occur in the system. For details, see "Impacted Query Nodes Dialog Box" on page 437.
	Note: Only relevant for Impact Analysis Manager.
Delete	Deletes the selected query node/relationship/CI.
	Note: This option is not available for calculated relationships.
Delete Relationship/Query Node	Available by right-clicking a query node or relationship when working in **Enrichment** mode.
	Creates a specific Enrichment rule that is designed to delete CIs/relationships from the RTSM. Applicable to regular query nodes and relationships only. You can use this option, for example, for removing unnecessary data from the RTSM. For details, see "Enrichment Manager" on page 489.
	Deleted query nodes and relationships are denoted by a removed ⊟ indicator.
	Note: Only relevant for Enrichment Manager.

UI Elements (A-Z)	Description
Edit Relationship	Displays the Refine Relationship Type dialog box. For details, see "Refine Query Node Type Dialog Box" on page 93. **Note:** Not relevant in the Modeling Studio. **Note:** This option appears only when the selected relationship has descendants.
Query Node/Relationship Properties	Displays the Query Node/Relationship Properties dialog box, enabling you to define the attribute conditions for the selected TQL query node/relationship. For details, see "Query Node/Relationship Properties Dialog Box" on page 82. **Note:** This option is not available for calculated relationships.
Refine Query Node Type	Displays the Refine Query Node Type dialog box. Enables you to change the CI type of the query node after you have created it. For details, see "Refine Query Node Type Dialog Box" on page 93. **Note**: This option only appears if a child of the CI type exists. Only relevant for Impact Analysis Manager and Enrichment Manager.
Remove Subgraph	Only appears if you have defined a subgraph definition. For details, see "Subgraph Definition Dialog Box" on page 97.
Reset Impacted	Removes the Define Impacted definition applied to that query node. For details on the Define Impacted definition, see "Impacted Query Nodes Dialog Box" on page 437. **Note:** Only relevant for Impact Analysis Manager.
Reset Inner Relationship	Redraws a self-referential relationship in the Topology map as a square for ease of viewing. **Note:** Only relevant for self-referential relationships that are not square.

UI Elements (A-Z)	Description
Set As Contact Query Node	Designates the selected query node as a contact query node for the perspective. **Note:** Only relevant for perspectives in the Modeling Studio.
Set Data Sources	Opens the Set Data Sources dialog box which enables you to select the required data sources for a TQL query node. **Note:** Only relevant for the Modeling Studio.
Set Element Invisible	When this option is selected, an invisible indicator appears to the right of the selected TQL query node in the editing pane. Any query results pertaining to that TQL query node are not displayed in the topology map. This can be useful when certain relationships or TQL query nodes are required to build the query but are not needed in the results. At least one query node must be visible for the view to be valid. **Note:** Only relevant for the Modeling Studio.
Set Element Visible	When this option is selected, the results pertaining to the TQL query node are displayed in the topology map. **Note:** Only relevant for the Modeling Studio.
Show Element instances	Displays the Element Instances dialog box which displays all the instances found for each query node in a table. For details, see "Element Instances Dialog Box" on page 75.
Show Parameters	Opens the Template Parameter Values dialog box, which enables you to set the values of the query node's parameters. **Note:** Only relevant for template-based views in the Modeling Studio.
Subgraph Definition	Displays the Subgraph Definition dialog box, where you can create a graph that represents additional TQL query data related to a specific query node. For details, see "Subgraph Definition Dialog Box" on page 97.

UI Elements (A-Z)	Description
Update Relationship/Query Node	Use an Enrichment rule to update the value of CI attributes in the RTSM, or to add data to attributes that currently do not have values. Opens the Query Node Definition - Attributes dialog box. For details, see "Query Node/Relationship Definition Dialog Box" on page 513. This is applicable for both regular and Enrichment query nodes. Updated query nodes are denoted by an updated ⬈ indicator. **Note:** Only relevant for Enrichment Manager.

🔍 Attribute Operator Definitions

This section contains a list of operators used to define attribute conditions in various dialog boxes, such as the Subgraph Condition dialog box, the Add Relationship dialog box, Impact Rules Definition dialog box, or the Query Node/Relationship Properties dialog box.

Operator	Description
Changed during	(Displayed only when you select an attribute of type Date.) Displays only the instances that changed during the period specified in the **Value comparison** box.
Equal	Checks whether the attribute value is equal to the value specified in the **Value Comparison** box.
Equal ignore case	Checks whether the attribute value is equal to the value specified in the value box regardless of the case.
Greater than or equal	Checks whether the attribute value is greater than or equal to the value specified in the **Value comparison** box.
Greater	Checks whether the attribute value is greater than the value specified in the **Value comparison** box.

Operator	Description
In	Displays only the instances where this attribute value equals one of the selected values. For example, for CIs that have a Change state that equals Plan and New, select the operator **In** from the **Operator** list and select both **Plan** and **New** from the **Value** box.
Is null	Checks whether the attribute value is null.
Less	Checks whether the attribute value is less than the value specified in the **Value comparison** box.
Less than or equal	Checks whether the attribute value is less than or equal to the value specified in the **Value comparison** box.
Like	Uses a wildcard (%). Use **Like** when you are not sure of the complete name for which you are searching.
Like ignore case	Uses a wildcard (%). Use Like ignore case when you are not sure of the complete name for which you are searching. The case of the string is ignored.
Not equal	Checks whether the attribute value is not equal to the value specified in the **Value Comparison** box.
Unchanged during	(Displayed when you select a date type attribute.) Displays only the instances that did not change during the period specified in the **Value comparison** box.

Note:

➤ For the **Not equal** operator, query results do not include data from the CI instances that are not assigned a value. For example, a system contains three nodes: Node1 is assigned the value A, Node2 is assigned the value B, and Node3 is not assigned a value. If you create a query to retrieve all nodes that are **Not equal** to A, the results of your query include Node2 only, because Node3 is not assigned a value.

➤ HP Business Service Management supports both Microsoft SQL Server and Oracle Server databases. Microsoft SQL Server is not case sensitive by default (unlike Oracle database which is case sensitive). Consequently, if you are using Microsoft SQL Server, the **Equal** operator retrieves the same query results as the **Equal ignore case** operator. For example, if you select the attribute **City**, the operator **Equal**, and type **NEW YORK** in the **Value comparison** box, case differences are ignored and query results include **NEW YORK**, **New York** and **new york**.

🔍 TQL Logs

This section contains definitions for TQL parameter log files.

This section includes the following topics:

➤ "Pattern Log" on page 47
➤ "Pattern Statistics Log" on page 48
➤ "Audit Short/Detailed Log (TQL Perspective)" on page 48
➤ "Incremental Statistics Log" on page 49
➤ "Incremental Splitter Log" on page 50
➤ "Incremental Detailed Log" on page 51

Pattern Log

The log name is **cmdb.pattern.log**.

Log File	Description
Purpose	Information about the lifecycle of a TQL query that is handled and calculated in the RTSM.
	Only TQL queries stored in the RTSM are included. Information about ad hoc TQL queries is not included.
Information Level	Not available.
Error Level	Not available.
Debug Level	Possible actions performed on each TQL query include:
	➤ status changes
	➤ model changes
	➤ query changes
	➤ completed calculations
Basic Troubleshooting	Check if a TQL query has the same status for a long time:
	➤ **new** – the query is in lazy loading
	➤ **inactive**
	➤ **calculation** – the calculation may have failed but the scheduler was not informed
	You can also view the number of notifications that a TQL query received.

Pattern Statistics Log

The log name is **cmdb.pattern.statistics.log**.

Log File	Description
Purpose	General calculation data for each TQL query, updated at predefined intervals.
Information Level	The following information is given for each TQL query: ➤ name ➤ average, minimum, and maximum calculation times ➤ number of calculations ➤ last calculation time ➤ result size
Error Level	Not available.
Debug Level	Not available.
Basic Troubleshooting	➤ Verify that a specific TQL query was updated. ➤ Evaluate a TQL query's calculation time. ➤ Evaluate a TQL query's result size.

Audit Short/Detailed Log (TQL Perspective)

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

Log File	Description
Purpose	RTSM state changes, CI Type changes, and TQL query results. You can use this log to follow the results of TQL queries.
Information Level	Not available.
Error Level	Not available.

Log File	Description
Debug Level	➤ Final calculation for TQL queries is logged. ➤ If the final TQL query calculation is unchanged from the previous calculation, this is noted. ➤ If the final TQL query calculation is changed from the previous calculation, results of the CIs and relationships are recorded in the detailed log. The number of CIs and relationships are recorded in the short log.
Basic Troubleshooting	➤ Use this log to verify which notifications are published by the TQL query subsystem. ➤ Check the section at the end of each result. This section includes added, removed, and updated CIs and relationships. ➤ Track the CIT changes and see if the query results also change. You can thus correlate the CIT changes to the results of the query calculations.

Incremental Statistics Log

The log name is **cmdb.incremental.statistics.log**.

Log File	Description
Purpose	Traces the calculation procedure, full or incremental, of every query.
Information Level	Not available.
Error Level	Not available.

Log File	Description
Debug Level	➤ Gives the date, time, query name, and whether an incremental statistic calculation was performed (yes/no). ➤ If an incremental statistic calculation was not performed, states the reason, the number of subcalculations (relevant for incremental calculations only), and the complete calculation time.
Basic Troubleshooting	Monitors the calculation process. If a specific query calculation takes a long time, check if it is a full or incremental calculation: ➤ If full, check whether a full calculation is necessary. ➤ If incremental, check how many subcalculations have been performed.

Incremental Splitter Log

The log name is **cmdb.incremental.splitter.log**.

Log File	Description
Purpose	Monitors the incremental splitter result made during an incremental calculation.
Information Level	Not available.
Error Level	Not available.
Debug Level	Gives the set of query node numbers of each query graph created by the incremental splitter.
Basic Troubleshooting	If the TQL result calculated by the incremental calculator is wrong, verify that the splitter result is correct.

Incremental Detailed Log

The log name is **cmdb.incremental.detailed.log**.

Log File	Description
Purpose	Monitors the incremental calculation process.
Information Level	Not available.
Error Level	Not available.
Debug Level	Each incremental subcalculation entry includes the following: ➤ the trigger query node ➤ the number of elements classified to the trigger query node ➤ whether the subcalculation step is driven by new elements added to the model or by existing elements ➤ the calculated query graph
Basic Troubleshooting	Follows the basic steps of an incremental calculation.

Topology Query Language User Interface

This section includes (in alphabetical order):

🔍 Add/Edit Calculated Relationship Dialog Box

This dialog box enables you to define the connection between two query nodes using a calculated relationship from the CI Type model.

To access	To access in Enrichment Manager, Impact Analysis Manager, and the Modeling Studio: Right-click the required query node in the editing pane in Enrichment Manager, Impact Analysis Manager, or the Modeling Studio and select **Add Calculated Relationship**.
	Note: If you are using Enrichment Manager, select **Query** mode at the top of the editing pane to display the **Add Calculated Relationship** option.
	To access in Adapter Management in Data Flow Management (DFM): **1** Select an adapter in the Discovery Resources pane. **2** In the **Adapter Definition** tab, click the 🖉 **Edit Input Query** button to the right of the **Input Query** box to open the Input Query Editor. **3** Right-click the required query node and select **Add Calculated Relationship**.

Relevant tasks	➤ "Define an Impact Rule – Workflow" on page 424
	➤ "Define an Enrichment Rule – Scenario" on page 492
	➤ "Define a TQL Query" on page 29
	➤ "Implement a Discovery Adapter" in the *Run-time Service Model Developer Reference Guide*
	➤ "Create a Pattern View" on page 341
	➤ "Create a Template" on page 342
	➤ "Create a Perspective" on page 344
See also	➤ "Impact Modeling" on page 105
	➤ "CI Type Relationships" on page 450

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

UI Elements (A-Z)	Description
	Click **Expand All** to expand all the folders in the tree.
	Click **Collapse All** to collapse all the folders in the tree.
Tree View	Click Tree View to select the display format of the calculated relationship tree. The following options are available: ➤ Display label ➤ Class name ➤ Legacy class name
<Calculated relationship tree>	Select the calculated relationship that defines the connection between two query nodes.
Relationship Direction	The direction of the relationship that indicates which query node is dependent on the other.
Relationship Name	The name of the calculated relationship.

UI Elements (A-Z)	Description
Relationship Restrictions	Select an option to define how to handle relationships between identical query nodes or self relationships in the query results. A self relationship is a relationship that leads from a query node to itself.
	Note: This list appears only when you select one query node or two identical query nodes.
	➤ **Allow All Relationships**. All relationships appear in the query results.
	➤ **Allow Self Relationships only**. Only self-relationships (a relationship that leads to itself) appear in the query results.
	➤ **Allow Non Self Relationships only**. Self-relationships do not appear in the query results.

🔍 Add/Edit Compound Relationship Dialog Box

This dialog box enables you to define the connection between two query nodes using a compound relationship.

To access	**To access in Enrichment Manager, Impact Analysis Manager, and the Modeling Studio:**
	Right-click the required query nodes in the editing pane in Enrichment Manager, Impact Analysis Manager, or the Modeling Studio and select **Add Compound Relationship**.
	Note: If you are using Enrichment Manager, select **Query** mode at the top of the editing pane to display the **Add Compound Relationship** option.
	To access in Adapter Management in DFM: **1** Select an adapter in the Discovery Resources pane. **2** In the **Adapter Definition** tab, click the 🖉 **Edit Input Query** button to the right of the **Input Query** box to open the Input Query Editor. **3** Right-click the required query node and select **Add Compound Relationship**.

Important information	You can create as many compound definitions as necessary.
Relevant tasks	➤ "Define an Impact Rule – Workflow" on page 424 ➤ "Define an Enrichment Rule – Scenario" on page 492 ➤ "Define a TQL Query" on page 29 ➤ "Implement a Discovery Adapter" in the *Run-time Service Model Developer Reference Guide* ➤ "Create a Pattern View" on page 341 ➤ "Create a Template" on page 342 ➤ "Create a Perspective" on page 344
See also	➤ "Compound Relationship" on page 25 ➤ "Define a Compound Relationship – Scenario" on page 32

User interface elements are described below:

UI Elements (A-Z)	Description
✚	Add a compound definition. In Impact Analysis Manager and Enrichment Manager, it opens the Add Triplet dialog box. In the Modeling Studio, it enters a default compound definition in the table. Click the Edit buttons to edit the definition components.
✖	Delete the selected compound definition.
✏	Edit the selected compound definition. In Impact Analysis Manager and Enrichment Manager, it opens the Add Triplet dialog box. In the Modeling Studio, it opens the Compound Relationship Condition Definition dialog box.
Max steps	The longest path allowed between the two CIs in the RTSM to be included in the discovery process. **Default is:** 5
Min steps	The shortest path allowed between the two CIs in the RTSM to be included in the discovery process. **Default is:** 1

UI Elements (A-Z)	Description
Relationship	The relationship connecting the two query nodes.
Relationship Direction	The direction of the relationship that indicates which query node is dependent on the other.
Relationship Name	The name of the compound relationship.
Relationship Restrictions	Select an option to define how to handle relationships between identical query nodes or self relationships in the query results. A self relationship is a relationship that leads from a query node to itself.
	Note: This list appears only when you select one query node or two identical query nodes.
	➤ **Allow All Relationships**. All relationships appear in the query results.
	➤ **Allow Self Relationships only**. Only self-relationships (a relationship that leads to itself) appear in the query results.
	➤ **Allow Non Self Relationships only**. Self-relationships do not appear in the query results.
Show full path between source and target CIs	If you select this option, then the query results display the actual names of the relationships that link the CIs and the full path between the source and target CIs.
Source	The required source query node.

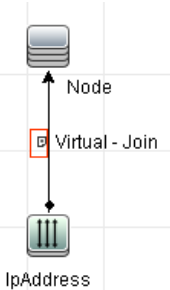| UI Elements (A-Z)	Description
Stop at first compound level	Select this option if you want the system to stop looking for TQL query results once it reaches the first target in the path. In the following sample compound link definition, **Depth** is defined as 10 and **Stop at first compound level** is selected. The TQL query results include the **Target 1**, **Target 3**, and **Target 4** because they are all at level 1 (the first CI found in the path). **Target 2** is not included in the TQL results because it is at level 2 (the second CI found in the path).
Target	The required target query node.
Visible	Select **Visible** to include query results relating to a join or compound relationship. By default, **Visible** is selected. When **Visible** is cleared, a box ▯ appears to the left of the of the relationship's name in the editing pane, denoting that any query results pertaining to the relationship are not displayed in the topology map.

🔍 Add/Edit Join Relationship Dialog Box

This dialog box enables you to define join relationships.

To access	**To access in Enrichment Manager, Impact Analysis Manager, and the Modeling Studio:**
	Right-click the required query nodes in the editing pane in Enrichment Manager, Impact Analysis Manager, or the Modeling Studio and select **Add Join Relationship**.
	Note: If you are using Enrichment Manager, select **Query** mode at the top of the editing pane to display the **Add Join Relationship** option.
	To access in Adapter Management in DFM: **1** Select an adapter in the Discovery Resources pane. **2** In the **Adapter Definition** tab, click the 🖉 **Edit Input Query** button to the right of the **Input Query** box to open the Input Query Editor. **3** Right-click the required query node and select **Add Join Relationship**.
Important information	When you access the dialog box from the Modeling Studio, you select the attributes and operator within the dialog box itself. When you access the dialog box from Impact Analysis Manager or Enrichment Manager, you select the attributes and operator from the Join Relationship Condition dialog box.
Relevant tasks	➤ "Define an Impact Rule – Workflow" on page 424 ➤ "Define an Enrichment Rule – Scenario" on page 492 ➤ "Define a TQL Query" on page 29 ➤ "Implement a Discovery Adapter" in the *Run-time Service Model Developer Reference Guide* ➤ "Create a Pattern View" on page 341 ➤ "Create a Template" on page 342 ➤ "Create a Perspective" on page 344
See also	"Join Relationship" on page 26 "Define a Join Relationship – Scenario" on page 35

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

UI Elements (A-Z)	Description
✚	Define a join definition. In Impact Analysis Manager and Enrichment Manager, it opens the Join Relationship Condition dialog box. In the Modeling Studio, it adds the selected attributes and operator to the list.
✖	Delete the selected join definition.
✏	Edit the join definition. Opens the Join Relationship Condition dialog box. **Note:** This option is not relevant in the Modeling Studio.
<**Query node1 Attribute**> box	Select an attribute for the <end_1> query node. **Note:** This option is only available in the Modeling Studio.
<**Query node2 Attribute**> box	Select an attribute for the <end_2> query node. **Note:** This option is only available in the Modeling Studio.
<**Selected query node1**> column	A selected query node. The first attribute applies to <end_1>.
<**Selected query node2**> column	A selected query node. The second attribute applies to <end_2>.
And	All join definitions are linked by the **And** operator. **Note:** This is not relevant in the Modeling Studio.
Operator box	Select an operator. For details on the available operators, see "Join Relationship Condition Dialog Box" on page 79. **Note:** This option is only available in the Modeling Studio.
Operator column	The operator selected in the Join Relationship Condition dialog box. For details about operator definitions, see "Attribute Operator Definitions" on page 44.
Relationship Direction	The direction of the relationship that indicates which query node is dependent on the other.

UI Elements (A-Z)	Description
Relationship Name	The name of the join relationship.
Relationship Restrictions	Select an option to define how to handle relationships between identical query nodes or self relationships in the query results. A self relationship is a relationship that leads from a query node to itself.
	Note: This list appears only when you select one query node or two identical query nodes.
	➤ **Allow All Relationships**. All relationships appear in the query results.
	➤ **Allow Self Relationships only**. Only self-relationships (a relationship that leads to itself) appear in the query results.
	➤ **Allow Non Self Relationships only**. Self-relationships do not appear in the query results.
Visible	Select **Visible** to include query results relating to a join or compound relationship. By default, **Visible** is selected. When **Visible** is cleared, an invisible box ▣ appears to the left of the of the relationship's name in the editing pane. Any query results pertaining to the relationship are not displayed in the topology map.

❖ Add/Edit Relationship Dialog Box

This dialog box enables you to define the connection between two query nodes in a TQL query.

To access	**To access in Enrichment Manager, Impact Analysis Manager, and the Modeling Studio:** ➤ Right-click the required query node in the editing pane in Enrichment Manager, Impact Analysis Manager, or the Modeling Studio and select **Add Relationship**. or ➤ Click the **Create Relationship** ↥ icon and draw a line between the required query nodes. The Select Relationship Type dialog box opens. Select **Regular Relationship**. **Note**: If you are using Enrichment Manager, select **Query** mode at the top of the editing pane to display the **Add Relationship** option. **To access in Adapter Management in DFM:** **1** Select an adapter in the Discovery Resources pane. **2** In the **Adapter Definition** tab, click the ✎ **Edit Input Query** button to the right of the **Input Query** box to open the Input Query Editor. **3** Right-click the required query node and select **Add Relationship**.
Relevant tasks	➤ "Define an Impact Rule – Workflow" on page 424 ➤ "Define an Enrichment Rule – Scenario" on page 492 ➤ "Define a TQL Query" on page 29 ➤ "Implement a Discovery Adapter" in the *Run-time Service Model Developer Reference Guide* ➤ "Create a Pattern View" on page 341 ➤ "Create a Template" on page 342 ➤ "Create a Perspective" on page 344
See also	This option does not appear when two selected query nodes (or a single selected query node) do not have a valid relationship between them.

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

UI Elements (A-Z)	Description
	Click **Expand All** to expand all the folders in the relationship tree.
	Click **Collapse All** to collapse all the folders in the relationship tree.
Tree View	Click **Tree View** to select the display format of the relationship tree. The following options are available: ➤ Display label ➤ Class name ➤ Legacy class name
<Relationship tree>	Select the relationship that defines the connection between two query nodes.
Relationship Direction	The direction of the relationship that indicates which query node is dependent on the other.
Relationship Name	The name of the relationship.
Relationship Restrictions	Select an option to define how to handle relationships between identical query nodes or self relationships in the query results. A self relationship is a relationship that leads from a query node to itself. **Note:** This list appears only when you select one query node or two identical query nodes. ➤ **Allow All Relationships**. All relationships appear in the query results. ➤ **Allow Self Relationships only**. Only self-relationships (a relationship that leads to itself) appear in the query results. ➤ **Allow Non Self Relationships only**. Self-relationships do not appear in the query results.

🔍 Add Related Query Node Wizard

This wizard enables you to build a TQL query.

To access	**To access in Enrichment Manager, Impact Analysis Manager, and the Modeling Studio:** In the editing pane, right-click the required query node and select **Add Related Query Node**. **Note**: If you are using Enrichment Manager, select **Query** mode at the top of the editing pane to display the Add Related Query Node option. **To access in Discovery Control Panel in DFM:** **1** Select a job in the Discovery Modules pane. **2** Select a Trigger Query in the Properties tab. Click the Open the Query Editor 🖉 button to open the **Trigger Query Editor**. **3** Right-click the required query node and select **Add Related Query Node Wizard**. **To access in Adapter Management in DFM:** **1** Select an adapter in the Discovery Resources pane. **2** In the **Adapter Definition** tab, click the 🖉 **Edit Input Query** button to the right of the **Input Query** box to open the Input Query Editor. **3** Right-click the required query node and select **Add Related Query Node Wizard**.
Important information	If the TQL query is empty, drag the required TQL query nodes on to the editing pane from the tree displayed in the CI Type Selector or the CI Types tab of the left pane.
Relevant tasks	➤ "Define an Impact Rule – Workflow" on page 424 ➤ "Define an Enrichment Rule – Scenario" on page 492 ➤ "Define a TQL Query" on page 29 ➤ "Implement a Discovery Adapter" in the *Run-time Service Model Developer Reference Guide* ➤ "Create a Pattern View" on page 341 ➤ "Create a Template" on page 342 ➤ "Create a Perspective" on page 344

Wizard map	The Add Related Query Node Wizard contains:
	Related Query Node Type Page > Relationship Type Page > Related Query Node Properties Page > Related Query Node Instances Page
See also	"Topology Query Language (TQL) Overview" on page 22

🔍 Related Query Node Type Page

This wizard page enables you to add a query node to the TQL query.

Important information	If the TQL query is empty, drag the required TQL query node on to the editing pane from the tree displayed in the Configuration Item Types pane.
	For general information on the Add Related Query Node Wizard, see "Add Related Query Node Wizard" on page 63.
Wizard map	The Add Related Query Node Wizard contains:
	Related Query Node Type Page > Relationship Type Page > Related Query Node Properties Page > Related Query Node Instances Page

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

UI Elements (A-Z)	Description
🔳	Click **Expand All** to expand all the folders in the tree.
🔳	Click **Collapse All** to collapse all the folders in the tree.
📄 **Tree View**	Click Tree View to select the display format of the CI type tree. The following options are available:
	➤ Display label
	➤ Class name
	➤ Legacy class name
	Note: This feature is only available in the Modeling Studio.

UI Elements (A-Z)	Description
<query node> is required	Define the relationship cardinality. For details, see "Cardinality Tab" on page 86.
	➤ Select the **<query node> is required** check box for each query node to include a minimum of one instance of the query node at the other end of the relationship in the query results. Selecting the check box gives the relationship a cardinality value of 1..*****.
	➤ Clear the **<query node> is required** check box to give the relationship a cardinality value of 0..*****.
<TQL Query Node hierarchy tree>	Select the required query node. The query node you select appears in the **Element name** box.
	This list only includes the query nodes of the CI type that have valid relationships to the selected (source) query node.
	To the right of each query node, the number of CI instances that exist in the RTSM for that CI type is displayed. The number of instances is only updated after you close the Add Related Query Node Wizard and open it again.
	Note: The first query node in the hierarchy tree is selected by default.
Element name	(Optional) Contains the name of the selected query node. By default, the CI type is assigned as the element's name.
	You can rename a TQL query node in the **Element name** box giving it a unique label. This can be helpful when there is more than one query node of the same CI type in the TQL query.
Show only CITs with instances	Select this check box to display only the CITs of which there are instances in the RTSM. If this box is not selected, the tree includes all CITs with a valid link to the source query node.
	Note: The **Show only CITs with instances** check box is selected by default.

🔍 Relationship Type Page

This wizard page enables you to add a relationship to a TQL query.

Wizard map	The Add Related Query Node Wizard contains:
	Related Query Node Type Page > **Relationship Type Page** > Related Query Node Properties Page > Related Query Node Instances Page

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

UI Elements (A-Z)	Description
📄 **Tree View**	Click Tree View to select the display format of the Relationship tree. The following options are available:
	➤ Display label
	➤ Class name
	➤ Legacy class name
	Note: This feature is only available in the Modeling Studio.
<TQL Query Relationship hierarchy tree>	Select the required relationship.
Relationship direction	Select the required relationship direction. The direction indicates which query node is dependent on the other.
Relationship Name	The name of the relationship.
	Note: This feature is only available in the Modeling Studio.
Relationship Restrictions	Select an option to define how to handle relationships between identical query nodes or self relationships in the query results. A self relationship is a relationship that leads from a query node to itself.
	Note: This feature is only available in the Modeling Studio.

UI Elements (A-Z)	Description
Relationship Type	A valid relationship that defines the connection between the selected query nodes. The box displays the relationship you selected in the relationship hierarchy tree. **Note:** This feature is only available in Enrichment Manager and Impact Analysis Manager.
Show only relationships with instances	Display only the relationships of which there are instances in the RTSM. If this box is not selected, the tree includes all valid relationships between the selected query nodes.

Related Query Node Properties Page
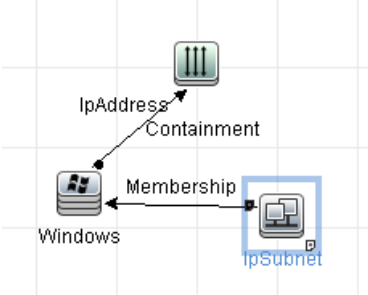
This wizard page enables you to create an expression that restricts the number of query nodes that appear in the query by adding an attribute condition to a query node or relationship.

Important information	When you access the wizard from the Modeling Studio, this wizard page has two tabs: **Attribute** and **Qualifier**. The **Attribute** tab includes the elements described below. For details on the **Qualifier** tab, see "Qualifier Tab" on page 89.
Wizard map	The Add Related Query Node Wizard contains: Related Query Node Type Page > Relationship Type Page > **Related Query Node Properties Page** > Related Query Node Instances Page

User interface elements are described below:

UI Elements (A-Z)	Description
✚	Add an attribute condition.
✖	Delete an attribute condition.
⬆	Move a selected row up.

UI Elements (A-Z)	Description
↓	Move a selected row down.
🔍	View the condition definition.
Advanced layout settings	Opens the Layout Settings dialog box which enables you to determine which attributes are used in the calculation of the TQL query when querying the RTSM using third-party or custom tools. **Note:** This option is only relevant when accessing the wizard from the Modeling Studio.
And/Or	Click inside the **And/Or** field and select either **And** or **Or** to link multiple conditions.
Attribute name	Choose an attribute from the list.
{ } **Brackets**	Click inside the **Brackets** box to display a list of brackets you can use to build more complex, logical statements.
Criteria	Contains the attribute condition definition as defined in the Element Instances Dialog Box.
Include subtypes	Display both the selected CI and its children in the topology map.
Not	Select **NOT** if you want the condition statement to do the opposite of what is defined. **Note**: If you select **NOT**, query results do not include data from the CI instances that were not assigned a value. For example, your system contains three nodes: Node1 is assigned the value A, Node2 is assigned the value B and Node3 is not assigned a value. You create a query to retrieve all nodes that are equal to A and select **NOT**; the results of your query only include Node2 because Node3 is not assigned a value.
Operator	Select the required operator. For details, see "Attribute Operator Definitions" on page 44.
Update	Update an attribute condition that has been modified.

UI Elements (A-Z)	Description
Value	Enter or select the value of the attribute. The **Value** options vary according to the attribute type you select.
Visible	Select **Visible** to display the selected TQL query node in the editing pane. When **Visible** is cleared, an invisible box 🗋 appears to the right of the selected TQL query node in the editing pane. Any query results pertaining to that TQL query node are not displayed in the topology map. This can be useful when certain relationships or TQL query nodes are required to build the query but are not needed in the results. For example, Windows are connected to the network by defining specific IP Addresses, but in any query results you may want to view the IP Address elements only and not the Windows elements.

🔍 Related Query Node Instances Page

This wizard page displays all the instances found for the selected TQL query node in a table.

Important information	The columns displayed in the report vary according to the CI type selected.
	By default, only columns corresponding to attributes that have been defined with the **Asset Data, Change Monitored,** and **Comparable** attribute qualifiers in the CI Type Manager are displayed as columns in the dialog box. For details, see "Attributes Page" on page 470.
	If required, you can click the **Display Hidden Columns** button to display the attributes that are defined as Visible but not Static. For details on Static attributes, see "Attributes Page" on page 470.
	Note: For information on the elements included in the Related Query Node Instances page, see "Element Instances Dialog Box" on page 75.
Wizard map	The Add Related Query Node Wizard contains:
	Related Query Node Type Page > Relationship Type Page > Related Query Node Properties Page > **Related Query Node Instances Page**

⚑ Add Triplet Dialog Box

This dialog box enables you to define the allowed steps in a path in the topology graph leading from the source CI to the target CI when creating a subgraph definition, a compound relationship, or a calculated relationship.

|	
To access	➤ In the Add Compound Relationship dialog box, click the **Add** ➕ button. For details, see "Add/Edit Compound Relationship Dialog Box" on page 54.
	➤ In the Subgraph Definition dialog box, click ➕ **Add**. For details, see "Subgraph Definition Dialog Box" on page 97.
	➤ In CI Type Manager, select **Calculated Relationships** from the drop-down list in the CI Types pane. In the editing pane, select the **Triplets** page and then click ➕ **Add**.
Important information	Select the query nodes and relationships to be included in the topology graph.
	Important: The Condition fields are displayed only when you access the Add Triplet dialog box from the Subgraph Definition dialog box.
Relevant tasks	➤ "Define an Impact Rule – Workflow" on page 424
	➤ "Define an Enrichment Rule – Scenario" on page 492
	➤ "Define a TQL Query" on page 29
	➤ "Implement a Discovery Adapter" in the *Run-time Service Model Developer Reference Guide*
	➤ "Create a Pattern View" on page 341
	➤ "Create a Template" on page 342
	➤ "Create a Perspective" on page 344
See also	➤ "Compound Relationship" on page 25
	➤ "Define a Compound Relationship – Scenario" on page 32
	➤ "Subgraph Definition" on page 27

User interface elements are described below:

UI Elements (A-Z)	Description
	Define attribute conditions for the source and target query nodes you selected. Opens the Subgraph Condition Definition dialog box.
	The **Condition** button is enabled only after you select a query node from the **Source** or **Target** lists.
	Note: You cannot define attribute conditions for the source and target query nodes in the CI Type Manager.
Relationship	Select an available relationship connecting the two query nodes. The list of available relationships appears only after defining both query nodes.
Relationship Direction	Select the required direction. Setting different relationship directions can achieve different query results. For an example, see "Setting Different Relationship Directions for Compound Definitions" on page 73.
	Note: The Relationship list remains empty until you have selected a source and target.
Source	Select the required source query node.
Target	Select the required target query node.

## Setting Different Relationship Directions for Compound Definitions

You can achieve different TQL results by setting different relationship directions. For example, in your business world, as illustrated below, you want to create a compound relationship that connects between a query node of the CIT **a** and a query node of the CIT **b**. Depth is defined at 5 (for details, see "Depth" on page 98).
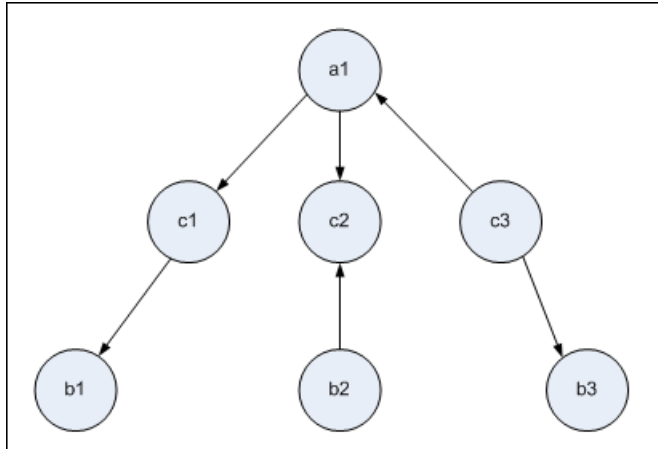
In the Add Triplet dialog box, you can create compound definitions to link query nodes **a** and **b** using different relationship directions.

Compound Definition	Source	Target	Relationship	Relationship Direction
#1	query node **a**	query node **c**	<relationship>	source --> target
#2	query node **c**	query node **b**	<relationship>	source --> target
#3	query node **c**	query node **b**	<relationship>	source <-- target

➤ Compound definitions 1 and 2 result in the following query:
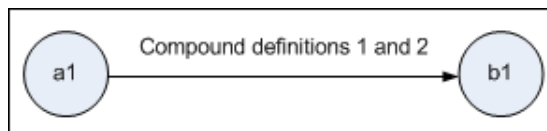
➤ Compound definitions 1 and 3 result in the following query:
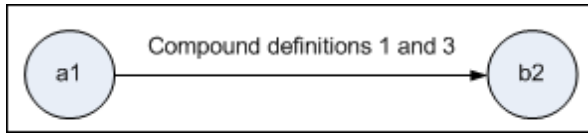
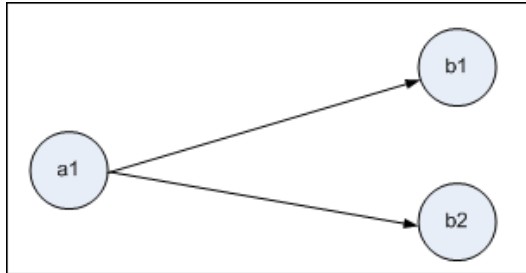➤ Compound definitions 1, 2, and 3 result in the following query:
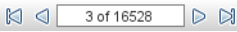
⚘ **Element Instances Dialog Box**

This dialog box displays all of the CI instances found for the selected TQL query node in a table.

To access	**To access in Enrichment Manager, Impact Analysis Manager, and the Modeling Studio:** In the editing pane, right-click the required query node and select **Show Element Instances**. **Note**: If you are using Enrichment Manager, select **Query** mode at the top of the editing pane to display the **Show Element Instances** option. **To access in Adapter Management in DFM:** **1** Select an adapter in the Discovery Resources pane. **2** In the **Adapter Definition** tab, click the 🖉 **Edit Input Query** button to the right of the **Input Query** box to open the Input Query Editor. **3** Right-click the required query node and select **Show Element's Instances**.
Important information	The columns in the table display the attributes of the selected CI type. The attributes displayed vary according to the CI type selected. By default, only columns corresponding to attributes that have been defined with the **Asset Data, Change Monitored,** and **Comparable** attribute qualifiers in the CIT Manager are displayed as columns in the dialog box. For details, see "Attributes Page" on page 470.
Relevant tasks	➤ "Define an Impact Rule – Workflow" on page 424 ➤ "Define an Enrichment Rule – Scenario" on page 492 ➤ "Define a TQL Query" on page 29 ➤ "Create a Pattern View" on page 341 ➤ "Create a Template" on page 342 ➤ "Create a Perspective" on page 344

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

UI Elements (A-Z)	Description
Show CI instances of: Network	Specify the CIT you want displayed in the table. The table also includes the children of the selected CIT.
✖	Click to delete the selected CI.
	Click **Show CI Properties** to open the Configuration Item Properties dialog box for the selected CI.
	Click to refresh the list of CI instances.
▼	Filters the CI instances you want to display for the selected query node. Opens the Filter CI Instances dialog box.
	Clears the filter definitions you created in the Filter CI Instances dialog box.
	Enables you to select the columns to be displayed. For details, see "Select Columns Dialog Box" on page 540.
	Enables you to set the sort order of the CI instances. For details, see "Sort Column Content Dialog Box" on page 541.
🔍	Click **Find** to display the Find toolbar.
✉	Click **Send Mail** to send the table data in an email.

UI Elements (A-Z)	Description
🔁	Choose the export format for the table data. The available options are: ➤ **Excel.** The table data is formatted as an .xls (Excel) file that can be displayed in a spreadsheet. ➤ **PDF.** The table data is exported in PDF format. ➤ **RTF.** The table data is exported in Rich Text Format. ➤ **CSV.** The table data is formatted as a comma-separated values (CSV) text file that can be displayed in a spreadsheet. **Note:** For the CSV formatted table data to display correctly, the comma (,) must be defined as the list separator. In Windows, to verify or modify the list separator value, open Regional Options from the Control Panel, and on the Numbers tab ensure that the comma is defined as the List Separator value. ➤ **XML.** The table data is formatted as an XML file that can be opened in a text or XML editor. **Tip:** To extract HTML code from the report: ➤ Save the file as HTML ➤ Open the file in an HTML editor ➤ Copy the relevant table into the target file
30 ▼ **Rows per page**	Select the number of rows to be displayed on each page.
◁◁ ◁ 3 of 16528 ▷ ▷▷	Click to navigate through the results page by page or to jump to the first or last page.
<Element Instances>	The CI instances found for the selected TQL query node. You can double-click an instance to open the Configuration Item Properties dialog box for that CI.
<Element instances shortcut menu>	For details, see "IT Universe Manager Shortcut Menu" on page 272.
Display Label	The name of the CI instance as it appears in the topology map.

🔍 Filter CI Instances Dialog Box

This dialog box enables you to reduce the number of CI instances to be displayed in a list by selecting a condition and a value for a specific CI.

To access	Click the **Filter** 🔽 button in the Element Instances dialog box.
Important information	A description of the filter condition you defined appears above the table columns in the Element Instances dialog box. For example, the following illustration shows that a filter condition was created to display only CI instances whose CI type is **Windows**.
Relevant tasks	➤ "Define an Impact Rule – Workflow" on page 424 ➤ "Define an Enrichment Rule – Scenario" on page 492 ➤ "Define a TQL Query" on page 29 ➤ "Implement a Discovery Adapter" in the *Run-time Service Model Developer Reference Guide* ➤ "Create a Pattern View" on page 341 ➤ "Create a Template" on page 342 ➤ "Create a Perspective" on page 344

User interface elements are described below:

UI Elements (A-Z)	Description
Attribute	Displays all the attributes of the CI type to which the CI belongs.
Condition	Select the required operator. For details, see "Attribute Operator Definitions" on page 44.
NOT	Select to filter the results by the negation of a condition and value.
Value	Select or enter the required value.

🔍 Join Relationship Condition Dialog Box

This dialog box enables you to define the connection between two query nodes using a join relationship.

To access	In Enrichment Manager or Impact Analysis Manager, click the **Add** ➕ button in the Add Join Relationship dialog box.
Relevant tasks	➤ "Define an Impact Rule – Workflow" on page 424 ➤ "Define an Enrichment Rule – Scenario" on page 492 ➤ "Define a TQL Query" on page 29 ➤ "Implement a Discovery Adapter" in the *Run-time Service Model Developer Reference Guide*.

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

UI Elements (A-Z)	Description
<Selected query node1>	A selected query node. The first attribute applies to <end_1>.

UI Elements (A-Z)	Description
<Selected query node2>	A selected query node. The second attribute applies to <end_2>.
Operator	Select one of the following operators: ➤ **Equal.** The system checks whether two selected attributes are equal. ➤ **Not equal.** The system checks whether two selected attributes are not equal. ➤ **Sub string.** The system checks whether the value of the first attribute is a substring of the value of the second attribute. ➤ **Sub string ignore case.** The system checks whether the value of the first attribute is a substring of the value of the second attribute regardless of the string's case. **Important**: When using the operator **Not equal**, ensure that both sides of the join relationship have a limited result size. It is recommended to define more specific conditions so as not to overload the system with large results.

🔍 Layout Settings Dialog Box

This dialog box enables you to determine which attributes are used in the calculation of the TQL query when using the UCMDB API. For details, see "HP Universal CMDB Web Service API" in the *Run-time Service Model Developer Reference Guide*.

To access	Click **Advanced layout settings** in the Query Node/Relationship Properties dialog box.
Important information	Since this option is only relevant when querying the CMDB API, the query results in the user interface is not impacted by the attributes you select in this dialog box.
Relevant tasks	➤ "Define an Impact Rule – Workflow" on page 424 ➤ "Define an Enrichment Rule – Scenario" on page 492 ➤ "Define a TQL Query" on page 29 ➤ "Implement a Discovery Adapter" in the *Run-time Service Model Developer Reference Guide* ➤ "Create a Pattern View" on page 341 ➤ "Create a Template" on page 342 ➤ "Create a Perspective" on page 344

User interface elements are described below:

UI Elements (A-Z)	Description
Attribute name	The name of the attribute.
Calculate	Select this check box to include the attribute in the query's calculation.

Query Node/Relationship Properties Dialog Box

This dialog box enables you to define the attribute conditions for the selected TQL query node/relationship.

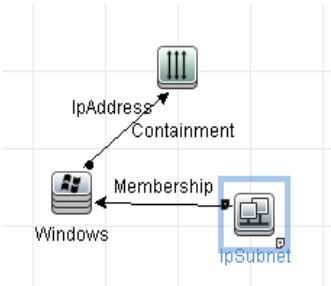| To access	**To access in Enrichment Manager, Impact Analysis Manager, and the Modeling Studio:** In the editing pane, right-click the required query node and select **Query Node/Relationship Properties**.
	Note: If you are using Enrichment Manager, select **Query** mode at the top of the editing pane to display the **Query Node Properties** option.
	To access in DFM: **1** To access from the Adapter Definition tab, select an adapter. Click the 🖉 **Edit Input Query** button to the right of the **Input Query** box to open the Input Query Editor. **2** Right-click the required query node/relationship and select **Query Node Properties** or **Relationship Properties**.
Relevant tasks	➤ "Define an Impact Rule – Workflow" on page 424 ➤ "Define an Enrichment Rule – Scenario" on page 492 ➤ "Define a TQL Query" on page 29 ➤ "Implement a Discovery Adapter" in the *Run-time Service Model Developer Reference Guide* ➤ "Create a Pattern View" on page 341 ➤ "Create a Template" on page 342 ➤ "Create a Perspective" on page 344

User interface elements are described below:

UI Elements (A-Z)	Description
Element name	(Optional) The **Element name** box contains the name of the selected query node/relationship. By default, the CI type is assigned as the element's name. You can rename a TQL query node in the **Element name** box giving it a unique label. This can be helpful when there is more than one query node of the same CI type in the TQL query.
Include subtypes	Select to display both the selected CI and its children in the topology map.
Query Result Count	Click **Query Result Count** to display a topology map of the TQL query showing the number of instances of each query node/relationship. **Note:** This feature is only available in the Modeling Studio.
Visible	Select **Visible** to display the selected TQL query node in the editing pane. When this option is cleared, an invisible box ▣ appears to the right of the selected TQL query node in the editing pane. Any query results pertaining to that TQL query node are not displayed in the topology map. This can be useful when certain relationships or TQL query nodes are required to build the query but are not needed in the results. For example, Windows are connected to the IP Subnet by defining specific IP Addresses, but in any query results you may want to view the IP Address elements only and not the Windows elements.

Attribute Tab

This area enables you to create an expression defining conditions that restrict the number of query nodes that appear in the query. You can add an attribute condition to a query node or relationship and filter the query results.

To access	Click the **Attribute** tab in the Query Node/Relationship Properties dialog box.
Relevant tasks	➤ "Define an Impact Rule – Workflow" on page 424
	➤ "Define an Enrichment Rule – Scenario" on page 492
	➤ "Define a TQL Query" on page 29
	➤ "Implement a Discovery Adapter" in the *Run-time Service Model Developer Reference Guide*
	➤ "Create a Pattern View" on page 341
	➤ "Create a Template" on page 342
	➤ "Create a Perspective" on page 344

User interface elements are described below:

UI Elements (A-Z)	Description
➕	Add the attribute condition you have defined.
✖	Delete an attribute definition.
⬆	Move a selected row up.
⬇	Move a selected row down.
🔍	Display the criteria in a popup dialog box.
Advanced layout settings	Opens the Layout Settings dialog box which enables you to determine which attributes are used in the calculation of the TQL query when querying the RTSM using third-party or custom tools.
And/Or	Click inside the **And/Or** field and select either **And** or **Or** to link multiple conditions.

UI Elements (A-Z)	Description
Attribute name	Select an attribute from the drop-down list.
`{  }` **Brackets**	Click inside the **Brackets** box to display a list of brackets you can use to build more complex, logical statements.
Criteria	Contains the attribute condition definition as defined in the Element Instances dialog box.
Default Value	For parameterized attributes, enter a default value for the parameter.
Not	Select **NOT** if you want the condition statement to do the opposite of what is defined. **Note**: If you select **NOT**, query results do not include data from the CI instances that were not assigned a value. For example, your system contains three nodes: Node1 is assigned the value A, Node2 is assigned the value B and Node3 is not assigned a value. You create a query to retrieve all nodes that are equal to A and select **NOT**; the results of your query only include Node2 because Node3 is not assigned a value.
Operator	Select the required operator. For details, see "Attribute Operator Definitions" on page 44.
Parameterized	Select **Yes** to define a parameterized value for the attribute. Select **No** to define a fixed value for the attribute. **Note:** This feature is only available in the Modeling Studio.
Parameter Name	If you are defining a parameterized value for the attribute, you must enter the parameter name. **Note:** This feature is only available in the Modeling Studio.
Value	Enter or select the value of the attribute. The **Value** options vary according to the attribute type you select.

Cardinality Tab

In this area, you can define a relationship cardinality, which enables you to define how many CI instances you expect to have at the end of a relationship in your query result.

To access	Click the **Cardinality** tab in the Query Node Properties dialog box.
Important information	Select the required relationship to which the selected query node is attached. Then define the lower and upper limits for including the query node at the other end of the relationship in the query results.
	You can define relationship conditions that enable the relationship's connecting query node to be included in the TQL query results by creating an expression defining that condition. For an example, see "Example of a Relationship Condition" on page 88.
	Note: This tab only appears when a query node is selected.
Relevant tasks	➤ "Define an Impact Rule – Workflow" on page 424
	➤ "Define an Enrichment Rule – Scenario" on page 492
	➤ "Define a TQL Query" on page 29
	➤ "Implement a Discovery Adapter" in the *Run-time Service Model Developer Reference Guide*
	➤ "Create a Pattern View" on page 341
	➤ "Create a Template" on page 342
	➤ "Create a Perspective" on page 344

User interface elements are described below:

UI Elements (A-Z)	Description
✚	Add the cardinality definition you have defined.
✖	Delete a cardinality definition from the Cardinality area.
⬆	Move a selected row up.

UI Elements (A-Z)	Description
↓	Move a selected row down.
🔍	Display the criteria in a popup dialog box.
1 .. *	Inserts **1** in the Min box and ***** in the Max box. **Note:** Only relevant for the Modeling Studio.
0 .. *	Inserts **0** in the Min box and ***** in the Max box. **Note:** Only relevant for the Modeling Studio.
And/Or	Click inside the **And/Or** field and select either **And** or **Or** to link multiple conditions.
{ } **Brackets**	Click inside the **Brackets** box to display a list of brackets you can use to build more complex, logical statements.
Criteria	Contains the cardinality condition definition as defined in the Element Instances Dialog Box.
Max	Enter the value that defines the upper limits for including the query node at the other end of the relationship in the query results. **Note**: You can use an asterisk (*****) in the **Max** box to represent an infinite value.
Min	Enter the value that defines the lower limits for including the query node at the other end of the relationship in the query results. For example, if <end_1> is **IP** and <end_2> is **Windows**, entering **1** in the **Min** box and asterisk (*****) in the **Max** box instructs the system to retrieve only those IP Addresses that are connected to at least one Windows operating system. (The asterisk indicates an infinite value.) Entering **3** in the **Min** box and asterisk (*****) in the **Max** box instructs the system to retrieve only those Windows operating systems that are connected to at least three IP Addresses.

UI Elements (A-Z)	Description
Query Node	Select the required relationship to which the selected query node is attached. The list contains all the relationships that are linked to the selected query node.
Not	Select **NOT** if you want the condition statement to do the opposite of what is defined.
	Note: If you select **NOT**, query results do not include data from the CI instances that were not assigned a value. For example, your system contains three nodes: Node1 is assigned the value A, Node2 is assigned the value B and Node3 is not assigned a value. You create a query to retrieve all nodes that are equal to A and select **NOT**; the results of your query only include Node2 because Node3 is not assigned a value.

Example of a Relationship Condition

The example of relationship conditions is based on the following TQL query:
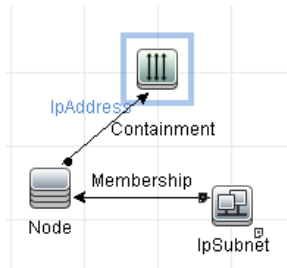
In the Relationship Cardinality dialog box, the following relationship conditions are defined for the query:

➤ Containment – **Min: 2, Max: 4**

➤ Membership – **Min: 1, Max: ***

Using the OR operator, the definitions appear in the **Cardinality** section, as follows:

NOT	(	Criteria	)	And/Or
☐		Containment (Node, IpAddress) : 2..4		OR
☐		Membership (IpSubnet, Node) : 1..*		

➤ [contained (Node, IP Address)] OR [member (IP Subnet, Node)] means that the node must either have between two and four IP Addresses OR be a member of the IP Subnet.

Using the AND operator, the definitions appear in the **Cardinality** section, as follows:

NOT	(	Criteria	)	And/Or
☐		Containment (Node, IpAddress) : 2..4		AND
☐		Membership (IpSubnet, Node) : 1..*		

➤ [contained (Node, IP Address)] AND [member (IP Subnet, Node)] means that the node must have between two and four IP Addresses AND also be a member of the IP Subnet.

Qualifier Tab

This area enables you to define qualifier conditions for the selected query node or relationship. For example, you can use a qualifier to define a CIT as abstract, meaning you cannot create instances from it.

To access	Click the **Qualifier** tab in the Query Node/Relationship Properties dialog box.

Important information	By default, multiple selection links the conditions with the OR operator.
Relevant tasks	➤ "Define an Impact Rule – Workflow" on page 424
	➤ "Define an Enrichment Rule – Scenario" on page 492
	➤ "Define a TQL Query" on page 29
	➤ "Implement a Discovery Adapter" in the *Run-time Service Model Developer Reference Guide*
	➤ "Create a Pattern View" on page 341
	➤ "Create a Template" on page 342
	➤ "Create a Perspective" on page 344

User interface elements are described below:

UI Elements (A-Z)	Description
ABSTRACT_CLASS	You cannot create instances of this CIT.
ALLOW_VOLATILITY	Used to mark attributes that enable minor deviations to their value. For example, there is probably no need to report a small disk size change (from 8.00008 to 8.00009 GB).
	By default, **ALLOW_VOLATILITY** is enabled for the following numeric or date attributes only:
	➤ CIT: Node
	➤ MemorySize
	➤ SwapMemorySize
	These attributes also include comparable and static qualifiers.
	➤ CIT: Host
	➤ HostLastBootTime
	➤ CIT: CPU
	➤ CpuClockSpeed
	➤ CIT: Filesystem
	➤ Disk_size
	For details of this qualifier's attributes and the procedure for activating and deactivating this feature, see "The ALLOW_VOLATILITY Qualifier" on page 27.

UI Elements (A-Z)	Description
BDM_SCOPE	Indicates that the CI type is part of the BDM scope of the class model.
BLE_LINK_CLASS	A relationship that has been assigned this qualifier is loaded by an online BLE engine TQL and becomes part of the Dashboard status calculations.
CALCULATED_LINK	This qualifier is assigned to calculated relationships
CONTAINER	This qualifier is assigned to relationships that signify a containment relationship, such as Member, Container link, Contains, or Contained.
HIDDEN_CLASS	Instances of this CIT do not appear anywhere in the application.
ID_CLASS_NAME_OVER RIDE	Indicates that the class ID is calculated based on another class.
ITU_HIDDEN_CLASS	Instances of this CIT do not appear in the topology map application.
MAJOR_APP	CI types that are assigned this qualifier appear in the Application Breakdown overview report. For details, see "Application Breakdown Report" on page 516.
MODELING_ENABLED	Enables a CIT to act as model in Modeling Studio. For details, see "Business CI Models" on page 329.
NETWORK_DEVICES	A qualifier common to all the CI types that represent a network device. It can be used for TQL queries related to network devices and serves as a replacement for CI types in a query.
Negate Qualifiers	If this check box is selected, then the element is included in the query results only if it has no qualifier in the list of selected qualifiers.
PM_SUSPECT	Used by Problem Isolation to determine which CIs are to be considered as suspects when isolating a problem. For details, see "Problem Isolation" in *Using Problem Isolation*.

UI Elements (A-Z)	Description
RANDOM_GENERATED_ ID_CLASS	Indicates that the RTSM ID of the CIs is randomly generated rather than being based on the key attributes of the class.
READ_ONLY_CLASS	This CIT cannot be edited.
RECURSIVE_DELETE	Relevant for relationships. When the CI at one end of a relationship is deleted, the system checks the CI at the other end of the relationship. If it is not related to any other CIs, it is also deleted.
TRACK_LINK_CHANGES	Changes that occur in the specified relationship appear in Change reports.

Identity Tab

This area enables you to filter the TQL query results according to the element ID of the instances found for the selected TQL query node.

To access	Click the **Identity** tab in the Query Node Properties dialog box.
Important information	Move the required element from the **Optional identities** pane on the left to the **Selected identities** pane on the right to define what you want included in the TQL query results using the left and right arrows. **Note:** This tab only appears when a query node is selected.
Relevant tasks	➤ "Define an Impact Rule – Workflow" on page 424 ➤ "Define an Enrichment Rule – Scenario" on page 492 ➤ "Define a TQL Query" on page 29 ➤ "Implement a Discovery Adapter" in the *Run-time Service Model Developer Reference Guide* ➤ "Create a Pattern View" on page 341 ➤ "Create a Template" on page 342 ➤ "Create a Perspective" on page 344

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

UI Elements (A-Z)	Description
<Toolbar>	For descriptions of the toolbar buttons, see "Element Instances Dialog Box" on page 75.
Optional identities pane	Displays all the instances found for the selected TQL query node.
Selected identities pane	Displays the elements that are used to define what should be included in the TQL query results.

🔖 Refine Query Node Type Dialog Box

This dialog box enables you to change the CI type of a TQL query node after you have created a TQL query.

To access	In Impact Analysis Manager or Enrichment Manager, right-click the required query node and select **Refine Query Node Type**. **Note**: If you are using Enrichment Manager, select **Query** mode at the top of the editing pane to display the **Refine Query Node Type** option.
Important information	You can change the CI type to a type from one of the CI type's children, if one exists. If no such CI type exists, this option does not appear.
Relevant tasks	➤ "Define an Impact Rule – Workflow" on page 424 ➤ "Define an Enrichment Rule – Scenario" on page 492 ➤ "Define a TQL Query" on page 29 ➤ "Implement a Discovery Adapter" in the *Run-time Service Model Developer Reference Guide* ➤ "Create a Pattern View" on page 341 ➤ "Create a Template" on page 342 ➤ "Create a Perspective" on page 344

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

UI Elements (A-Z)	Description
<List of CI types from which to choose>	Select the required CI type.

Select Relationship Type Dialog Box

This dialog box enables you to select the type of TQL relationship to be created.

To access	In the editing pane of Impact Analysis Manager, Enrichment Manager, and the Modeling Studio, click the **Create Relationship** button in the toolbar and draw a line between two query nodes. The Select Relationship Type dialog box opens automatically.
Important information	Select one of the following relationship types: ➤ **Regular Relationship.** For details, see "Add/Edit Relationship Dialog Box" on page 61. ➤ **Join Relationship.** For details, see "Add/Edit Join Relationship Dialog Box" on page 58. ➤ **Compound Relationship.** For details, see "Add/Edit Compound Relationship Dialog Box" on page 54. ➤ **Calculated Relationship.** For details, see "Add/Edit Calculated Relationship Dialog Box" on page 52.
Relevant tasks	➤ "Define an Impact Rule – Workflow" on page 424 ➤ "Define an Enrichment Rule – Scenario" on page 492 ➤ "Define a TQL Query" on page 29 ➤ "Implement a Discovery Adapter" in the *Run-time Service Model Developer Reference Guide* ➤ "Create a Pattern View" on page 341 ➤ "Create a Template" on page 342 ➤ "Create a Perspective" on page 344

Subgraph Condition Definition Dialog Box

This dialog box enables you to create conditions that restrict the number of query nodes that appear in the query.

To access	In Impact Analysis Manager and Enrichment Manager, click **Condition** 🖉 in the Add Triplet dialog box.
	In the Modeling Studio, click **Condition** 🖉 in the Subgraph Definition dialog box.
Important information	Contains the following tabs:
	➤ **Attribute**. Enables you to define attribute conditions for query nodes and relationships. See a description of the elements in the **Attribute** tab in the table below.
	➤ **Qualifiers**. Enables you to define qualifier conditions for the selected query node or relationship. For details, see "Qualifier Tab" on page 89.
Relevant tasks	➤ "Define an Impact Rule – Workflow" on page 424
	➤ "Define an Enrichment Rule – Scenario" on page 492
	➤ "Define a TQL Query" on page 29
	➤ "Implement a Discovery Adapter" in the *Run-time Service Model Developer Reference Guide*
	➤ "Create a Pattern View" on page 341
	➤ "Create a Template" on page 342
	➤ "Create a Perspective" on page 344

User interface elements are described below:

UI Elements (A-Z)	Description
➕	Add the subgraph condition definition.
✖	Delete the subgraph condition definition.
⬆	Move a selected row up.
⬇	Move a selected row down.

UI Elements (A-Z)	Description
🔍	View the subgraph condition definition.
And/Or	Click inside the **And/Or** field and select either **And** or **Or** to link multiple conditions.
Attribute name	Choose an attribute from the list.
{ } Brackets	Click inside the **Brackets** box to display a list of brackets you can use to build more complex, logical statements.
Criteria	Contains the attribute condition definition as defined in the Element Instances Dialog Box.
Element Name	Contains the CIT selected from the **Source** and **Target** lists.
Not	Select **NOT** if you want the condition statement to do the opposite of what is defined. **Note**: If you select **NOT**, query results do not include data from the CI instances that were not assigned a value. For example, let us assume that your system contains three nodes. Node1 is assigned the value A, Node2 is assigned the value B and Node3 is not assigned a value. If you create a query in which you want to retrieve all nodes that are equal to A and you select **NOT**, the results of your query only include Node2 because Node3 is not assigned a value.
Operator	Select the required operator. For details, see "Attribute Operator Definitions" on page 44.
Value	Enter or select the value of the attribute. The **Value** options vary according to the attribute type you select.

⚛ Subgraph Definition Dialog Box

This dialog box enables you to create a graph that represents additional TQL query data related to a specific CI.

To access	**To access in Enrichment Manager, Impact Analysis Manager, and the Modeling Studio:** In the editing pane, right-click the required query node and select **Subgraph Definition**.
	Note: If you are using Enrichment Manager, select **Query** mode at the top of the editing pane to display the **Subgraph Definition** option.
	To access in Adapter Management in DFM: **1** Select an adapter in the Discovery Resources pane. **2** In the **Adapter Definition** tab, click the ✏ **Edit Input Query** button to the right of the **Input Query** box to open the Input Query Editor. **3** Right-click the required query node and select **Subgraph Definition**.
Important information	The following icon is displayed next to the query node for which you define a subgraph:
Relevant tasks	➤ "Define an Impact Rule – Workflow" on page 424 ➤ "Define an Enrichment Rule – Scenario" on page 492 ➤ "Define a TQL Query" on page 29 ➤ "Implement a Discovery Adapter" in the *Run-time Service Model Developer Reference Guide* ➤ "Create a Pattern View" on page 341 ➤ "Create a Template" on page 342 ➤ "Create a Perspective" on page 344
See also	➤ "Subgraph Definition" on page 27 ➤ "Create a Subgraph Definition – Scenario" on page 37

User interface elements are described below:

UI Elements (A-Z)	Description
✚	Add a subgraph definition. In Enrichment Manager and Impact Analysis Manager, click to open the Add Triplet dialog box. In the Modeling Studio, click to add a row to the table.
✖	Delete a subgraph definition.
✎	Edit a subgraph definition. In Impact Analysis Manager and Enrichment Manager, click to open the Edit Triplet dialog box. In the Modeling Studio, click to open the Subgraph Condition Definition dialog box.
Depth	A number that represents the longest path (that is, the maximum connecting query nodes) allowed between two CIs in the RTSM that should be included in the DFM process. **Default:** 5
Element condition exists	A green asterisk appears next to either the source, relationship, or target in the subgraph definition if an attribute condition has been defined for one of them in the Subgraph Condition Definition dialog box. For details, see "Subgraph Condition Definition Dialog Box" on page 95.
Relationship	The relationship selected connecting the source to the target query node.
Relationship Direction	The direction of the relationship selected, indicating which query node is dependent on the other.
Source	The required source query node selected.
Target	The required target query node selected.

🔍 User Preferences Dialog Box

This dialog box enables you to reset system preferences.

To access	Select **Edit** > **User Preferences** or click Configure User Preferences button 🖼 in the Status Bar.
Important information	All the preferences you select (such as whether to display certain wizard pages or warning message preferences) are stored in the system. This dialog box enables you to reset those preferences.

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

UI Elements (A-Z)	Description
<Left pane>	Select the preferences page to edit. The following options are available: ➤ Wizard Preferences ➤ Optional Messages Preferences ➤ Discovery Preferences ➤ General ➤ Reports
Filter by	Enter a search word to filter the list of options.
Preferences list	The list of warning messages and their user-selected preferences.
Reset Page	Click to reset the selected preference to its default value.
Reset All	Click to reset all the preferences to their default values.

🔍 Troubleshooting and Limitations

This section describes troubleshooting and limitations for Topology Query Language.

For TQL queries to be valid, they must comply with certain restrictions.

This section includes the following topics:

➤ "Understanding Validation Restrictions" on page 100

➤ "Impact Analysis TQL Query Validation" on page 102

➤ "Enrichment TQL Query Validation" on page 103

Understanding Validation Restrictions

For Impact Analysis, Discovery, and Enrichment TQL query types to be valid, they must comply with the following restrictions:

➤ **Unique Names.** TQL query elements must have unique names.

➤ **Self Relationships**. A TQL query must not contain self relationships, that is, a relationship must not lead from a query node to itself, as the following example illustrates:
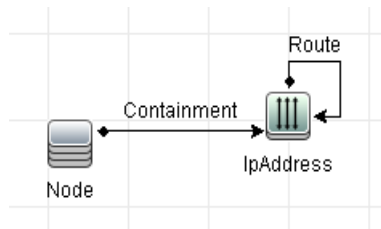
➤ **Cyclic Graph**. The TQL query structure cannot be a closed circle, as shown in the following example:
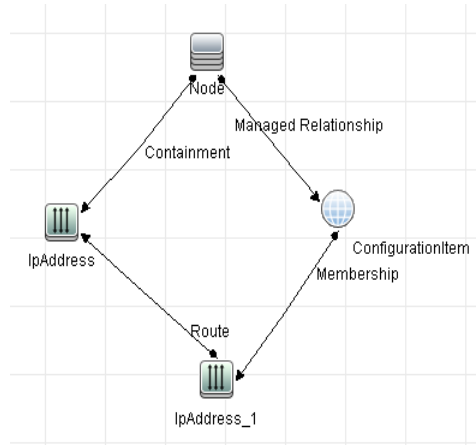
➤ **Separate Query Nodes and Groups**. All the TQL query nodes must be linked to one another, that is, the TQL query cannot contain separate query nodes or groups, as the following example illustrates:
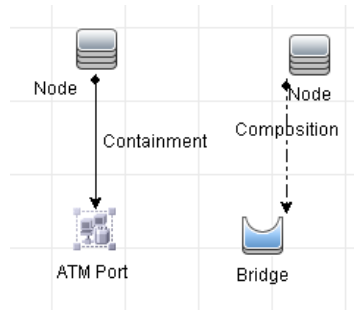
Impact Analysis TQL Query Validation

Impact Analysis TQL queries must also comply with the following restrictions:

➤ **Number of query nodes**. An Impact Analysis TQL query must consist of at least two query nodes.

➤ **Trigger and affected query nodes must be connected**. There must be a path of relationships from the triggered query node to the affected query nodes.

➤ **Selecting query nodes to function as Impact Analysis triggers**. When selecting query nodes to function as Impact Analysis triggers, the query nodes must comply with the following restrictions:

➤ You can select more than one query node as a trigger. However, you cannot define a query node both as affected and as a trigger.

➤ If a query node has a relationship whose minimum limit is 0 (meaning that one of its ends does not necessarily have a query node linked to it), the query node that is linked to its other end cannot be a root cause query node (because it may or may not exist in the TQL query). For details about minimum limits, see "Cardinality Tab" on page 86. For example, **Configuration Item** cannot be either a root cause or affected query node because it is connected to the query node with a **Min** limit of 0.
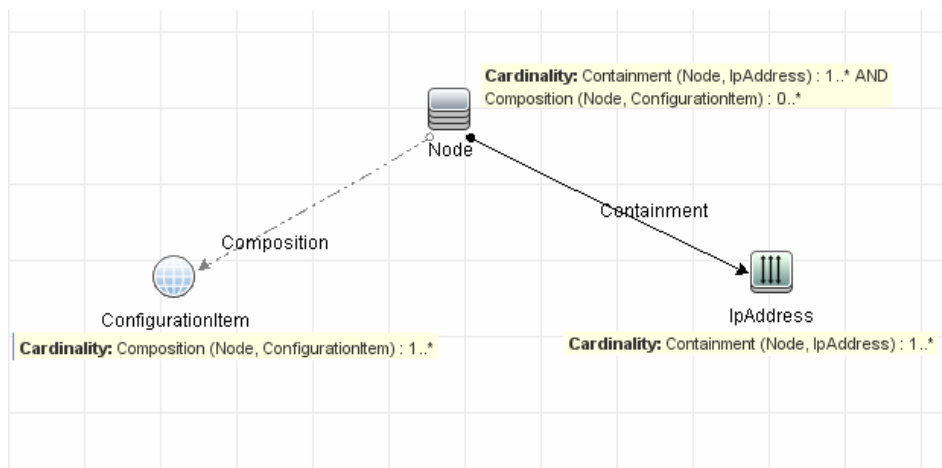
**Note:** A query node that is not visible cannot be a root cause or an affected query node.

➤ **The connection between trigger and affected query nodes**. The trigger query node and affected query nodes you define must be connected by a path of relationships from the triggered query node to the affected query nodes.

Enrichment TQL Query Validation

Enrichment TQL queries must comply with the following restriction:

➤ **Required elements**. You cannot perform Enrichment on a non-required query node, that is, a query node that does not necessarily appear in the TQL query results.

Example 1. In this example, the TQL query results can be either **A** and **B** or **A** and **C**. Therefore, you cannot add an Enrichment query node to query nodes **B** or **C** because they are not required elements. You can add an Enrichment query node to query node **A** because it always appears in the TQL query results. For details on how to add Enrichment query nodes and relationships, see "Add Enrichment Query Nodes and Relationships to an Enrichment TQL Query" on page 497.
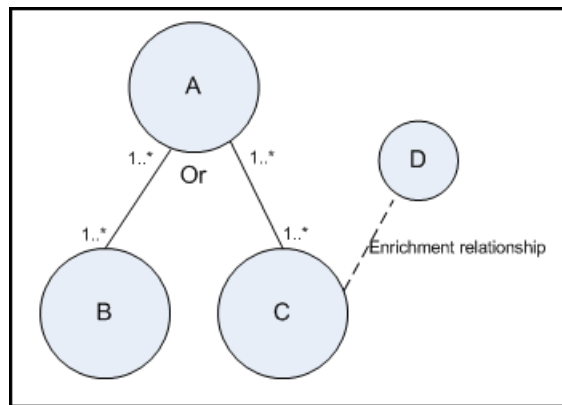
Example 2. In this example, both **A** and **B** are required elements that always appear in the TQL query results. Only **C** is not a required element because it has a cardinality of 0. Therefore, you cannot add an Enrichment query node to it.
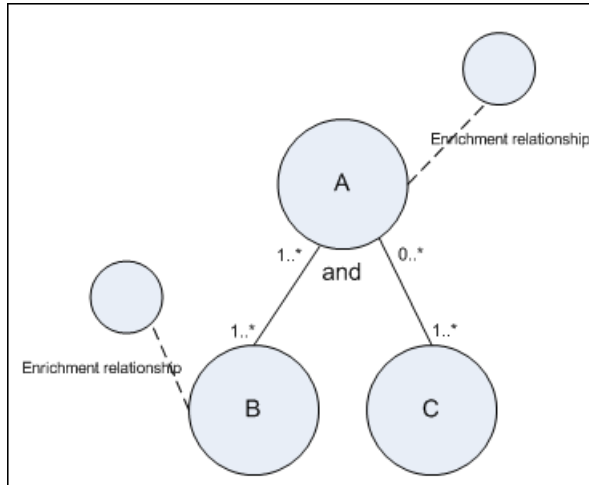
2

Impact Modeling

This chapter includes:

Concepts

Concepts

🔵 Impact Modeling Overview

The impact model enables you to determine the direction of the propagation of the IT infrastructure CIs in your business world. The direction of the impact is not always the same direction as the physical relationships taken from the CI Type model.

The impact model uses the impact layer to change the propagation direction. The impact layer is used in the applications where propagation occurs. You change the direction of the impact using the impact layer, regardless of the direction of the physical relationships.

All KPI propagation is affected by the impact model. For details on KPI propagation in Service Health, see "Propagation Rules" in *Using Service Health*. For details on KPI propagation in Service Level Management, see "Propagation Rules" in *Using Service Level Management*.

Impact Layer

The impact layer changes the direction of the impact. The impact layer separates the impact direction from the CI Type model, creating an independent layer on top of the CI Type model. This means that components affected by the impact model are no longer relying on the physical relationships as defined in the CI Type model. As a result, the impact direction is no longer necessarily identical to the direction of the physical relationships in the CI Type model.

Impact Rules

The impact layer consists of impact rules. The impact rules are defined in the CI Type Manager. For details, see "Triplets Page" on page 475.

An impact rule is defined by one or more triplets. Each triplet is defined by the following components:

➤ One source CI type

➤ One target CI type

➤ A physical relationship type (for example, Containment) that links the two CI types

➤ The required impact direction. The direction of the impact can be identical to or opposite from the direction of the physical relationship between the source and target CIs.

HP Business Service Management implements the impact layer by creating calculated relationships that are defined by impact rules. Once one of the triplets fulfills the impact rule condition, HP Business Service Management automatically creates the calculated relationship based on the triplet definition.

Since calculated relationships are defined by physical relationships from within the class model, their lifetime is determined by the lifetime of the physical relationships defined in the impact rule. When the physical relationship in the class model is removed, the corresponding calculated relationship is removed from all view results as well.


Note: If you create a new CI type or relationship in the CI Type Manager, you need to define the required triplets. For example, to enable the impact model to properly affect KPI propagation. If the triplets are not defined, the required KPIs are not included in the Dashboard views and SLA agreements.


You can use calculated relationships to create TQL queries just like any other relationship in the CI Type model. This enables you to base Enrichment rules, Impact rules, and views on calculated relationships. Calculated relationships affect the results of all TQLs that use that calculated relationships since calculated relationships are part of the class model.

Example of an Impact Rule Definition:
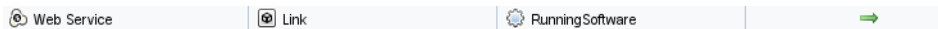
🎲 Propagation Reversal

The following example illustrates a scenario in which propagation is reversed.
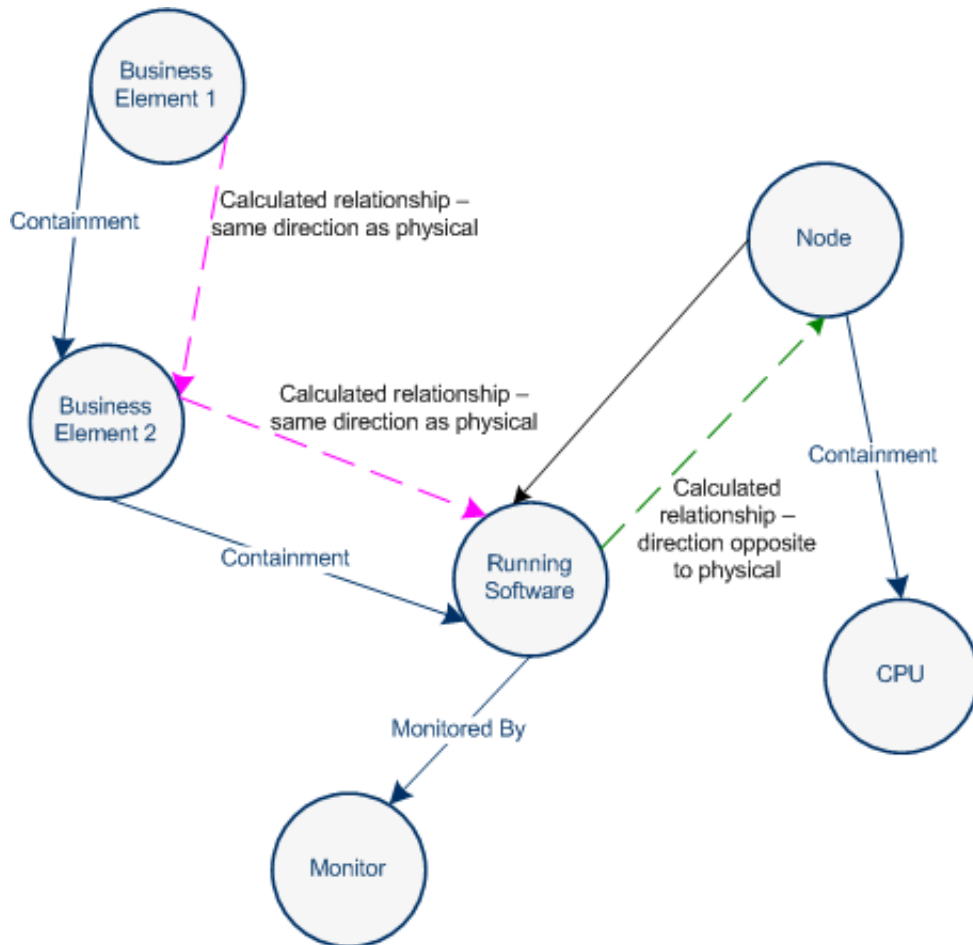
Based on the impact rules defined in the CI Type Manager, the impact is propagating from the **Business2** CI to **Business1**, the same direction as the physical relationship that is connecting the **Running Software** CI to **Business2**.

According to the direction of the physical relationship between the **Running Software** CI and the **Node**, the **Running Software** CI should impact the **Node**.

But based on the following impact rule, a calculated relationship is automatically created and HP Business Service Management reverses the impact of the propagation.

🖳 Node	🔘 Link	⚙ Running Software	⇐
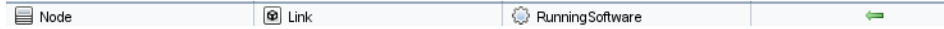
The impact is now propagated from the **Node** to the **Running Software**.

🍀 Calculated Relationship Types

There is one out-of-the-box calculated relationship called **Impacted By**. **Impacted By** contains two subtypes, each one representing a different type of dependency relationship (complete dependency vs. potential dependency.

➤ **Impacted by (Directly).** Represents the fact that one CI that is linked to another CI using an Impacted By (Directly) relationship is part of that CI. You use an Impacted By (Directly) relationship for those CIs that you want to see in your model. The ownership of the two CIs may be the same, but this is not always the case.

➤ **Impacted By (Potentially).** Represents the fact that one CI consumes the products of another. CIs that are linked by an Impacted By (Potentially) relationship are not part of that model, but are listed as related CIs. For details, see "Model Editor" on page 375.

🍀 Creating Views Based on the Impact Model

As a best practice, you should use Modeling Studio to create a view of calculated relationships based on a model. Modeling Studio enables you to create perspective based views that use calculated relationships instead of physical relationships. For details, see "Modeling Studio" on page 319.

For details on how to create and edit models, see "Model Editor" on page 375.

Note: For an in-depth description of the Impact Modeling Solution, see "Best Practices for Modeling" on page 209.

3

Create a URL for a Direct Link

This chapter includes:

Concepts

➤ Generate a Direct Link – Overview on page 114

Tasks

➤ Generate a Direct Link – Scenario on page 116

Reference

➤ Generate a Direct Link User Interface on page 117

Concepts

🍥 Generate a Direct Link – Overview

Direct Links enables you to create a URL that guides another user to a specific target view or CI in HP Business Service Management.

You can create a URL that:

➤ Opens a specific HP Business Service Management view or CI directly in HP Business Service Management. This enables users to retrieve information from HP Business Service Management without being located in the HP Business Service Management context.

Note: To open a specific view or CI directly in HP Business Service Management, use the **Open in context links** option. For details, see "Select Command Page" on page 119.

➤ Enables integration with HP Business Service Management:

➤ If you create a URL using the Embedded links option, the URL takes you first to the HP Business Service Management login page. After you enter your login name and password, the target page opens in your browser.

Note: To open the target page in your browser, use the **Embedded links** option. For details, see "Select Command Page" on page 119.

When you create a URL, you can:

➤ Send the URL to an email recipient

➤ Copy the URL to the clipboard

➤ Test the URL to ensure that the target application page can be found

The user to whom you are sending the URL must have an account with sufficient privileges to open the target page. You must apply the appropriate viewing and editing permissions to the users and user groups that want to access the target view. You set permissions in **Admin** > **Platform** > **Users and Permissions**, select a user or a group and select **Permissions**. For details, see "How to Assign Permissions" in *Platform Administration*.

Note: You can use **Link to this Page** function to open a target HP Business Service Management page in your browser. While the **Link to this Page** function enables you to access another application page in HP Business Service Management, it does not enable you to access a specific CI or view. For details, see "Linking to a Specific Page" in *Platform Administration*.

Tasks

❧ Generate a Direct Link – Scenario

This scenario describes how to generate a direct link to email the URL of a specific CI to another person.

Jane Harrison is a senior engineer in the ABC Software company. She has encountered a problematic CI in a view she has created. She wants to inform Henry Jones, who is working with the same view through HP ServiceCenter, about the problematic CI. Since the view Jane has created contains many hundreds of CIs, she decides to email Henry the URL of the CI so that he does not have to spend a lot of time searching for that specific CI.

In IT Universe Manager, Jane selects **Generate Direct Link** from the **Edit** menu. In the Select Command page, she selects **Open in context links** and then the **Show View** option, and clicks **Next**.

In the **Direct Link Parameters — Show View** page, she selects the view she created, the problematic CI, and **View Topology** as the mode in which Henry should open the CI. When the URL is created, she emails Henry the link to the problematic CI.

For details, see "Generate Direct Link Wizard" on page 118.

Reference

⚙ Generate a Direct Link User Interface

This section includes (in alphabetical order):

➤ Generate Direct Link Dialog Box on page 117

➤ Generate Direct Link Wizard on page 118

⚙ Generate Direct Link Dialog Box

This dialog box enables you to create a URL to send to users so that they can access HP Business Service Management.

To access	From the **Admin** > **RTSM Administration** > **Modeling** main menu, select **Edit** > **Generate Direct Link**. After you configure the Direct Link parameters in the "Generate Direct Link Wizard" on page 118, click **Finish** in the Finish page.
Relevant tasks	"Generate a Direct Link – Scenario" on page 116

User interface elements are described below:

UI Elements (A-Z)	Description
Copy URL	Copies the URL to the clipboard.
Description	Describes the parameters that are included in the URL. For details on selecting the parameters, see "Select Command Page" on page 119.
Link URL	The created URL that accesses the specified HP Business Service Management function.

UI Elements (A-Z)	Description
Mail URL	Opens an email containing the URL of the link.
Test URL	Checks the URL to ensure that the specified application page can be found.

✎ Generate Direct Link Wizard

This wizard enables you to create a URL that guides another user to a specific target view or CI in HP Business Service Management.

To access	From the **Admin** > **RTSM Administration** > **Modeling** main menu, select **Edit** > **Generate Direct Link**.
Important information	By default, this wizard is set to display a Welcome page. You can choose not to display the Welcome page by selecting the **Do not show this page again** check box.
Relevant tasks	"Generate a Direct Link – Scenario" on page 116
Wizard map	The Generate Direct Link wizard contains: Select Command Page (<Open in context links options> and <Embedded links options>) > Finish Page

🔖 Select Command Page

This wizard page enables you to select the required parameters that must be added to the URL.

You can create two types of links:

➤ **Open in context links.** Creates a URL that opens a specific view or CI directly in HP Business Service Management without having to be in the HP Business Service Management context:

➤ **Embedded links.** Creates a URL that enables you to embed an RTSM applet into external applications.

Important information	By default, this wizard is set to display a Welcome page. You can choose not to display the Welcome page by selecting the **Do not show this page again** check box.
Wizard map	The Generate Direct Link wizard contains: **Select Command Page** (<Open in context links options> and <Embedded links options>) > Finish Page
See also	"Generate Direct Link Wizard" on page 118

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

UI Elements (A-Z)	Description
<**Left pane**>	A graphic illustration of the selected command.
CII Grid	Creates a URL that displays all the CI instances found in the RTSM for a selected CI type and its children. For details, see "Direct Link Parameters – CII Grid Page" on page 125. **Note:** Available when you select the **Embedded links** option.

UI Elements (A-Z)	Description
CI Selector	Creates a URL that embeds the CI Selector displaying the CIs of a selected view, into external applications. For details, see "Direct Link Parameters – CI Selector Page" on page 123. **Note:** Available when you select the **Embedded links** option.
CI Type Selector	Creates a URL that embeds the CI type selector into external applications. For details, see "Direct Link Parameters – CI Type Selector Page" on page 123. **Note:** Available when you select the **Embedded links** option.
Description	A description of the selected command.
Impact Map	Creates a URL that embeds an impact map into an external application. For details, see "Direct Link Parameters – Impact Map Page" on page 126. **Note:** Available when you select the **Embedded links** option.
Model Editor	Creates a URL that embeds the Model Editor into an external application, highlighting the selected CIs in the CI Selector in the Model Editor. For details, see "Direct Link Parameters – Model Editor" on page 127. **Note:** Available when you select the **Embedded links** option.
Query Editor	Creates a URL that embeds the Model Editor into an external application, displaying the selected TQL query. For details, see "Direct Link Parameters – Query Editor" on page 128. **Note:** Available when you select the **Embedded links** option.

UI Elements (A-Z)	Description
Related CIs	Creates a URL that opens a topology map displaying the selected CI and its immediate neighbors within the selected view. For details, see "Direct Link Parameters – Related CIs Page" on page 129. **Note:** Available when you select the **Embedded links** option.
Report Viewer	Creates a URL that opens a specific report. For details, see "Direct Link Parameters – Report Viewer Page" on page 130. **Note:** Available when you select the **Embedded links** option.
Report Viewer - Saved Report	Creates a URL that opens a saved topology or custom report. For details, see "Direct Link Parameters – Report Viewer – Saved Report Page" on page 130. **Note:** Available when you select the **Embedded links** option.
Show change report	Creates a URL that embeds a report displaying changes made to a specific CI into an external application. For details, see "Direct Link Parameters – Show Change Report Page" on page 132. **Note:** Available when you select the **Embedded links** option.
Show change report on view	Creates a URL that embeds a report displaying changes made to a specific view into an external application. For details, see "Direct Link Parameters – Show Change Report on View Page" on page 133. **Note:** Available when you select the **Embedded links** option.
Show CI properties	Creates a URL that displays a CI's properties. For details, see "Direct Link Parameters – Show CI Properties Page" on page 131. **Note:** Available when you select the **Embedded links** option.

UI Elements (A-Z)	Description
Show Topology Report	Creates a URL that embeds a Topology Report into an external application. For details, see "Direct Link Parameters – Show Topology Report Page" on page 132. **Note:** Available when you select the **Embedded links** option.
Show view	Creates a URL that displays the selected view and optionally preselects a query node in it. For details, see "Direct Link Parameters – Show View Page" on page 136. **Note:** Available when you select the **Open in context links** option.
Show view topology	Creates a URL that displays the topology map of the selected view and embeds it in an external application. For details, see "Direct Link Parameters – Show View Topology Page" on page 134. **Note:** Available when you select the **Embedded links** option.
Start in mode	Creates a URL that opens HP Business Service Management at the selected page. For details, see "Direct Link Parameters – Start in Mode Page" on page 137. **Note:** Available when you select the **Open in context links** option.
Steps	The current step in the procedure.
View Editor	Creates a URL that opens a specific view in the Pattern View Editor in Modeling Studio. For details, see "Direct Link Parameters – View Editor Page" on page 135. **Note:** Available when you select the **Embedded links** option.
Views Selector	Creates a URL that embeds the View Selector in an external application, enabling you to select and display a view in that application. For details, see "Direct Link Parameters – Views Selector Page" on page 135. **Note:** Available when you select the **Embedded links** option.

🔍 Direct Link Parameters – CI Selector Page

This wizard page enables you to create a URL that embeds the CI Selector displaying the CIs of a selected view, into external applications.

Wizard map	**Select Command Page** (Embedded links > CI Selector) > Finish Page
Important information	➤ For general information about the Generate Direct Link wizard, see "Generate Direct Link Wizard" on page 118. ➤ Click **Finish** to close the wizard and create a URL. For details, see "Generate Direct Link Dialog Box" on page 117.

User interface elements are described below:

UI Elements (A-Z)	Description
Allow multi selection	Allow single or multiple selection of CIs.
Selected view	Select the required view from which you want to select the required CIs. ➤ Click ⋯ to open the View Selector dialog box. Select the view you want to appear in the CI Selector. ➤ Click ✖ to delete the selected view.

🔍 Direct Link Parameters – CI Type Selector Page

This wizard page enables you to create a URL to a hierarchical tree or list of selected CI types, which can be embedded into an external application.

Important information	➤ For general information about the Generate Direct Link wizard, see "Generate Direct Link Wizard" on page 118. ➤ Click **Finish** to close the wizard and create a URL. For details, see "Generate Direct Link Dialog Box" on page 117.
Wizard map	**Select Command Page** (Embedded links > CI Type selector) > Finish Page

User interface elements are described below:

UI Elements (A-Z)	Description
CI type selector mode	View the selected CI types in either a hierarchical tree or list.
Invisible CITs (tree only)	Select the CI types you do not want to appear in the tree. ➤ Click 🖉 to open the CI Type Selector dialog box. Select the CI types you want to appear in the tree. ➤ Click ✖ to delete the selected CI types.
Root CI Type (tree only)	Select the CI type you want to use as the root CI type in a hierarchical tree. ➤ Click 🖉 to open the CI Type Selector dialog box. Select the CI type you want to use as the root CI type in the tree. ➤ Click ✖ to delete the selected CI type. The default is IT Universe.
Selection mode	Allow single or multiple selection of CI types.
Unselectable CITs (tree only)	Select the CI types which cannot be selected in the tree. ➤ Click 🖉 to open the CI Type Selector dialog box. Select the CI types which cannot be selected in the tree. ➤ Click ✖ to delete the selected CI types.
Visible CITs (list only)	Select the CI types which you want to appear in the CI type list. ➤ Click 🖉 to open the CI Type Selector dialog box. Select the CI types which you want to appear in the CI type list. ➤ Click ✖ to delete the selected CI types. **Note:** If you choose to view the CITs in a list, then you are required to select at least one CI type.

🔍 Direct Link Parameters – CII Grid Page

This wizard page enables you to display all of the CI instances found in the RTSM for selected CI type, and its children.

Important information	➤ For general information about the Generate Direct Link wizard, see "Generate Direct Link Wizard" on page 118. ➤ Click **Finish** to close the wizard and create a URL. For details, see "Generate Direct Link Dialog Box" on page 117.
Wizard map	**Select Command Page** (Embedded links > CII Grid) > Finish Page
See also	"Element Instances Dialog Box" on page 75

User interface elements are described below:

UI Elements (A-Z)	Description
Class type	Select the required CI type. ➤ Click 🖉 to select the required CI type. Opens the CI Type Selector dialog box. ➤ Click ✖ to delete the CI type.

🔍 Direct Link Parameters – Impact Map Page

This wizard page enables you to run an Impact Analysis rule defined in Impact Analysis Manager. The URL you create enables you to embed a topology map showing a simulation of all the CIs that are affected by the selected trigger CI for the selected severity and state. For details, see "Run Impact Analysis Dialog Box" on page 282.

Important information	➤ For general information about the Generate Direct Link wizard, see "Generate Direct Link Wizard" on page 118. ➤ Click **Finish** to close the wizard and create a URL. For details, see "Generate Direct Link Dialog Box" on page 117.
Wizard map	**Select Command Page** (Embedded links > Impact map) > Finish Page
See also	"IT Universe Manager" on page 221

User interface elements are described below:

UI Elements (A-Z)	Description
Filter by CI types	Select the CI types you do not want to appear in the impact analysis results. ➤ Click ⋯ to select the required CI types. ➤ Click ✖ to delete the selected CI types.
Rule bundle	Enables you to define where you can run Impact Analysis rules.

UI Elements (A-Z)	Description
Severity	➤ Click ▢ to select the required severity. **Note**: The severity list was defined for the state in the System Type Manager. For details, see "System Type Manager" on page 450. For example, you can create an Impact rule in the Impact Analysis Manager (see the "Impact Rules Definition Dialog Box" on page 439), that defines the severity of the trigger query node as other than **No Change**. If you select a severity other than **No Change**, for example, **Plan**, the condition is met and the simulated changes in the system are triggered. For details, see "Run Impact Analysis Dialog Box" on page 282. ➤ Click ✖ to delete the selected severity.
Trigger CIs	➤ Click ▢ to select the CIs that are used as the triggers in an impact map. These CIs represent the simulated changes to be made to the system. Opens the CI Selector dialog box. For details on how to use the CI Selector pane, see "CI Selector" on page 159. ➤ Click ✖ to delete the selected CIs.

🔍 Direct Link Parameters – Model Editor

This wizard page enables you to embed the Model Editor into an external application, highlighting the selected CIs in the CI Selector in the Model Editor.

Important information	➤ For general information about the Generate Direct Link wizard, see "Generate Direct Link Wizard" on page 118. ➤ Click **Finish** to close the wizard and create a URL. For details, see "Generate Direct Link Dialog Box" on page 117.
Wizard map	**Select Command Page** (Embedded links > Model Editor) > Finish Page
See also	"Business CI Models" on page 329

User interface elements are described below:

UI Elements (A-Z)	Description
Model name	Select the model you want to display in the Model Editor. ➤ Click [...] to open the Select Model dialog box. Select the model you want to appear in the Model Editor. ➤ Click ✖ to delete the selected model.
Selected CI in search	Select the CIs you want to appear highlighted in the CI Selector in the Model Editor. ➤ Click [...] to open the CI Selector. ➤ Click ✖ to delete the selected CIs.

Direct Link Parameters – Query Editor

This wizard page enables you to embed the Model Editor into an external application, displaying the selected TQL query.

Important information	➤ For general information about the Generate Direct Link wizard, see "Generate Direct Link Wizard" on page 118. ➤ Click **Finish** to close the wizard and create a URL. For details, see "Generate Direct Link Dialog Box" on page 117.
Wizard map	**Select Command Page** (Embedded links > Query Editor) > Finish Page
See also	"Business CI Models" on page 329

User interface elements are described below:

UI Elements (A-Z)	Description
Query name	Select the model you want to display in the Model Editor. ➤ Click [...] to open the Select Query dialog box. Select the query you want to appear in the Model Editor. ➤ Click ✖ to delete the selected query.

🔍 Direct Link Parameters – Related CIs Page

This wizard page enables you to embed into an external application, a topology map that displays a specific CI, and all the CIs that are linked to it by a distance of no more than one relationship.

Important information	➤ For general information about the Generate Direct Link wizard, see "Generate Direct Link Wizard" on page 118. ➤ Click **Finish** to close the wizard and create a URL. For details, see "Generate Direct Link Dialog Box" on page 117.
Wizard map	**Select Command Page** (Embedded links > Related CIs) > Finish Page

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

UI Elements (A-Z)	Description
CIs	Select the CI type you want to appear in the topology map. ➤ Click 🔳 to select the required CI types. Opens the CI Selector dialog box. ➤ Click ✖ to delete the value in the **CI** box.
Filter by CI types	Restrict the results of the topology map to related CIs of one or more CI types. ➤ Click 🔳 to select the required CI types. ➤ Click ✖ to delete the value in the **Filter by CI types** box.
Restrict to view	Restrict the results of the topology map to related CIs from a specific view. ➤ Click 🔳 to select the required view. Opens the View Selector dialog box. ➤ Click ✖ to delete the selected view in the **Restrict results to view** box.

🔍 Direct Link Parameters – Report Viewer Page

This wizard page enables you to create a URL that opens a specific report.

Important information	➤ For general information about the Generate Direct Link wizard, see "Generate Direct Link Wizard" on page 118.
	➤ Click **Finish** to close the wizard and create a URL. For details, see "Generate Direct Link Dialog Box" on page 117.
Wizard map	**Select Command Page** (Embedded links > Report Viewer) > Finish Page

User interface elements are described below:

UI Elements (A-Z)	Description
Report type	Select the required report type. For information about the different report types, see "Reports" on page 287.

🔍 Direct Link Parameters – Report Viewer – Saved Report Page

This wizard page enables you to create a URL that opens a saved topology or custom report.

Important information	➤ For general information about the Generate Direct Link wizard, see "Generate Direct Link Wizard" on page 118.
	➤ Click **Finish** to close the wizard and create a URL. For details, see "Generate Direct Link Dialog Box" on page 117.
Wizard map	**Select Command Page** (Embedded links > Report Viewer - Saved Report) > Finish Page

User interface elements are described below:

UI Elements (A-Z)	Description
Report	Select the required saved report. ➤ Click ⬛ to open the Select Report dialog box. Select the required topology or custom report. ➤ Click ✖ to delete the selected report. For information about saved reports, see "Reports" on page 287.

🔍 Direct Link Parameters – Show CI Properties Page

This wizard page enables you to view basic information for an existing CI.

Important information	➤ For general information about the Generate Direct Link wizard, see "Generate Direct Link Wizard" on page 118. ➤ Click **Finish** to close the wizard and create a URL. For details, see "Generate Direct Link Dialog Box" on page 117.
Wizard map	**Select Command Page** (Embedded links > Show CI properties) > Finish Page
See also	"Configuration Item Properties Dialog Box" on page 254

User interface elements are described below:

UI Elements (A-Z)	Description
Source CI object ID	Select the required CI. ➤ Click ✏ to select the source CI and retrieve its object ID. Opens the Select Source CI dialog box. For details, see "CI Selector" on page 159. ➤ Click ✖ to delete the value in the **Source CI object ID** box.

🔖 Direct Link Parameters – Show Topology Report Page

This wizard page enables you to create a URL to a specific Topology report.

Important information	➤ For general information about the Generate Direct Link wizard, see "Generate Direct Link Wizard" on page 118. ➤ Click **Finish** to close the wizard and create a URL. For details, see "Generate Direct Link Dialog Box" on page 117.
Wizard map	**Select Command Page** (Embedded links > Show Topology Report) > Finish Page
See also	"Topology Reports Overview" on page 288

User interface elements are described below:

UI Elements (A-Z)	Description
Report name	Select the required Topology report. ➤ Click 🖉 to select the required Topology report. Opens the Reports Tree dialog box. ➤ Click ✖ to delete the value that appears in the **Report name** box.

🔖 Direct Link Parameters – Show Change Report Page

This wizard page enables you to create a URL to a specific Change report that displays the changes made to a specific CI and its children.

Important information	➤ For general information about the Generate Direct Link wizard, see "Generate Direct Link Wizard" on page 118. ➤ Click **Finish** to close the wizard and create a URL. For details, see "Generate Direct Link Dialog Box" on page 117.
Wizard map	**Select Command Page** (Embedded links > Show change report) > Finish Page

User interface elements are described below:

UI Elements (A-Z)	Description
Date from:	Configure a start date and time for the report.
Date until:	Configure an end date and time for the report.
Source CI object ID	Enables you to create a URL to a specific Change report that displays the changes made to a specific CI and its children. ➤ Click ✎ to select the source CI and retrieve its object ID. Opens the Select Source CI dialog box. For details, see "CI Selector" on page 159. ➤ Click ✖ to delete the value in the **Source CI object ID** box.
Time range:	Select a time range for which you want to view the report.

🔍 Direct Link Parameters – Show Change Report on View Page

This wizard page enables you to create a URL to a specific Change report that displays the changes made to a specific view.

Important information	➤ For general information about the Generate Direct Link wizard, see "Generate Direct Link Wizard" on page 118. ➤ Click **Finish** to close the wizard and create a URL. For details, see "Generate Direct Link Dialog Box" on page 117.
Wizard map	**Select Command Page** (Embedded links > Show change report on view) > Finish Page

User interface elements are described below:

UI Elements (A-Z)	Description
Date from:	Configure a start date and time for the report.
Date until:	Configure an end date and time for the report.
Selected view	➤ Click ✏ to select the required view. Opens the Select View dialog box. ➤ Click ✖ to delete the value in the **Selected View** box.
Time range:	Select a time range for which you want to view the report.

🔍 Direct Link Parameters – Show View Topology Page

This wizard page enables you to display the topology map of the selected view and embed it in an external application.

Important information	➤ For general information about the Generate Direct Link wizard, see "Generate Direct Link Wizard" on page 118. ➤ Click **Finish** to close the wizard and create a URL. For details, see "Generate Direct Link Dialog Box" on page 117.
Wizard map	**Select Command Page** (Embedded links > Show view topology) > Finish Page

User interface elements are described below:

UI Elements (A-Z)	Description
Show topology of view	➤ Click ✏ to select the required view to be opened by the URL. Opens the Select View dialog box. ➤ Click ✖ to delete the selected view in the **Selected view** box.

🔖 Direct Link Parameters – View Editor Page

This wizard page enables you to create a URL that opens a specific view in the Pattern View Editor in Modeling Studio.

Important information	➤ For general information about the Generate Direct Link wizard, see "Generate Direct Link Wizard" on page 118. ➤ Click **Finish** to close the wizard and create a URL. For details, see "Generate Direct Link Dialog Box" on page 117.
Wizard map	**Select Command Page** (Embedded links > View Editor) > Finish Page
See also	"Building a Business View" on page 323

User interface elements are described below:

UI Elements (A-Z)	Description
View name	➤ Click ··· to select the required view to be opened by the URL. Opens the View Selector dialog box. ➤ Click ✖ to delete the selected view in the **Selected view** box.

🔖 Direct Link Parameters – Views Selector Page

This wizard page enables you to embed into an external application, the View Selector, that enables you to select, and display a view in that application.

Important information	➤ For general information about the Generate Direct Link wizard, see "Generate Direct Link Wizard" on page 118. ➤ Click **Finish** to close the wizard and create a URL. For details, see "Generate Direct Link Dialog Box" on page 117.
Wizard map	**Select Command Page** (Embedded links > Views Selector) > Finish Page
See also	"Building a Business View" on page 323

🔍 Direct Link Parameters – Show View Page

This wizard page enables you to create a URL to a specific view and optionally select a specific query node in that view. When the view opens, the CI you chose is selected in the view. The view opens in IT Universe Manager.

Important information	➤ For general information about the Generate Direct Link wizard, see "Generate Direct Link Wizard" on page 118.
	➤ Click **Finish** to close the wizard and create a URL. For details, see "Generate Direct Link Dialog Box" on page 117.
Wizard map	**Select Command Page** (Open in context links > Show view) > Finish Page

User interface elements are described below:

UI Elements (A-Z)	Description
<Left pane>	A graphic illustration of the selected option.
Advanced pane (visibility)	Hide or display the Advanced pane in IT Universe Manager.
Select CI from view result	(Optional) Click to select a CI and retrieve its object ID. When the view opens, the CI you chose is selected in the view.
	➤ Click 🖉 to choose the CI you want selected in the target view and retrieve its object ID. Opens the Select Source CI dialog box. For details, see "CI Selector" on page 159.
	➤ Click ✖ to delete the object ID for the selected CI in the **Select CI from view result** box.

UI Elements (A-Z)	Description
Selected View	The target view to be opened by the URL. ➤ Click 🖉 to select the target view to be opened by the URL. Opens the Select View dialog box. ➤ Click ✖ to delete the selected view in the **Selected view** box.
View mode	The view options are: ➤ **View Topology**. Displays an entire layer within a view. ➤ **Related in View**. Displays the selected CI and its immediate neighbors within the current view. ➤ **Related in DB**. Displays the selected CI and its immediate neighbors in the RTSM.

🔍 Direct Link Parameters – Start in Mode Page

This wizard page enables you to start the RTSM application at the selected page, for example, in the Modeling Studio page.

Important information	➤ For general information about the Generate Direct Link wizard, see "Generate Direct Link Wizard" on page 118. ➤ Click **Finish** to close the wizard and create a URL. For details, see "Generate Direct Link Dialog Box" on page 117.
Wizard map	**Select Command Page** (Open in context links > Start in mode page) > Finish Page

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

UI Elements (A-Z)	Description
<Left pane>	A graphic illustration of the selected mode.
Initial mode	Starts the RTSM application in the selected mode.

🔖 Finish Page

This is the final page of the Generate Direct Link wizard. Click **Finish** to close the wizard and create a URL. Opens the Generate Direct Link dialog box.

Important information	For general information about the Generate Direct Link wizard, see "Generate Direct Link Wizard" on page 118.
Wizard map	Select Command Page (\<Open in context links options\> and \<Embedded links options\>) > **Finish Page**

4

Embedding RTSM Applets Using Direct Links

This document describes how to embed RTSM applets into external applications using direct links.

This chapter includes:

Concepts

➤ Using the Direct Link Functionality to Embed RTSM Applets on page 140

➤ RTSM Applet Tag – Overview on page 141

Reference

➤ Direct Link Operation Flow on page 143

Note: This chapter is relevant to integration developers only.

Concepts

☘ Using the Direct Link Functionality to Embed RTSM Applets

You can directly embed RTSM applets into external applications using a direct link. A direct link is a URL that you create using the Direct Links wizard. For details, see "Generate Direct Link Wizard" on page 118.

You can embed RTSM applets in the following ways:

➤ Using the URL itself to display RTSM content in an external application. For example, you can create a URL in the Direct Links wizard to display the properties of a certain CI. The login page opens if you are not already logged into HP Business Service Management or if Lightweight Single Sign-On Authentication Support (LW-SSO) is not enabled for HP Business Service Management.

Note: Using the URL to enable the integration requires opening the link in an IFrame or a new window. This does not allow you to manage the resulting RTSM applet using Javascript due to cross-site scripting issues. For example, if you use a URL that displays the properties of a specific CI using the object ID, you cannot use the same URL to display the properties of another CI.

➤ Using the RTSM applet tag to embed the RTSM applet in an external application. This enables integration developers to display a part of the HP Business Service Management user interface as part of their own application. In addition, this enables interaction with the embedded HP Business Service Management user interface using Javascript.

🔩 RTSM Applet Tag – Overview

The RTSM Applet tag creates the environment needed for the RTSM applet to run (HTML, Javascript, and server session parameters). The code behind the tag can log into the HP Business Service Management server in one of the following cases:

➤ The login parameters are specified and the user is not already logged in (or if Lightweight Single Sign-On Authentication Support (LW-SSO) is not enabled for HP Business Service Management).

➤ The **clear session** parameter is true.

Once a user session is established, the tag continues to write the required applet environment (HTML and Javascript code) to the result of the JSP processor. The resulting HTML page includes the required Javascript code to load the RTSM applet from the specified server. On error, the specified error string is printed to the page. This string can be customized using the **userErrorMessage** parameter and may include HTML elements and HTML wrapped Javascript code to initiate error handling scenarios.

Example of an RTSM Applet Tag

```
<ucmdb:ucmdb_applet
serverConnectionString="x.com"
serverType="BAC"
directLinkParameters="cmd=ShowProperties&objectId=2d3b0fec35431ea01625
a4&navigation=false&interfaceVersion=8.0.0"
userName="admin"
userPassword="admin"
clearSessionCookies="false"/>
```

Caution: You retrieve the **directLinkParameters** from the URL created in the Direct Links wizard. Delete the part of the parameter that precedes "**cmd**=", as it is not part of the parameter needed for the RTSM applet tag. For details on how to create a direct link, see "Generate Direct Link Wizard" on page 118.

The RTSM applet tag is located at **<HP Business Service Management>AppServer\webapps\site.war\WEB-INF\tags\CMS\ ucmdb_applet.tag** on the Gateway Server machine.

You can copy the RTSM applet tag to an external application server. The RTSM applet tag requests the login data from the HP Business Service Management server provided that:

➤ The external application server can communicate with JSP tags.

➤ The HP Business Service Management server is accessible to the external application server and to the browser.

Reference

🔍 Direct Link Operation Flow

This section describes different scenarios in which direct links are used to embed RTSM applets into external machines.

This section includes the flow descriptions:

➤ "Regular Login" on page 144

➤ "An Embedded RTSM Applet Using a Direct Link URL" on page 146

➤ "An Embedded RTSM Applet Using an RTSM Applet Tag" on page 148

Regular Login

This flow describes a regular login to the HP Business Service Management server. It serves as a base reference for the direct link flows.
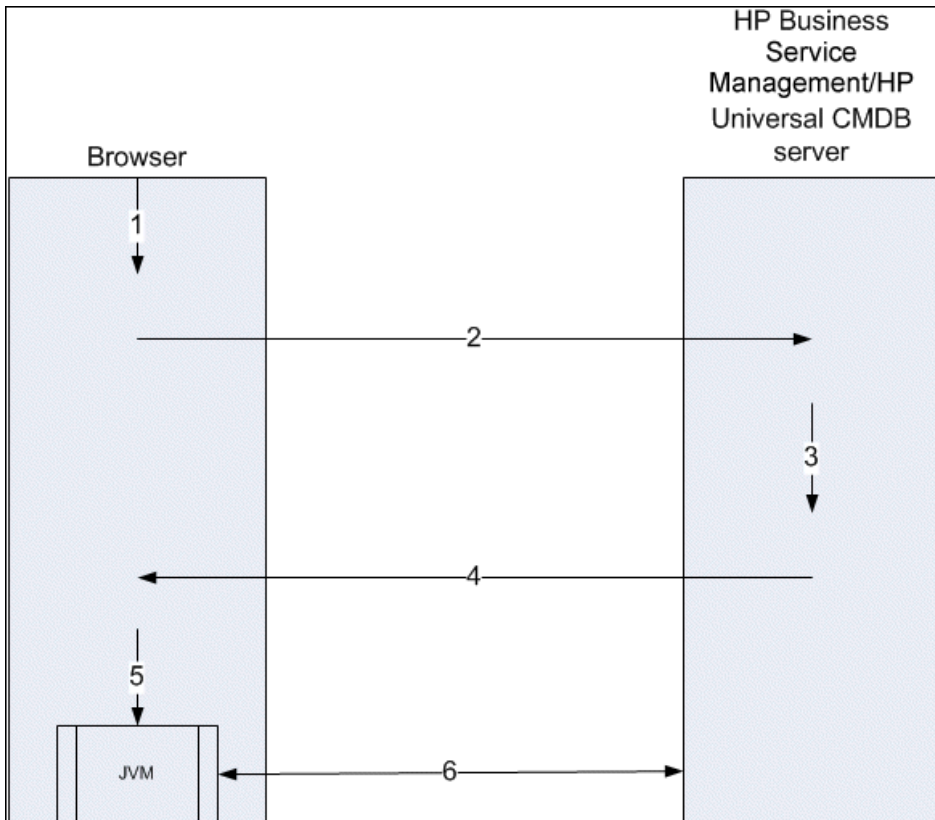
1 The user enters the direct link URL (into the browser) to log into the HP Business Service Management server.

2 The browser sends the login request to the HP Business Service Management server.

3 The server checks the user credentials and creates a user session if required.

4 The server returns the requested first page of HP Business Service Management.

Note: This can be any page. For this flow, we assume that it is the **Admin > RTSM Administration > Modeling** page in which the RTSM applet is loaded.

---

5 The browser loads the Java virtual machine (JVM) with the `code base` location parameter (which instructs the JVM from where to load the RTSM applet files) as the HP Business Service Management server.

6 RTSM applet files (jars) and data are transferred between the HP Business Service Management server and the JVM loaded in the browser.

At this point, the RTSM applet is loaded and regards HP Business Service Management as the server with which it should communicate.

An Embedded RTSM Applet Using a Direct Link URL

This flow shows how to use the direct link to open an RTSM applet (opened to a specified context) in a new browser frame.
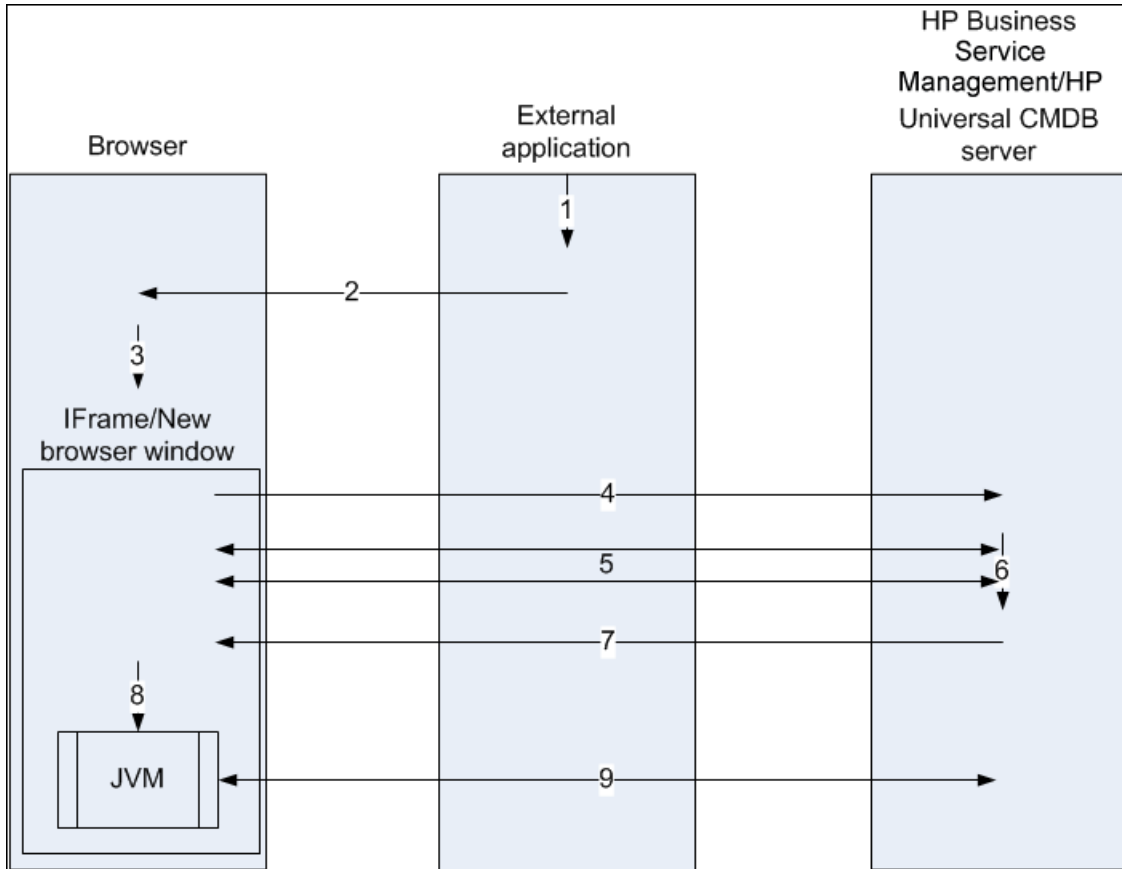
1 The external application has a page that needs to show the RTSM applet.

2 The returned page includes a directive to open the direct link in an IFrame or new browser window.

3 The browser opens a new frame (IFrame or new window) with the direct link as the frame URL.

4 The new frame sends the direct link to the HP Business Service Management server.

5 If the user is not already logged into HP Business Service Management, or if Lightweight Single Sign-On Authentication Support (LW-SSO) is not enabled for HP Business Service Management, HP Business Service Management displays the login page and waits for the user to enter credentials and click the login button.

6 The user session is created, if required.

7 The HP Business Service Management server returns a page that includes the directive to load the RTSM applet.

8 The browser processes the page. When the browser encounters the directive to load the RTSM applet, it starts the JVM. The browser then passes the needed parameters to the JVM, including the HP Business Service Management server location as "code base."

9 RTSM applet files (jars) and data are transferred between the HP Business Service Management server and the JVM loaded in the browser.
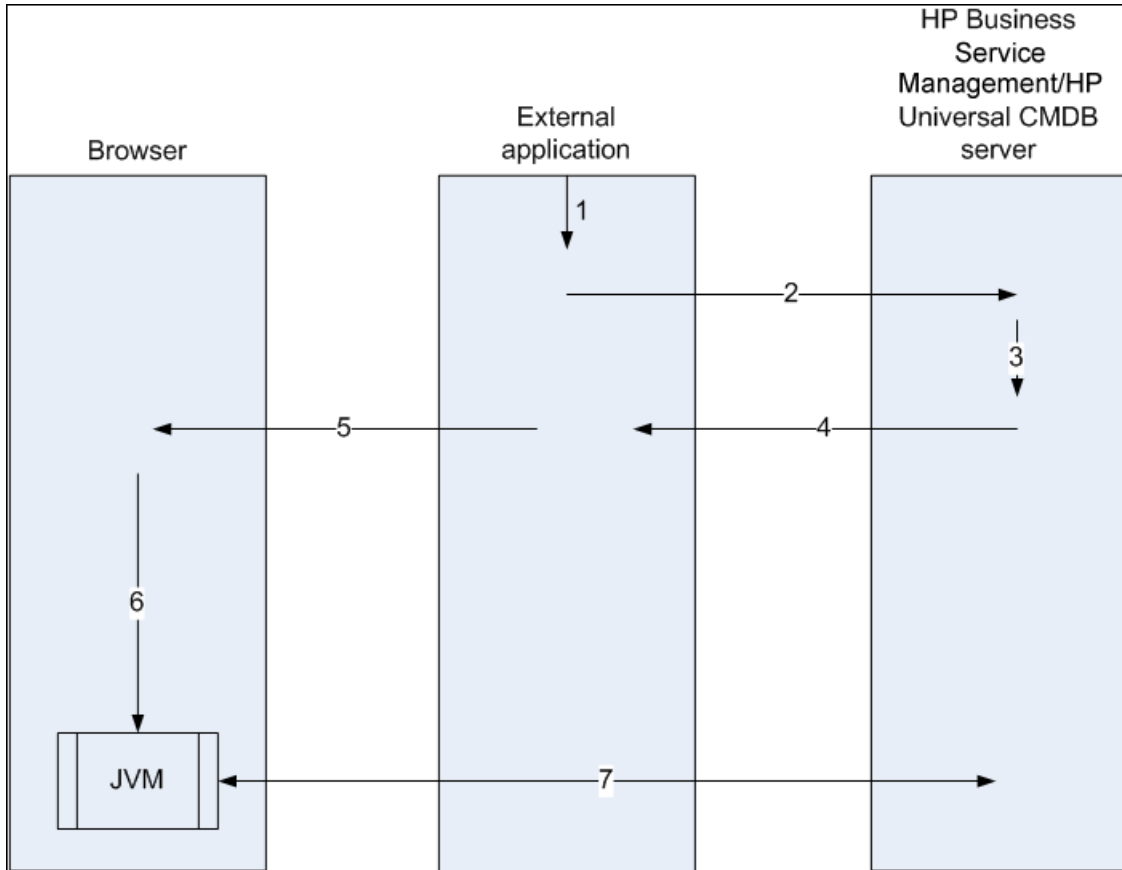

Caution: The HP Business Service Management server must be accessible from the browser machine.

An Embedded RTSM Applet Using an RTSM Applet Tag

This flow shows how to use the RTSM applet tag in conjunction with direct links to embed the RTSM applet (opened to a specified context) in an external application page.

1 The RTSM applet tag is included in the processed JSP in the external application.

2 The RTSM applet tag uses the parameters given to it to create an HTTP/ HTTPS connection to the HP Business Service Management server and requests the applet HTML snippet code.

 3 If the user is not already logged in, the parameters from the RTSM applet tag are used (see the tag itself for reference information regarding this step). If login fails, the RTSM applet tag returns an error message, either the preset one or the one specified in the RTSM applet tag parameters.

 4 The HP Business Service Management server returns the HTML snippet code (with embedded Javascript) that loads the RTSM applet. The external application can now incorporate this snippet code into the page, and send the page to the browser.

 5 The external application sends the complete page that includes the HTML snippet code to the browser.

 6 The browser processes the page. When the browser encounters the HTML snippet code that loads the RTSM applet, the JVM is started. The browser then passes the needed parameters to the JVM, including the HP Business Service Management server location as "code base".

 7 RTSM applet files (jars) and data are transferred between the HP Business Service Management server and the JVM loaded in the browser.

Caution: The HP Business Service Management server must be accessible from the browser machine as well as the external application machine.

5

Working with the CI Selector

This chapter includes:

Concepts

➤ CI Selector Overview on page 152

Tasks

➤ Display a View in Browse Mode on page 153

➤ Search for CIs in Search Mode on page 153

➤ Modify CI Selector Display Options on page 155

Reference

➤ CI Selector User Interface on page 157

Troubleshooting and Limitations on page 170

Concepts

CI Selector Overview

Note: The CI Selector was known as View Explorer in earlier versions of HP Business Service Management.

The CI Selector presents the elements of the IT universe model in HP Business Service Management through the medium of views. HP Business Service Management displays the CI Selector in the left pane of IT Universe Manager and the Modeling Studio.

When you select a view in the CI Selector, the configuration items (CIs) contained in the view are displayed in a hierarchical tree format according to the relationships defined between the CIs. A view may be empty if no CIs were found matching the TQL query. For details on views, see "View Formats" on page 322.

You can use the CI Selector to select views and to locate CIs. You can select a view and browse through the list of CIs, or you can search for a specific CI by name or by CI type. You can also save the search criteria for future use.

For information on the components of the CI Selector, see "CI Selector User Interface" on page 157.

Tasks

🪛 Display a View in Browse Mode

When the CI Selector is set to **Browse** mode, you can display the contents of a selected view. For details on the CI Selector user interface in Browse mode, see "Browse Views Mode" on page 159.

This task includes the following steps:

➤ "Prerequisites" on page 153

➤ "Select a View to Display" on page 153

1 Prerequisites

In the CI Selector pane, select **Browse Views** mode.

2 Select a View to Display

Click the ellipsis button to open the View Selector dialog box and select the view you want to display. The name of the selected view is shown in the **View** box. The CIs in the view appear in the CI tree in the lower part of the CI Selector pane. The view remains selected when you move to other applications in HP Business Service Management.

🪛 Search for CIs in Search Mode

The CI Selector search tool enables you to locate a specific CI. The search is executed on the entire RTSM. For details on the CI Selector search tool user interface, see "Search CIs Mode" on page 163.

This task includes the following steps:

➤ "Prerequisites" on page 154

➤ "Search by CI Name" on page 154

➤ "Search by Configuration Item Type" on page 154

Prerequisites

In the CI Selector pane, select **Search CIs** mode and select the **Simple** tab.

Search by CI Name

To search for CIs by name, enter a string in the **CI Name** box, representing the name of the CI, or part of the name. The search returns all CIs that contain the entered string somewhere in the name (within the boundaries of the other search criteria that you define).

Note: The search by CI name option is not case sensitive.

Search by Configuration Item Type

You can search for CIs using the **CI type** box. This search returns CIs of the type specified in the **CI type** box.

Click the ellipsis button and select the required CI type. You cannot manually enter a CIT in the **CI type** box.

After defining a CI in the **CI type** box, HP Business Service Management remembers your selection until you move to a different application, or until you define a different value.

Run the Search and Sort the Results

Run the search. The results appear in the lower part of the CI Selector pane, showing the CI name and type for each entry. You can sort the search results by clicking the appropriate heading.

When you select the required CI from the results list, the right pane displays details for the CI you selected, in the context in which you are working. To see a CI in the context of its view, right-click the CI and select **Locate CI in View**. The CI Selector reverts to Browse mode and displays the view that contains the CI, with the CI selected in the view tree.

When you select a CI in the search results, the CI appears in the topology map with its related CIs in the RTSM.

Optionally, save the search criteria by clicking the **Save** button and entering a name for the search. For details, see "Save Search Criteria Dialog Box" on page 169.

Run an Advanced Search

You can select the **Advanced** tab for other search options. For details on the CI Conditional search, see "CI Conditional Search Dialog Box" on page 157. For details on the Running Software search, see "Running Software Search Dialog Box" on page 168.

🪚 Modify CI Selector Display Options

You can modify the display options for the CI Selector. These options are configured in the Infrastructure Settings Manager.

Caution: Modifying certain settings in the Infrastructure Settings Manager can adversely affect the performance of HP Business Service Management. Do not modify settings without first consulting HP Software Support or your HP Professional Services representative.

This task includes the following steps:

➤ "Prerequisites" on page 156

➤ "Modify Selected Settings" on page 156

1 Prerequisites

Access the Infrastructure Settings Manager by selecting **Admin** > **Platform** > **Setup and Maintenance** > **Infrastructure Settings**.

2 Modify Selected Settings

The following settings under RTSM - General properties can be modified:

➤ **Immediate Children Count.** Number of children immediately displayed when expanding their parent's query node in the CI Selector.

➤ **Maximal Children Count.** Maximum number of children displayed under their parent's query node in the CI Selector.

➤ **Maximal search results size.** Maximum number of CMDB instances that can be returned in one search operation.

➤ **Recently Used Views List size.** Maximal number of recently used views to store per user.

Reference

CI Selector User Interface

This section includes (in alphabetical order):

➤ CI Conditional Search Dialog Box on page 157

➤ CI Selector on page 159

➤ Organize Searches Dialog Box on page 167

➤ Running Software Search Dialog Box on page 168

➤ Save Search Criteria Dialog Box on page 169

CI Conditional Search Dialog Box

This dialog box enables you to search for CIs by attribute conditions, by related CIs, and by attribute conditions of related CIs.

To access	In the CI Selector, select the **Advanced** tab in Search mode and click the ellipsis button next to CI Conditional Search.

User interface elements are described below:

UI Elements (A-Z)	Description
✚	Click to add an attribute condition.
✖	Click to delete a selected row.
⬆	Click to move a selected row up.
⬇	Click to move a selected row down.

UI Elements (A-Z)	Description
	Click to display a preview of the attribute condition list.
Attribute Name	Select an attribute from the drop-down list.
CI Name	Enter a CI name for which to search.
CI Type	Enter the CI type for which to search.
Operator	Select an operator from the drop-down list.
Related CI Name	Enter the name of a related CI for the search.
Related CI Type	Click the ellipsis button ... to select a CI type from the tree for a search by related CI.
Relationship Type	Click the ellipsis button ... to select a relationship from the tree for a search by related CI.
Search by CI conditions	Select to run a search for CIs with the specified conditions.
Search by Related CI conditions	Select to run a search for CIs related to CIs with the specified conditions.
Search by Related CI criteria	Select to run a search for CIs related to the specified CIs or CI types.
Value	Enter a value for the attribute condition.

🔍 CI Selector

This feature enables you to select views and to locate CIs.

To access	Appears in the left pane of the IT Universe Manager page and the Modeling Studio.
Important information	The CI Selector consists of two functional formats: Browse Views mode and Search CIs mode.
	➤ In Browse Views mode, you can search for and display a view, and browse through the view to locate a particular CI. You can also perform operations for the CI from a shortcut menu.
	➤ In Search CIs mode you can search for one or more CIs in the views or the RTSM by name or by CI type.
	Note: Many of the features of the CI Selector are only relevant in the RTSM and not in other HP Business Service Management modules.
Relevant tasks	"Display a View in Browse Mode" on page 153
	"Search for CIs in Search Mode" on page 153

Browse Views Mode

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

UI Elements (A-Z)	Description
🔄	Click to Refresh the data content of the hierarchical tree structure that may have been modified by other users.
✏️	Click **Show Template Parameters** to open the Template Parameter Values dialog box, which enables you to edit the parameters of the selected template.
	Note: This button is only active when a template is selected.
➡️	Click **Add selected CIs to model/view** to add the selected CIs to the current model or view.
	Note: This button only appears in the Modeling Studio.

UI Elements (A-Z)	Description
	Click **Add as related CI** to add the selected CI to the model as a related CI.
	Note: This button is only active in the Model Editor of the Modeling Studio.
	Click **Open selected model in a new tab** to open the selected model in the Model Editor.
	Note: This button is only active when a model is selected in the Modeling Studio.
	Click **Show models containing selected CI** to display a list of models containing the selected CI.
	Note: This button only appears in the Modeling Studio.
	In IT Universe Manager, this represents **Show View Definition,** which takes you directly to the view definition in the Modeling Studio for the current view.
	In the Modeling Studio, this represents **Open Selected View**, which opens the selected view in the Editor pane.
	Click **Show views containing selected CI/model** to display a list of views containing the selected CI or model.
	Note: This button only appears in the Modeling Studio.
	Click **Generate view for selected model** to open the Creating New View dialog box which enables you to build a view based on the selected model.
	Note: This button is only active when a model is selected in the Modeling Studio.
	Click **Show Discovery and Changes Summary** to rediscover all the CIs in a selected view by manually starting the DFM jobs that originally discovered them. For details, see "Discovery and Changes Summary Dialog Box" on page 259.
	Note: This button only appears in IT Universe Manager.

UI Elements (A-Z)	Description
	Click **Generate Direct Link to View** to create a direct link to the view using the Direct Links wizard. **Note:** This button only appears in IT Universe Manager.
	Choose the export format for the table data. The available options are: ➤ **Excel.** The table data is formatted as an .xls (Excel) file that can be displayed in a spreadsheet. ➤ **PDF.** The table data is exported in PDF format. ➤ **RTF.** The table data is exported in Rich Text Format. ➤ **CSV.** The table data is formatted as a comma-separated values (CSV) text file that can be displayed in a spreadsheet. **Note:** For the CSV formatted table data to display correctly, the comma (,) must be defined as the list separator. In Windows, to verify or modify the list separator value, open Regional Options from the Control Panel, and on the Numbers tab ensure that the comma is defined as the List Separator value. ➤ **XML.** The table data is formatted as an XML file that can be opened in a text or XML editor. **Tip:** To extract HTML code from the report: ➤ Save the file as HTML ➤ Open the file in an HTML editor ➤ Copy the relevant table into the target file

UI Elements (A-Z)	Description
🖫	Click the Snapshot button to work with snapshots. The following options are available: ➤ **Save Snapshot.** Select to open the Save Snapshot dialog box, which enables you to save a snapshot of the view. For details, see "Save Snapshot Dialog Box" on page 284. ➤ **Compare Snapshots.** Select to run the Compare Snapshots Report. For details, see "Compare Snapshots Report" on page 302. ➤ **Schedule Snapshot.** Select to open the Schedule Job dialog box. For details, see "Schedule Job Dialog Box" on page 311. ➤ **Show Scheduled Snapshot Jobs.** Select to open the Job List dialog box. For details, see "Job List Dialog Box" on page 309. **Note:** This button only appears in IT Universe Manager.
🗏	Click **View Based Report** to display the topology report for the selected view. **Note:** This button only appears in IT Universe Manager.
🗎	Click **Asset Report** to open the Asset report for the selected view. For details, see "Asset Report" on page 295. **Note:** This button only appears in IT Universe Manager.
...	Click the **Select view from the folder tree** button to the right of the **View** box, to open the View Selector dialog box. You can browse through the folder tree to locate the view you want to display.
▽ △	Enables you to move to the next or previous result of the search for the string entered in the Find box.
<CIs>	The CIs contained in the currently selected view.
<Tooltip>	Hold the cursor over a CI to display a tooltip with the relevant CI type.

UI Elements (A-Z)	Description
Find	Enter a CI name or a portion of a CI name in the Find box to locate a CI in the CI tree.
View	The **View** box displays the currently selected view. To select a view to display, click the down arrow on the right side of the View box; this displays an abridged list of views, containing the most recently accessed views. Click the arrow at the bottom of the list to scroll through the entire list. The recently accessed views appear at the top of the drop-down, above the dividing line. The complete list of views appears below the line. Alternatively, place the cursor in the list and begin typing the view name. HP Business Service Management completes the view name, if the first few letters that you type match an existing entry. If the names of several views begin with those letters, all matching views are displayed in the list.

Search CIs Mode

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

UI Elements (A-Z)	Description
	Click **Show Search Results in Table** to open a separate pane with a table of the CIs in the search results. **Note:** This button only appears in IT Universe Manager.
	Click **Add selected CIs to model/view** to add the selected CIs to the current model or view. **Note:** This button only appears in the Modeling Studio.
	Click **Add as related CI** to add the selected CI to the model as a related CI. **Note:** This button is only active in the Model Editor of the Modeling Studio.

UI Elements (A-Z)	Description
👓	Click **Open selected model in a new tab** to open the selected model in the Model Editor. **Note:** This button is only active when a model is selected in the Modeling Studio.
⬡	Click **Show models containing selected CI** to display a list of the models containing the selected CI. **Note:** This button only appears in the Modeling Studio.
📋	Click **Show views containing selected CI/model** to display a list of the views containing the selected CI or model. **Note:** This button only appears in the Modeling Studio.
📋	Click **Generate View for Selected Model** to open the Creating New View dialog box which enables you to build a view based on the selected model. **Note:** This button is only active when a model is selected in the Modeling Studio.

UI Elements (A-Z)	Description
(icon)	Choose the export format for the table data. The available options are: ➤ **Excel.** The table data is formatted as an .xls (Excel) file that can be displayed in a spreadsheet. ➤ **PDF.** The table data is exported in PDF format. ➤ **RTF.** The table data is exported in Rich Text Format. ➤ **CSV.** The table data is formatted as a comma-separated values (CSV) text file that can be displayed in a spreadsheet. **Note:** For the CSV formatted table data to display correctly, the comma (,) must be defined as the list separator. In Windows, to verify or modify the list separator value, open Regional Options from the Control Panel, and on the Numbers tab ensure that the comma is defined as the List Separator value. ➤ **XML.** The table data is formatted as an XML file that can be opened in a text or XML editor. **Tip:** To extract HTML code from the report: ➤ Save the file as HTML ➤ Open the file in an HTML editor ➤ Copy the relevant table into the target file **Note:** This button only appears in the Modeling Studio.
(icon)	Click to open the Organize Searches dialog box, where you can edit or delete searches from the list of saved searches.
(icon)	Click to collapse or expand the search criteria area.
(icon)	Click to run the search. The search results are displayed in the lower part of the CI Selector pane.
(icon)	Click to save the current search criteria for future use.
(icons)	Enables you to move to the next or previous result of the search for the string entered in the Find field.

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UI Elements (A-Z)	Description
<Search results>	After you run the search, the results are listed in the lower part of the CI Selector pane. The results are shown in two columns: ➤ **Name.** Contains the name of the CI. ➤ **CI Type.** Contains the CI type of the CI. If the CI or view name is abbreviated, hold the pointer over the entry to see the full name. You can sort the search results by clicking the appropriate heading.
Advanced tab	The following detailed search options are available: ➤ **CI Conditional Search.** Enables you to search for CIs by attribute conditions, by related CIs, and by attribute conditions of related CIs. ➤ **Running Software Search.** Enables you to search for hosts by the applications running on them and for applications by the host on which they are running. For each of the searches, click the ellipsis button ... to open the search dialog box. After running a search, click the Save button 💾 to save the search for future use.
CI Name	To search for a CI by name, enter the name of the CI for which to search.
CI Type	To search for CIs by CI type, click the ellipsis button to select a CI from the Select Configuration Item Type dialog box.
Find	Enter a CI name or a portion of a CI name in the Find box to locate a CI in the search results.
Searches	Select a search from the drop-down list of saved searches.
Search results count	The Search results count below the Find box displays the total number of CIs found in the search.
Simple tab	The Simple tab includes the standard search functionality. Click the Advanced tab for more detailed search options.

Shortcut Menu Options

Menu Item	Description
<**IT Universe Manager shortcut menu options**>	The regular shortcut menu for the topology map in IT Universe Manager is also available from the CI Selector. For details on the menu options, see "IT Universe Manager Shortcut Menu" on page 272.
Add	Adds the selected CI to the current model or view. **Note:** This feature only appears in the Modeling Studio.
Add to model as related CI	Adds the selected CI as a related CI to the current model. **Note:** This feature only appears in the Modeling Studio.
Generate View from Model	Select to create a view based on the current model. The Creating New View dialog box opens which enables you to select a perspective to apply. **Note:** This feature only appears in the Modeling Studio.
Open Selected Model	Opens the selected model in the Model Editor. **Note:** This feature only appears in the Modeling Studio.
Show containing models	Select **Show models containing selected CI** to display a list of the models containing the selected CI. **Note:** This option only appears in the Modeling Studio.
Show containing views	Select **Show views containing selected CI/model** to display a list of the views containing the selected CI or model. **Note:** This option only appears in the Modeling Studio.

🔍 Organize Searches Dialog Box

This dialog box enables you to edit or delete searches from the list of saved searches.

To access	Click the **Manage the list of saved searches** button 📝 in the CI Selector.

User interface elements are described below:

UI Elements (A-Z)	Description
✏	Click to edit the selected search. For simple searches, the CI Simple Search dialog box opens, which enables you to edit the name and type of the CI. For CI Conditional searches, the CI Conditional Search dialog box opens.
✖	Click to delete the selected search.
▦	Click to expand the search tree.
▦	Click to collapse the search tree.
Find	Enter a search name or a portion of a search name in the Find box to locate it in the list.
Find Next	Click to go to the next occurrence of the selected search phrase in the list.
Find Previous	Click to go to the previous occurrence of the selected search phrase in the list.
Searches tree	Displays all the saved searches in tree format.

🔍 Running Software Search Dialog Box

This dialog box enables you to search for hosts by the applications running on them and for applications by the host on which they are running.

To access	In the CI Selector, select the **Advanced** tab in Search mode and click the ellipsis button next to Running Software Search.

User interface elements are described below:

UI Elements (A-Z)	Description
Host Name	Enter the name of the node for which you are searching.
Running Software	Select a running software CI from the drop-down list.
Search for	Select **Running Software** or **Node**. **Note:** To search for a running software CI running on a specific node, enter a node name, select the required running software CI and search for it.

Save Search Criteria Dialog Box

This dialog box enables you to save the current search criteria for future use.

To access	Click the **Save** button 💾 from Search mode in the CI Selector.

User interface elements are described below:

UI Elements (A-Z)	Description
Existing Queries	Displays a list of existing searches in tree format.
Name	Enter a name for the current search.
Find	Enter a search name or a portion of a search name in the Find box to locate it in the list.
Find Next	Click to go to the next occurrence of the selected search phrase in the list.
Find Previous	Click to go to the previous occurrence of the selected search phrase in the list.

🔍 Troubleshooting and Limitations

This section describes troubleshooting and limitations for the CI Selector.

This section includes the following topics:

Unavailable Views and CIs

The View list in the CI Selector may not display all views in the RTSM, or it may not display the contents of a view, for any of the following reasons:

➤ The View list includes only the views for which you have the necessary permissions. Similarly, Search mode is only available if you have CI Search permission. To set permissions, select **Admin** > **Platform** > **Users and Permissions**, select a user or a group and select **Permissions**. For more information, see "How to Assign Permissions" in *Platform Administration*.

➤ Views that are currently inactive appear in red in the View list, but they cannot be selected. In IT Universe Manager, inactive views appear in faded text.

➤ Out-of-the-box views for which you do not have a license may appear in the View list, but these views do not contain CIs. For information on the out-of-the-box views, see "Predefined Folders and Views" on page 327.

Note: After deleting one or more query nodes from a TQL query, it can take time for changes to be updated to the view; meanwhile, the removed CIs appear in the view. If you select one of these CIs before it is updated, an error message is displayed. Click the **Refresh** button to update the view.

6

Working with Topology Map

This chapter includes:

Concepts

➤ Topology Map Overview on page 172

➤ Handling Large Views on page 173

Reference

➤ Topology Map User Interface on page 174

Concepts

🔩 Topology Map Overview

The Topology Map provides a graphical display of a view. All the CIs in a given layer of the view are represented by icons and the connecting lines represent relationships. You can select a CI in the Topology Map or in the CI Selector in the left pane. You can also drill down in the CI Selector to display different layers of the view in the Topology Map.

The label of a CI appears under the icon. You can set the maximum number of characters per line and the maximum number of lines in a CI label in the User Preferences dialog box under **General**. For details, see "User Preferences Dialog Box" on page 99.

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If a CI icon appears with a downward arrow icon in the Topology Map, there is an additional CI layer beneath it, created by the hierarchy set for the view. You can click the arrow to display the CIs contained in the sublayer.

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

The toolbar and Main Menu above the Topology Map enable you to zoom in, change the layout of the Topology Map, and print the Topology Map. Additional functionality is available from the shortcut menu by right-clicking a CI in the Topology Map or in the CI Selector.

Handling Large Views

The Topology Map cannot display a view with more than 900 CIs in a single layer. When you select a view which contains a layer with more than this number of CIs, the Topology Map appears empty. A layer with more than 900 CIs can be displayed in a table in Text mode.

To display large views in the Topology Map, use one of the following methods:

➤ Reduce the TQL query results by redefining the view in the Modeling Studio. For details, see "Change Query Node/Relationship Type Dialog Box" on page 361.

➤ Define a different hierarchy for the view to redistribute the CIs among the view's layers. For details on defining hierarchy, see "Setting the View Hierarchy" on page 324.

➤ Reset the maximum number of CIs allowed in the configuration parameters. Select the **Max Object Count GUI for TS** parameter under **RTSM - Viewing Settings** in the Infrastructure Settings Manager. However, be aware that increasing the maximum number of CIs per layer may significantly slow down the redrawing of the Topology Map.

To modify the setting, select **Admin** > **Platform** > **Setup and Maintenance** > **Infrastructure Settings** > **Foundations** > **RTSM.** Locate **Max Object Count GUI for TS** and change the value to the required number.

Reference

🔍 Topology Map User Interface

This section includes (in alphabetical order):

➤ Export Map to Image Dialog Box on page 174

➤ Layout Properties Dialog Box on page 176

➤ Main Menu on page 193

➤ Print Dialog Box on page 194

➤ Print Preview Dialog Box on page 195

➤ Print Setup Dialog Box on page 195

➤ Toolbar Options on page 197

➤ Topology Map Sidebar on page 205

🔍 Export Map to Image Dialog Box

This dialog box enables you to save a topology map to a file.

To access	From a topology map, select **Operations** > **Export Map to Image**.
Relevant tasks	"Print and Save a Topology Map to File" on page 248

User interface elements are described below:

UI Elements (A-Z)	Description
Actual Size	Save the view so that the graph node sizes are at maximum.
Current Zoom Level	Save the view as you see it on the topology map. For example, if you have used the **Interactive Zoom** mode to decrease the view magnification, the graph nodes also appear smaller in the saved view. For details, see "Interactive Zoom" on page 200.
Custom	Specify the size of the view you want to save in the **Width** and **Height** boxes.
File Name	Specify the required file name and location (or click **Browse** to search for the file and location).
Fit in Canvas	Expand or shrink the view so that it fits in the pane.
Image Quality	The quality of the printed map. Select **High**, **Medium**, or **Low**.
Selected Objects Only	Saves only the graph nodes/CIs and their relationships that you selected in the map.
Type	Select the required file format.
Visible Window Only	Saves only the part of the graph that appears in the pane.

🔍 Layout Properties Dialog Box

This dialog box enables you to customize the layout of a specific layer in a view, to achieve the clearest presentation possible and to better understand and monitor the managed data.

To access	Select **Layout** > **Layout Properties**.
Important information	You define the layout of a view's layers by assigning logical positions for the graph's nodes and relationships that appear in a layer. You customize the layer layouts by modifying the default values.
	You set layout definitions for a specific layer only. The definitions cannot be saved for a different layer or a different view.
	Parameter values are in pixels.

Global Tab

This area enables you to define global layout parameters.

To access	Click the **Global** tab in the Layout Properties dialog box.
Important information	The Global tab enables you to define global settings for the layout.
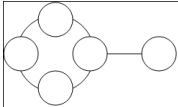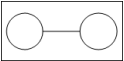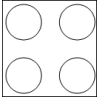
User interface elements are described below:

UI Elements (A-Z)	Description
Drawing Fitting	Select one of the following options for fitting the layout:
	➤ **Fit to Canvas.** Fit the layout to the canvas on the screen.
	➤ **Fit for Printing.** Fit the layout to a page for printing.
	➤ **No Fitting.** Do not change the layout.

UI Elements (A-Z)	Description
Labeling	Select **Perform Labeling** to ensure that the labels appear when the layout is redrawn. If this field is not selected, labels do not appear in the redrawn layout.
Style	Select **Apply Style Deeply** to apply the layout selected to all nested layers of the topology map.

All Styles Tab

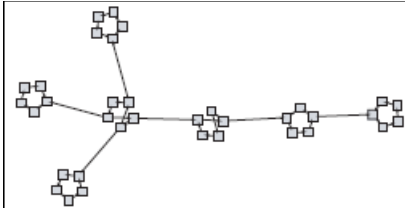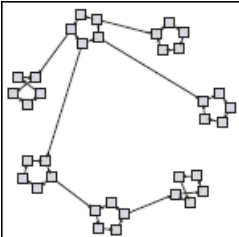| **To access**	Click the **All Styles** tab in the Layout Properties dialog box.
Important information	The All Styles tab enables you to define general layout parameters for disconnected graph nodes and connected components.
	➤ A disconnected graph node is a node that is not connected to any other graph node.
	➤ A disconnected component is a component that is not connected to any other component. It contains a set of graph nodes that can be connected to each other.
	This illustrates a connected component with five graph nodes:
	This illustrates a connected component with two graph nodes:
	This illustrates four disconnected components, each made up of a single, disconnected graph node:

User interface elements are described below:

UI Elements (A-Z)	Description
Components	The spacing between the components in a disconnected graph consists of both a constant value and a proportional value based on the sizes of the components. Select **Detect Components** to view the disconnected components. You can specify that all components be laid out together or individually, regardless of the other components. If the grouping for components is selected, each component is laid out, and the resulting components are packed together. When Detect Components is selected, enter values for the following settings: ➤ **Constant Spacing.** Set constant spacing (horizontal and vertical) around each disconnected component. **Default value:** 20 ➤ **Proportional Spacing.** Set spacing (horizontal and vertical) that is proportional to the size of the component around each disconnected component. **Default value:** 0.05

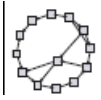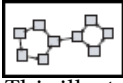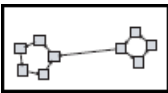| UI Elements (A-Z)	Description
Disconnected Graph Nodes	The spacing between the graph nodes in a disconnected graph consists of both a constant value and a proportional value based on the sizes of the graph nodes.
	Select **Detect Disconnected Graph Nodes** to view the disconnected graph nodes. You can specify that disconnected graph nodes be grouped into one component or laid out individually.
	When Detect Disconnected Graph Nodes is selected, enter values for the following settings:
	➤ **Constant Spacing.** Set constant spacing (horizontal and vertical) around each disconnected graph node. **Default value:** 20
	➤ **Proportional Spacing.** Set spacing (horizontal and vertical) that is proportional to the size of the component around each disconnected graph node. **Default value:** 0.05
Margin Spacing	Enter values for the right, left, top, and bottom margin spacing for the layout.
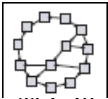
Circular Tab

To access	**To access:** Click the **Circular** tab in the Layout Properties dialog box.
Important information	The Circular tab enables you to group a graph's nodes into groups or clusters based on the grouping options you select. It is particularly suited for visualizing ring and star network topologies, and for link analysis.

User interface elements are described below:

UI Elements (A-Z)	Description
Clustering	Set the values for the following settings: ➤ **Cluster Size Factor.** Specifies the ratio between the average cluster size and the number of clusters. The size of a cluster is defined as the sum of the weights of all graph nodes in the cluster. You can assign a weight value to each graph node. ➤ **Min Number of Clusters.** The minimum number of clusters in a layer. ➤ **Max Number of Clusters.** The maximum number of clusters in a layer.
Cluster Layout Style	Displays clusters either in a symmetric or circular layout style. Select one of the following options: ➤ **Symmetric.** Displays clusters in a symmetric layout style. ➤ **Circular.** Displays clusters in a circular layout style.

UI Elements (A-Z)	Description
Layout Quality	Adjusts the quality of the layout produced to fit your application's needs. The quality reflects the number of steps or the method used to produce the layout. For example, high quality is sharper but takes more time to set the layout.
	Select one of the following options:
	➤ **Draft.** Set the layout to draft quality.
	➤ **Medium.** Set the layout to medium quality.
	➤ **Proof.** Set the layout to proof quality.

UI Elements (A-Z)	Description
Spacing	Sets the spacing around each graph node within the same cluster and between clusters. Enter values for the following settings: ➤ **Between Graph Nodes.** Sets the spacing around each graph node within the same cluster. The larger the spacing, the more graph nodes there are on the cluster boundary. **Default value:** 50 This illustration shows smaller graph node spacing. This illustration shows larger graph node spacing. ➤ **Between Clusters.** Sets the spacing between clusters. **Default value:** 50 This illustration shows smaller cluster spacing. This illustration shows larger cluster spacing.

Hierarchical Tab

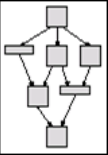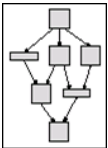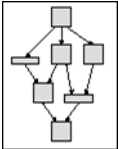| To access	Click the **Hierarchical** tab in the Layout Properties dialog box.

Important information	The Hierarchical tab shows the precedence relationships that can represent organizational or information management system dependencies, as well as process models, software call graphs, and work flows. The hierarchical layout emphasizes dependencies by placing the graph nodes at different levels.

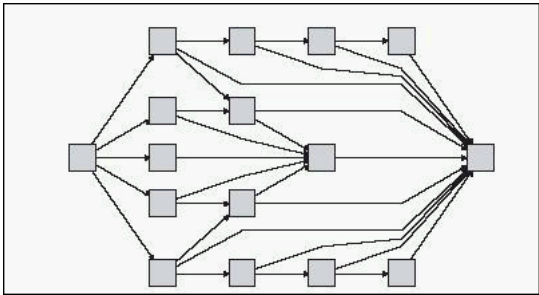User interface elements are described below:

UI Elements (A-Z)	Description
Backward Edges	Specifies how backward relationships are displayed in the hierarchical layout. Select one of the following options: ➤ **Minimize Backward Edges.** Sets the number of backward relationships displayed in a layer to a minimum. ➤ **Optimize for Feedback Flow.** Sets the number of backward relationships displayed in a layer to a maximum. This mode is more appropriate for flow charts.
Horizontal Spacing	Enables you to set the minimum horizontal distance between two neighboring graph nodes at each level. Enter values for the following settings: ➤ **Between Graph Nodes.** Sets a space around each graph node horizontally in the layer. **Default value:** 28 ➤ **Between Edges.** This setting is available only when you select **Routing > Orthogonal**. It sets a horizontal space between edges in the graph. **Default value:** 12

UI Elements (A-Z)	Description
Layout Quality	Adjusts the quality of the layout produced to fit your application's needs. The quality reflects the number of steps or the method used to produce the layout. For example, high quality is sharper but takes more time to set the layout.
	Select one of the following options:
	➤ **Draft.** Set the layout to draft quality.
	➤ **Medium.** Set the layout to medium quality.
	➤ **Proof.** Set the layout to proof quality.

UI Elements (A-Z)	Description
Level Alignment	Enables you to set the way graph nodes are vertically aligned.

Select one of the following options:

➤ Top. This illustration shows that the top of the graph nodes at the same level of the hierarchy are aligned.

➤ Center. This illustration shows that the center of the graph nodes at the same level of the hierarchy are aligned.

➤ Bottom. This illustration shows that the bottom of the graph nodes at the same level of the hierarchy are aligned.

UI Elements (A-Z)	Description
Orientation	Enables you to set the orientation of the hierarchy.
	Select one of the following options:
	➤ **Top to Bottom.** The children are located above the parent.
	➤ **Left to Right.** The children are located to the left of the parent.
	➤ **Bottom to Top.** The children are located below the parent.
	➤ **Right to Left.** The children are located to the right of the parent.
Orthogonal Routing - Fix Node Sizes	This setting is available only when you select **Routing > Orthogonal**. Maintain the size of a graph node. Clear this option if you want the layout to increase the size of a graph node if it is necessary to maintain the specified relationship spacing when more than one relationship is attached to the same side of the graph node.
Polyline Routing - Spacing Between Bends	This setting is available only when you select **Routing > Polyline**. Polyline routing routes edges (connecting lines) as one or more straight line segments with arbitrary angles. Path nodes are added automatically to prevent the edges (connecting lines) from overlapping.
	Default Value: 12

UI Elements (A-Z)	Description
Routing	Select the type of routing for the layout. The available options are: ➤ **Orthogonal** ➤ **Polyline**
Undirected Layout	Edge direction is not used to build the levels of the hierarchical drawing.
Variable Level Spacing	Variable level spacing adjusts the spacing between pairs of neighboring levels according to the density of edges between the levels. If the drawing's edges are orthogonally routed, this ensures the desired vertical spacing between horizontal edges (in a top-to-bottom or bottom-to-top layout) routed between levels. If the routing is polyline, variable level spacing makes it easier to distinguish among edges in very dense drawings.
Vertical Spacing	Enables you to set the minimum vertical distance between two neighboring graph nodes on different levels. Enter values for the following settings: ➤ **Between Graph Nodes.** Sets a vertical space around each graph node in the level. **Default value:** 28 ➤ **Between Edges.** This setting is available only when you select **Routing** > **Orthogonal**. It sets a vertical space between edges in the graph. **Default value:** 12

Orthogonal Tab

To access	**To access:** Click the **Orthogonal** tab in the Layout Properties dialog box.
Important information	The Orthogonal tab enables you to set orthogonal layout route relationships horizontally and vertically. This results in relationships bending at 90-degree angles only.

User interface elements are described below:

UI Elements (A-Z)	Description
Fix Node Sizes	Maintain the size of a graph node. Clear this option if you want the layout to increase the size of a graph node if it is necessary to maintain the specified relationship spacing when more than one relationship is attached to the same side of the graph node.
Horizontal Spacing	Enables you to set the minimum horizontal distance between graph nodes. Select one of the following options: ➤ **Between Graph Nodes.** Set a horizontal space around each graph node in the layer. **Default value:** 20 ➤ **Between Edges.** Set a horizontal space between elements in the layer. **Default value:** 12
Layout Quality	Adjusts the quality of the layout produced to fit your application's needs. The quality reflects the number of steps or the method used to produce the layout. For example, high quality is sharper but takes more time to set the layout. Select one of the following options: ➤ **Draft.** Set the layout to draft quality. ➤ **Medium.** Set the layout to medium quality. ➤ **Proof.** Set the layout to proof quality.
Vertical Spacing	Enables you to set the minimum vertical distance between graph nodes. Select one of the following options: ➤ **Between Graph Nodes.** Set a vertical space around each graph node in the layer. **Default value:** 100 ➤ **Between Edges.** Set a vertical space between elements in the layer. **Default value:** 20

Symmetric Tab

To access	Click the **Symmetric** tab in the Layout Properties dialog box.
Important information	The Symmetric tab displays a clear representation of complex networks. The symmetric layout emphasizes the symmetries that may occur in a graph.

User interface elements are described below:

UI Elements (A-Z)	Description
Layout Quality	Adjusts the quality of the layout produced to fit your application's needs. The quality reflects the number of steps or the method used to produce the layout. For example, high quality is sharper but takes more time to set the layout. Select one of the following options: ➤ **Draft.** Set the layout to draft quality. ➤ **Medium.** Set the layout to medium quality. ➤ **Proof.** Set the layout to proof quality.
Spacing	Allows you to set constant horizontal and vertical spacing around each graph node in the layer. The value you specify is a guideline for the layout, so that it is possible that the spacing for a particular pair of graph nodes might be different from the one you specified. The larger the graph node spacing, the farther apart the graph nodes are spaced in the final layout. **Default value:** 50 The following figure illustrates smaller and larger spacing. node spacing=75 node spacing=150

Routing Tab

To access	Click the **Routing** tab in the Layout Properties dialog box.
Important information	The Routing tab enables you to produce drawings that leave graph nodes essentially where they are, and reroute the lines orthogonally.

User interface elements are described below:

UI Elements (A-Z)	Description
Fix Node Positions	Maintain the position of all the graph nodes in the display. Clear this option for the layout to move the graph nodes if it is necessary to improve the layout. The movement is minimal, avoids overlaps, and minimizes bend points.
Fix Node Sizes	Maintain the size of a graph node. Clear this option if you want the layout to increase the size of a graph node if it is necessary to maintain the specified relationship spacing when more than one relationship is attached to the same side of the graph node.

UI Elements (A-Z)	Description
Horizontal Spacing	Enables you to set the minimum horizontal distance between graph nodes. Select one of the following options: ➤ **Between Graph Nodes.** Set a horizontal space around each graph node in the layer. **Default value:** 20 ➤ **Between Edges.** Set a horizontal space between elements in the layer. **Default value:** 12
Vertical Spacing	Enables you to set the minimum vertical distance between graph nodes. Select one of the following options: ➤ **Between Graph Nodes.** Set a vertical space around each graph node in the layer. **Default value:** 20 ➤ **Between Edges.** Set a vertical space between elements in the layer. **Default value:** 12

🔍 Main Menu

This feature contains the options for working with the topology map.

To access	Located in the upper left portion of the screen.
Important information	The specific options contained within the Main Menu drop-downs are detailed in "Toolbar Options" on page 197.

User interface elements are described below:

UI Elements (A-Z)	Description
Edit	Contains selection options for the topology map.
Editor Item	Contains the topology map shortcut menu options for the current manager. **Note:** This drop-down does not appear in CI Type Manager.
Layout	Contains options for changing the layout of the topology map.
Operations	Contains options for printing or exporting the topology map.
Resources	Contains the left pane shortcut menu options for the current manager. **Note:** This drop-down does not appear in IT Universe Manager, and in CI Type Manager it is called **CI Types**.
Tools	Contains the User Preferences, Log Configuration, and Screen Capture tools.
View	Enables you to hide or display the different panes of the module.

🔍 Print Dialog Box

This dialog box enables you to print the contents of the topology map.

To access	Select **Operations** > **Print.**
Important information	The results of printing a topology map is similar to a screen capture. Therefore, before printing, it is recommended to:
	➤ Define your print settings and arrange the contents of the topology map according to your requirements. For details, see "Print Setup Dialog Box" on page 195.
	➤ Arrange the contents of the topology map for print. You can use the **Layout** option and **Layout Properties**. For details about the layout options, see "Layout" on page 201. For details about layout properties, see "Layout Properties Dialog Box" on page 176.
Relevant tasks	"Print and Save a Topology Map to File" on page 248

User interface elements are described below:

UI Elements (A-Z)	Description
Number of copies	Enter the number of copies you want to print.
Properties	Define document properties as required.

🔖 Print Preview Dialog Box

This dialog box enables you to preview the content of the topology map before printing.

To access	Select **Operations** > **Print Preview.**
Relevant tasks	"Print and Save a Topology Map to File" on page 248

User interface elements are described below:

Menu Item	Description
Fit in Canvas	Fit the complete view in the pane.
Print	Print the map. For details, see "Print Dialog Box" on page 194.
Print Setup	Define the print settings for the map. For details, see "Print Setup Dialog Box" on page 195.
Zoom	Focus on specific details of the map. For details, see "Interactive Zoom" on page 200.

🔖 Print Setup Dialog Box

This dialog box enables you to define the print settings for a topology map.

To access	Select **Operations** > **Print Setup.**
Relevant tasks	"Print and Save a Topology Map to File" on page 248

User interface elements are described below:

UI Elements (A-Z)	Description
Actual Size	Print the view as it really is.
Color	Set the text color.
Font	Set the required font.

UI Elements (A-Z)	Description
Page Setup	Set the printer settings.
Pages	Divide the map into rows and columns and print each section separately. Enter the number of columns and rows in the **Page Columns** and **Page Rows** boxes.
Position	Select the position of the caption from the **Position** list.
Print Background	Print the background behind the view.
Print Border	Print the map with a border. Click **Color** to select the required border color.
Print Caption	Enter the caption in the text area and click **Font** to select the required custom font.
Print Crop Marks	Print the crop marks.
Print Current Selection	Print the selected graph nodes and their relationships.
Print Current Window	Print the part of the view that appears in the pane.
Print Entire Drawing	Print the complete view.
Print Page Numbers	Print the page numbers.
Zoom Level	Print the view at the current zoom level.

🔍 Toolbar Options

The following table contains a description of each Topology Map toolbar option, organized alphabetically.

Note: These toolbar options are relevant for RTSM applications.

Button	Option Name	Use This Option to...
	Additions Count	Calculate the number of instances that are created as a result of an Enrichment Rule. The number of TQL query node instances and relationships that are created appear next to the Enrichment query nodes/relationships, as seen in the figure below. **Note**: This option appears in the toolbar in Enrichment Manager only.
	Advanced Pane	Toggle between hiding and displaying the Advanced Pane at the bottom center of the screen. **To access:** Select **View** > **Advanced Pane**.
	Calculate Query Result Count	Calculate the number of instances found for each TQL query node/relationship.

Button	Option Name	Use This Option to...
	Change Label Length/Prop erties	Enter the maximum number of characters that the labels should contain. **To access:** In IT Universe Manager and the Modeling Studio, select **Layout** > **Change label properties**. In the other managers, select **Layout** > **Change label length**.
	CI Types Tree	Toggle between hiding and displaying the CI Type Selector at the right of the screen. **To access:** Select **View** > **CI Types Tree**. **Note:** In the Modeling Studio, this option is called CI Types.
⬆	**Create Relationship**	In most managers, create a relationship between two existing TQL query nodes. For details, see "Add Query Nodes and Relationships to a TQL Query" on page 30. In IT Universe Manager, create a relationship between existing CIs. For details, see "Attaching Existing CIs" on page 232.
✖	**Delete Selected Item(s)**	Delete a CI from IT Universe Manager or a TQL query node from Impact Analysis Manager or Enrichment Manager.
⬆̸	**Disable/Enabl e Related CIs Retrieval**	Toggle between disabling and enabling the redrawing of the topology map with related CIs when selecting a new CI in the CI Selector. **Note:** This option appears only in IT Universe Manager in the Related in View or Related in DB tabs.
	Drag Map	Drag the view. **To access:** Open the drop-down menu in the **Mode** box or select **View** > **Drag Map**. In IT Universe Manager and the Modeling Studio, select **Layout** > **Dragging Mode**.
⬇	**Drill Down One Layer**	Move down one level in the topology map. This option is enabled only if there is an additional CI layer below it, created by setting the hierarchy of the view. For details on setting the hierarchy, see "Setting the View Hierarchy" on page 324. **Note:** This option appears only in IT Universe Manager.

Button	Option Name	Use This Option to...
	Entities Tree	Toggle between hiding and displaying the manager specific entities tree at the left of the screen. **To access:** Select **View** > **Entities Tree**. **Note:** In the Modeling Studio, each of the tabs of the Left pane (Resources, CI Types, CI Selector) is listed as a separate option.
	Export Map to Image	Save the topology map to a file. For details, see "Export Map to Image Dialog Box" on page 174. **To access:** Select **Operations** > **Export Map to Image**.
	Fit to Window	Fit the complete map in the pane.
	Generate Direct Link	Generate a direct link to a view or CI. **To access:** Select **Edit** > **Generate Direct Link.**
	Get Related CIs	Toggle between hiding and displaying the Get Related CIs toolbar. **Note:** This option appears only in IT Universe Manager when the Related in View or Related in DB tabs are selected.
	Go Up One Layer	Move up one level in the topology map. This option is enabled only if there is an additional CI layer above it, created by setting the hierarchy of the view. For details on setting the hierarchy, see "Setting the View Hierarchy" on page 324. **Note:** This option appears only in IT Universe Manager.
	Hide All Inheritance From Map	Toggle between showing and hiding Inheritance_f relationships and their connecting query node. **To access:** Select **Layout** > **Hide All Inheritance From Map**. **Note:** This option is only active in the toolbar in CI Type Manager.
	Hide All Query Node Labels	Toggle between showing or hiding the CI/CIT/query node/pattern labels. **To access:** Select **Layout** > **Hide All Query Node Labels**. **Note:** This option is not available in IT Universe Manager and the Modeling Studio.

Button	Option Name	Use This Option to...
	Hide All Relationship Labels	Toggle between showing or hiding the relationship labels. **To access:** Select **Layout** > **Hide All Relationship Labels**. **Note:** This option is called **Hide edges' labels** in IT Universe Manager and the Modeling Studio.
	Hide All Relationships	Toggle between showing and hiding the relationships in the displayed map. **To access:** Select **Layout** > **Hide All Relationships**. **Note:** This option is not available in IT Universe Manager and the Modeling Studio.
	Hide/Show Legend	Toggle between hiding and displaying the topology map legend. **Note:** This option appears only in IT Universe Manager and the Modeling Studio.
	Interactive Zoom	➤ Decrease the view magnification by clicking and pushing the pointer upwards. ➤ Magnify the view by clicking and pulling the pointer downwards. **To access:** Open the drop-down menu in the **Mode** box or select **View** > **Interactive Zoom**. **Note:** This option is not available in IT Universe Manager and the Modeling Studio.
	Layout Properties	Define the view's layer layout, by assigning positions for the query nodes and relationships of the view. For details, see "Layout Properties Dialog Box" on page 176. **To access:** Select **Layout** > **Layout Properties**.

| Button	Option Name	Use This Option to...
	Layout	Select the layout display from the list. The options are: ➤ **Hierarchical**. Enables you to display the precedence relations in the topology map. ➤ **Symmetric**. Enables you to display clear representations of complex networks. ➤ **Circular.** Groups a graph's nodes into groups or clusters. ➤ **Manual.** Enables you to display the changes you have made manually to the topology map. ➤ **Orthogonal.** Enables you to display views of outstanding clarity that are achieved by employing only horizontal and vertical edge routing. For further details about each of the options, see "Layout Properties Dialog Box" on page 176. **Note:** These layout options are only relevant for Enrichment Manager, CIT Manager, and Impact Analysis Manager.
	Log Configuration	Open the Log Configuration dialog box. **To access:** Select **Tools** > **Log Configuration.**
	Map overview	Open a small box with a copy of the topology map. This is useful in large views when zooming in. **To access:** Select **Layout** > **Map Overview**.
	Maximize Workspace/Restore Workspace	Toggle between the regular display and a full-screen display of the topology map.

Button	Option Name	Use This Option to...
	Navigation	Take the pointer to the next connected CI/CIT/TQL query node in a clockwise direction. ➤ Left-click to move in a clockwise direction. ➤ Right-click to point to the next CI/CIT/query node/pattern in a clockwise direction. **To access:** Open the drop-down menu in the **Mode** box or select **View** > **Navigation**. **Note:** ➤ You can use this option only on CI/CIT/query nodes/patterns that are connected by relationships. ➤ This option is not available in IT Universe Manager and the Modeling Studio.
	New CI	Define a new unrelated CI. For details, see "Working with CIs" on page 227. **Note:** This option appears in the toolbar in IT Universe Manager only.
	New Related CI	Define a new related CI. For details, see "Working with CIs" on page 227. **Note:** This option appears in the toolbar in IT Universe Manager only.
	Place in Center	Place the selected CI/CIT/query nodes/pattern in the center of the map. **To access:** Select **Layout** > **Place in Center**. **Note:** This option is not available in IT Universe Manager and the Modeling Studio.
	Print	Print the contents of the topology map. For details, see "Print Dialog Box" on page 194. **To access:** Select **Operations** > **Print...**
	Print Preview	Preview the contents of the map before printing. **To access:** Select **Operations** > **Print Preview**.

Button	Option Name	Use This Option to...
	Print Setup	Define print settings for printing the topology map. For details, see "Print Setup Dialog Box" on page 195. **To access:** Select **Operations** > **Print Setup...**
	Remove Enrichment Results	Remove the instances created from an Enrichment rule from the RTSM. **Note**: This option appears in the toolbar in Enrichment Manager only.
	Screen Capture	Take a snapshot of the screen using the Screen Capture tool. **To access:** Select **Tools** > **Screen Capture**.
	Select	Select a CI/CIT/TQL query node or multiple CIs/CITs/TQL query nodes. **To access:** Open the drop-down menu in the **Mode** box or select **View** > **Select**. In IT Universe Manager and the Modeling Studio, select **Layout** > **Selection Mode**.
	Select All	Select all the CIs and relationships in a selected layer. **To access:** Select **Edit** > **Select All**. **Note:** This option is not available in IT Universe Manager and the Modeling Studio.
	Select All Query Nodes	Select all the query nodes in a selected layer. **To access:** Select **Edit** > **Select All Query Nodes**. **Note:** This option is not available in IT Universe Manager and the Modeling Studio.
	Select Columns	Enables you to select the columns to be displayed. For details, see, "Select Columns Dialog Box" on page 540. **Note:** This option is displayed in Text mode of IT Universe Manager only.
	Set Change Timeframe	Open the Change Timeframe dialog box, which enables you to set the period for the display of added or changed CI indicators. **Note:** This option appears in the toolbar in IT Universe Manager only.

Button	Option Name	Use This Option to...
🔧	**Show Candidates for Deletion**	Identify the CIs in the current view which are candidates for deletion with the following icon 🔧 . **Note:** This option appears in the toolbar in IT Universe Manager only.
🕐	**Show Schedule Info**	Display the scheduling information for the selected job. For details, see "Discovery Scheduler Dialog Box" in the *Run-time Service Model Data Flow Management Guide*. **Note:** This option appears in the toolbar in the Dependency Map tab of DFM. For details, see "Dependency Map Tab" in the *Run-time Service Model Data Flow Management Guide*.
≣↑	**Sort Order**	Enables you to set the order of the visible columns. For details, see, "Sort Column Content Dialog Box" on page 541. **Note:** This option is displayed in Text mode of IT Universe Manager only.
	Straighten	Straightens any selected relationship between two query nodes that has angles. **To access:** Select **Layout** > **Straighten**. **Note:** This option is only available in Enrichment Manager and Impact Analysis Manager.
	User Preferences	Opens the User Preferences dialog box which enables you to reset warning message preferences. For details, see "User Preferences Dialog Box" on page 99. **To access:** Select **Tools** > **User Preferences**.
	Zoom In	Zoom in on a specific section of the topology map by clicking and drawing a selection rectangle around the part to magnify. The area you select is displayed at the highest percentage that fits in the topology map. **To access:** Open the drop-down menu in the **Mode** box or select **View** > **Zoom In**. In IT Universe Manager and the Modeling Studio, select **Layout** > **Zoom in**.

🔍 Topology Map Sidebar

The following table contains a description of each Topology Map sidebar option. The Topology Map sidebar appears in IT Universe Manager and the Modeling Studio.

Button	Option Name	Use This Option to...
	Move to Right/Left	Move the sidebar to the right or left side of the screen.
	Zoom In/Out	Zoom in or out on the topology map.
	Selection Mode	Enable selection mode in the topology map.
	Dragging Mode	Enable dragging mode in the topology map.
	Refresh to get an optimal layout	Refresh the topology map to optimize the layout.
	Fit to Window	Fit the complete map in the pane.
	Hide Edges' Labels	Hide the labels of all relationships.
	Change label properties	Open the Map Label Properties dialog box which enables you to set the maximum label length per line and maximum number of lines per label.
	Show Map Overview	Open a small box with a copy of the topology map. This is useful in large views when zooming in.
	Hierarchical Layout	Display the topology map in a layout displaying the precedence relations.

Button	Option Name	Use This Option to...
	Hierarchical Layout with Orthogonal Routing	Display the topology map in a layout displaying the precedence relations using only horizontal and vertical edge routing.
	Circular Layout	Display the topology map in a layout that groups a graph's nodes into groups or clusters.
	Orthogonal Layout	Display the topology map in a layout using only horizontal and vertical edge routing.
	Symmetric Layout	Display the topology map in a layout showing clear representations of complex networks.
	Print	Print the topology map.
	Export Map to Image	Save the topology map to a file.

Part II

Modeling

7

Best Practices for Modeling

This chapter includes:

Reference

➤ Using Modeling Studio on page 210

➤ Models and Perspectives on page 210

➤ Building Models on page 211

➤ Model Dependencies on Other CIs in the RTSM on page 216

➤ Modeling an Application with Running Software on page 217

➤ Creating Views Using the Modeling Studio on page 217

Reference

✵ Using Modeling Studio

The Modeling Studio is the RTSM module for building and modeling views for display in Service Health. This document details the required flow to create Service Health views using the Modeling Studio.

The motivation behind developing the Modeling Studio is to create a separation between the need to change the RTSM content by creating CIs and relationships and the need to consume (view) the RTSM content. In earlier versions, altering the RTSM content was part of the view creation workflow. Hence, users were unintentionally changing the RTSM and influencing other users' views. In the Modeling Studio, you build models and transform your content into views to be consumed by HP Business Service Management.

✵ Models and Perspectives

A model is a CI collection that represents a managed business entity such as an application, business service, or line of business. A model is usually created by solution or application architects who are familiar with the content and hierarchy of the model. The model content can include system CIs (typically nodes), running software CIs (such as web servers, databases, and J2EE servers), end user monitoring components (Business Process Monitor or Real User Monitor applications), business processes, groups, and other existing models.

To generate a view from a model, a perspective needs to be applied. A perspective is a TQL-based tool that enriches the model content by adding additional CIs, thus creating a view. The default perspectives that are applied to create Service Health views add all descendent CIs that are related by impact links down to the level of monitor CIs. There are other perspectives provided out of the box that can be used to address additional use cases.

The resulting view shows the model content as it is monitored by
HP Business Service Management.

Building Models

The information required to define a model includes the CI content, the
hierarchy, and the dependencies upon additional CIs.

HP Business Service Management is configured with a predefined list of CI
types that represent your business entities. When creating a new model
using the Modeling Studio, the following list of valid models appears:

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The model CI types can be arranged in hierarchies to reflect the organization's specific needs. Here is an example of a typical recommended model hierarchy:
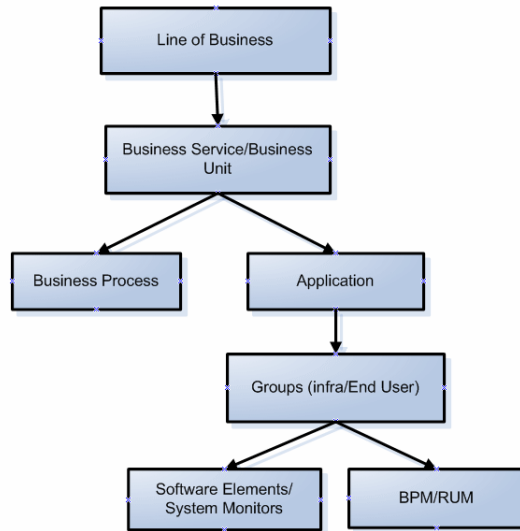
A model can be nested in any logical hierarchy, but it is best to create a hierarchy that starts from high level business entities down to more specific model types.

It is strongly recommended to build models in a way that allows them to be reused as components of other models.

Building a model creates a **contains** link between the model and its CIs according to the defined hierarchy.

The creation of a CI which is a model CI results in the creation of an empty model by default. Therefore, if you want to create a model for a CI that does not yet exist, you create a new model and thus, a new CI. If you want to model an existing CI for the first time, select the CI in the CI Selector, drag it onto the canvas and select **Create a New Model**.

Preconfigured Models

HP Business Service Management creates out-of-the-box models for applications monitored by Business Process Monitor and Real User Monitor.

The Business Process Monitor model is of type business transaction flow and it contains business transaction CIs.

The Real User Monitor model is of type application and contains the End User Management Application related group and business process step CIs. The Real User Monitor model is also impacted by the Real User Monitor Sessions monitor CIs, Real User Monitor Errors events CIs, and Real User Monitor Informational events CIs, which are visible in the Related CIs pane.

Building Model Content

Create a model of the desired type and assign it a name. The new model appears as the top CI in the content pane of the Model Editor. Drag and drop CIs from the CI Selector into the content pane to build the model content.

A model can contain system CIs, running software CIs, SiteScope groups, and other models (both existing models and new ones created during the modeling process).

The only CIs that cannot be part of a model containment tree are monitors. Monitor CIs are added to a model after you generate a view from the model using one of the monitor perspectives. You can include monitors in view by dragging them into the Related CIs pane when a model CI is selected in the upper pane of the Model Editor. If you try to drop a monitor CI into the upper pane, a message appears prompting you to add the monitor CI to the Related CIs pane.

The CI Selector pane offers two ways to search for a CI (both model CIs and non-model CIs):

➤ **Browse Views**

Use this option when you are familiar with a view that contains the CI you are looking for. The following out-of-the-box views can help you find commonly used CIs:

➤ End User Monitors view - contains business process groups and their content.

➤ System Monitors view - contains SiteScope groups hierarchy.

➤ System Software Monitoring view - contains running software CIs and the servers on which they are deployed.

In the CI Selector, select **Browse Views** and begin entering the view name or use the view tree to look for a CI in a specific folder.

➤ **Search CIs**

If you know the CI type you are looking for, select the **Search CIs** mode and use the quick search dialog to locate the desired CI. Use the Advanced Search option for CIs that do not appear in the quick search mode.

The search result appears in the left pane. After the list of CIs is refreshed, you can drag and drop CIs into the model content pane. It is possible to drag and drop multiple CIs in a single selection.

Models can be placed in a hierarchical mode. During the process of building the content you can insert new models and create groups.

Hierarchies between CI types which are not models is not supported.

Grouping

In some cases, there is a need to divide the model into logical groups according to ownerships, locations or any other custom representation.

In the following example the application contains two groups that represent data centers:

For details on creating groups in a model, see "CI Collection" on page 379.

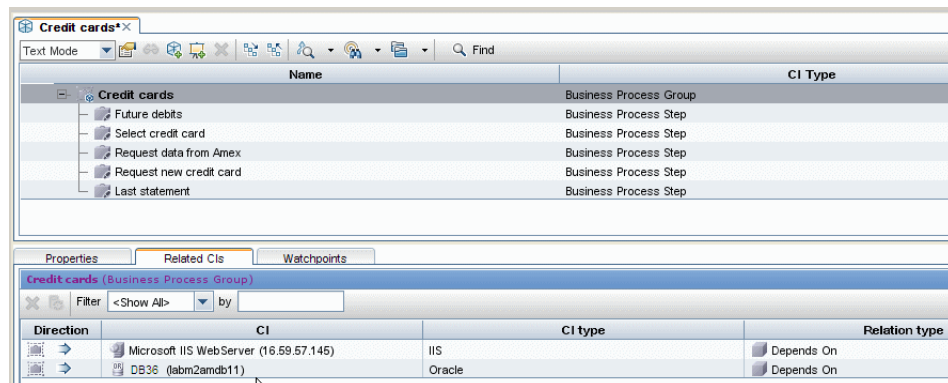# 🔍 Model Dependencies on Other CIs in the RTSM

Each model CI in the model can be dependent on other CIs that exist in the RTSM but are not part of the model itself. Examples of such CIs include shared resources such as database servers and storage devices.

The model structure may vary between organizations according to policies and responsibilities in the IT department. There are organizations where shared resources are considered to be part of the application and are monitored as part of it, while in other organizations they are considered external to the application. In the first case, shared resources are part of the model and appear in the content pane, whereas in the second case they appear as related CIs (in the lower pane of the Model Editor).

To create a dependency between a CI in the model and another CI in the RTSM, search for a CI in the left pane and drag it into the Related CIs tab. This operation creates a **usage** link in the RTSM.

In order to create a dependency relationship between two CIs, there must be a valid link in the RTSM between the two CI types. By default, all business CIs can be dependent on other business CIs.

The following example shows an application that depends on a web server and Oracle software elements:

HP Business Service Management offers a revised out-of-the-box impact model. The impact model describes the impact relationships between CI types. For example, a running software CI is impacted by the node on which it is deployed. In the Modeling Studio, when you include a running software CI as part of a model, the node on which it is deployed appears in the Related CIs tab, since the running software is dependent on the server.

Modeling an Application with Running Software

Running software CIs are CIs that describe the implementation components of an application. Examples include web servers such as IIS or Apache, application servers such as Webshpere or Weblogic, and databases.

To build the implementation model of a three tier application using its running software CIs, create an application model.

You can use the Running Software search in the Advanced Search dialog or browse the System Software Monitoring view to locate running software CIs. The names of the running software CIs are formed by combining the running software CI type with the server name, for example, Microsoft IIS web server (Server1).

Drag the relevant running software CIs into the modeling pane. The server on which the running software was deployed as well as the monitor of the running software both appear automatically in the Related CIs pane. This change derives from the new SiteScope monitoring model. In previous versions, all monitors (of both hardware and software) were connected to the Server CI. The SiteScope model was enhanced and now hardware monitors are connected to the server CI, while software monitors are connected to the running software CIs.

Creating Views Using the Modeling Studio

There are two methods of creating perspective-based views using the Modeling Studio. The first option is to create a view based on a model (or on several models); the second one is to create a view out of CI collection that is not a model.

A view based on a model is updated automatically when the model content is updated. For example, a view was generated using a business process group model that initially contained five business process steps. The business process group was then updated to include additional business process steps. Those changes are automatically reflected in the view.

This option is the recommended one, since it creates a dynamic view.

In a view based both on models and individual CIs, the view content is updated according to changes in the models.

Generating a View from a Model

After building a model and saving the model definition, select the top model and select **Generate view for selected model**. In the dialog box that opens, select the desired perspective according to the desired view content.

The recommended perspective is the Impact Perspective. It creates a view with all the CIs in the model and for each CI, it adds all the child CIs including the monitor CIs. Additional perspectives that may be used for other purposes are described in "Predefined Perspectives" on page 328.

If the selected model includes dependent CIs (which appear in the Related CIs tab), they are also enriched by the perspective and become part of the view.

The Content Only perspective does not make any changes in the view, even for model CIs.

Hiding Irrelevant CIs from a View

The view result appears in the View Results pane. At this point, you may choose to hide CIs that appear in the view.

Hiding CIs from a view does not change the status calculation of CIs in the view (the status calculation is performed according to the RTSM hierarchy). For example, hiding two business process steps from a business process group with five steps does not affect the business process group status. If a hidden CI has a critical status and the remaining CIs are OK, the business process group shows a critical status.

For details on hiding CIs and restoring them to a view, see "Including and Excluding Child CIs" on page 334.

8

IT Universe Manager

This chapter includes:

Concepts

Tasks

Reference

Concepts

🔩 IT Universe Manager Overview

IT Universe Manager enables you to manage the content of your IT Universe model. The following tasks represent the basic functionality of the application:

➤ **Creating CIs without creating relationships.** You can define new CIs that are added to the RTSM individually, so that no new relationships are created. For details, see "Creating a Non-Related CI" on page 227.

➤ **Creating CIs with relationships for them.** You can define new CIs and attach them to existing CIs, so defining a new CI and a new relationship in the RTSM. For details, see "Creating a Related CI" on page 227.

➤ **Adding existing CIs and creating relationships for them.** You can attach CIs to an existing CI, so creating new relationships for existing CIs. For details, see "Attaching Existing CIs" on page 232.

➤ **Deleting CIs.** You can delete CIs from the RTSM. For details, see "Deleting CIs" on page 228.

➤ **Get Impact Analysis results**. You can run the Impact rules you defined for a view to simulate how certain defined changes impact your system, and to discover the root causes of the changes. For more information about Impact rules, see "Impact Analysis Manager Overview" on page 422.

Populating the IT Universe Model

The IT Universe model in the RTSM contains the CIs and relationships produced by the CI-generating tools that operate within HP Business Service Management. Most CIs and relationships originate from one of the following sources:

➤ **Data Flow Management (DFM).** Automatically creates CIs and relationships based on the discovered IT resources and topology in your company's infrastructure. For details, see "Data Flow Management Overview" in the *Run-time Service Model Data Flow Management Guide*.

➤ **IT Universe Manager.** Enables you to manually create CIs and relationships that represent logical and physical elements of the business. For details, see "Working with CIs" on page 227.

➤ **End User Management Administration and System Availability Management Administration.** Enables you to manually create relationships between the CIs for monitor objects and CIs in the RTSM. For details, see "Integrating SiteScope Data with BSM's Configuration Items" in *Using System Availability Management*.

➤ **Enrichment Manager.** Enables you to add CIs and relationships to the RTSM by receiving data from the attributes of Enrichment query nodes as defined in the Enrichment TQL query. For details, see "Enrichment Manager" on page 489.

Working with Views in IT Universe Manager

In IT Universe Manager, you analyze data at the view level. Views are subsets of the IT Universe, containing only those CIs relating to a specific area of interest. All views are based on a pattern which determines the content of the view.

➤ Pattern views and template-based views are built from a TQL (Topology Query Language) query that defines the structure of the view. The view displays only those CIs and relationships that satisfy the query definition.

➤ Perspective-based views are built manually, by selecting a group of CIs and applying perspectives to them. A perspective is a pattern used to define which related CIs are included in the view.

You build all views in the Modeling Studio, using the appropriate editor for each view type. For information on the different view types and how they function, see "View Formats" on page 322.

Note: You must have **Change** permissions for a view to edit the view. If you do not have the necessary permissions, contact your HP Business Service Management Administrator.

CIs created by DFM are automatically added to each view where the CIs (and their relationships) fit the TQL definition for the view. When you open a view in the CI Selector, the TQL query for the view queries the RTSM for CIs that match the defined pattern. If there are no matches (for example, in the case of a view for a DFM process where the process has not yet run) then the view remains empty.

When you define a new CI while working in any view in IT Universe Manager, the CI (and any associated relationship) is created in the RTSM. The CI is added to your current view only if it meets the view's TQL specifications.

If the created CI and relationship do not meet the TQL requirements, then the CI and relationship are created in the RTSM but are not visible in the view. Similarly, if you attach an existing CI to a CI in the view, and the new pattern does not meet the TQL requirements, then the attached CIs do not appear in the view, but the relationship is still created.

Templates and Template-based Views

If you open a template in IT Universe Manager, it is displayed in the topology map like a pattern view. Click the **Show Template Parameters** button in the CI Selector toolbar to open the Template Parameter Values dialog box, where you can change the values of the template parameters and thereby affect the view results displayed in the topology map. You can try different parameter values and see the resulting topology map, but you cannot save changes to the template itself. To save the view results as a template-based view with the selected parameters, click the **Save As View** button in the Template Parameter Values dialog box.

View Lifecycle

If you do not access a view from the CI Selector for a specified period of time, the view is cleared out, to save memory in the system. It is not deleted from the RTSM; the view can be retrieved by clicking on it. The default time period for clearing out unused views is one hour.

Note: Views defined as persistent are not cleared out and always remain in the memory.

Hidden Views

You can designate a view as a hidden view that does not appear in IT Universe Manager by defining a bundle for hidden views and assigning the view to that bundle.

To designate a view as a hidden view:

1 In the Infrastructure Settings Manager, select **Hidden Bundles Names in CI Selector**.

2 Enter the name of the new bundle as the default value and save the setting.

3 In the Modeling Studio, open the relevant view and click the **View Definition Properties** button in the toolbar.

4 In the View Definition Properties dialog box, select the hidden views bundle and assign the view to it.

View Tree Structure

Views are organized in a hierarchical tree format in the left pane of IT Universe Manager, which is known as the CI Selector. The view name appears in the View box above the tree and acts as the containing folder for the CIs in the view.

The first level of the CI Selector tree consists of the query nodes for the root CIs. A root CI is the starting point for a view subtree. A view may contain any number of subtrees. Under the root CIs come the branch CIs, expanding down to the leaf CIs as the last query nodes at the ends of each branch.

The CIs at each level in a subtree are considered to be attached to the CI on the branch directly above. This attachment generally depicts a dependent relationship, so that the higher branch (closer to the root CI) represents a component of your business that depends on the CIs on the next branch down (closer to the leaf CIs) in the business process. For example, an application depends on the servers running the application.
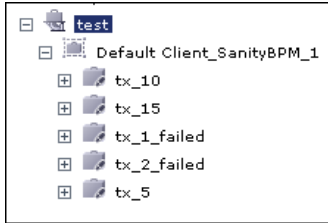
The attachment between a higher and a lower query node is referred to as a parent-child relationship. The parent CI may have many attached child CIs, and the child CIs pass operational status to the parent. The status at each level is viewed in Service Health.

The tree topology is determined by the hierarchy defined for the view. In a pattern view, these are defined for the specific view. In a template-based or a perspective-based view, the hierarchy is defined as part of the template or perspective. For details on defining the hierarchy, see "Setting the View Hierarchy" on page 324.

Working with CIs

In IT Universe Manager, you can create related and non-related CIs, delete CIs, edit the CI properties, and remove out-of-date CIs using the aging mechanism.

This section includes the following topics:

➤ "Creating a Non-Related CI" on page 227

➤ "Creating a Related CI" on page 227

➤ "Deleting CIs" on page 228

➤ "CI Properties" on page 229

➤ "Removing Out of Date CIs Using the Aging Mechanism" on page 230

Creating a Non-Related CI

You can define a new CI in IT Universe Manager by clicking the **New CI** button in the toolbar. The New CI dialog box opens, which enables you to define the properties for the new CI. The CI is created in the RTSM. For details, see "New CI/New Related CI Dialog Box" on page 275.

Note: The CI is added to the view only if it meets the specifications of the pattern, template, or perspective of the view.

A CI created in this way is added as an independent entity without any relationship to any other existing CI in the RTSM.

Creating a Related CI

You can define a new CI to be added as a parent, child, or sibling of an existing CI.

To define a new related CI:

1 Select the CI in your view to which you want to attach the new CI.

2 Click the **New Related CI** button in the toolbar.

3 In the New Related CI dialog box, define the properties and relationship for the CI. For details, see "New CI/New Related CI Dialog Box" on page 275.

The CI and relationship are created in the RTSM.

Note: The CI and relationship are added to the view only if they meet the specifications of the pattern of the view, template, or perspective.

Deleting CIs

You can delete a CI by selecting **Delete from CMDB** from the shortcut menu in IT Universe Manager. The CI is deleted from the RTSM and from all views. If the CI has children, they are not automatically deleted when you delete the parent CI. If you delete a CI without first deleting the relationship between the CI and any child CIs that appear with the parent CI in a view, the child CIs are removed from the view.

If the child CIs do not appear in any other view, they remain in the RTSM without appearing in a view. The child CIs might appear in the future in views where they meet the pattern requirements.

One exception to this rule is when the relationship between a child and parent CI is a **Composition** relationship; in that case, when the parent CI is deleted, the contained CI is also removed from the RTSM. For example, if a node CI is the container for a child CPU CI, then when the node CI is deleted, the CPU is also removed from the RTSM.

When you delete a CI that was created by the DFM process, the CI is restored the next time that DFM runs (if the CI is still valid), and it reappears in all relevant views.

CI Properties

In IT Universe Manager, you can edit the properties of a CI. The CI
properties are divided into several categories which appear in the New CI
dialog box:

➤ The general properties of a CI are common to all CIs. Some general
  properties are defined automatically during CI creation; others can only
  be defined manually in the New CI dialog box.

➤ CIT-specific properties are created as part of the CIT definition in the CI
  Type Manager. The values for the CIT-specific properties are taken from
  the CIs discovered during DFM. The values can also be entered manually,
  when you manually create CIs to represent entities in your infrastructure.
  For details, see "CI Type Manager" on page 447.

➤ Key properties can be general or CIT-specific properties, which must be
  assigned a value to create an instance of the CI type.

You can access the Configuration Item Properties dialog box to view the CI
properties from IT Universe Manager by right-clicking the CI and selecting
Properties or by clicking the Properties tab in the Advanced pane. You can
also edit the CI properties if you have the necessary permissions for editing
CIs. For details on CI properties, see "Configuration Item Properties Dialog
Box" on page 254.

The CIT-specific properties are displayed in the **Specific Properties** section of
the Configuration Item Properties dialog box when you sort the properties
using the **Categorized** button. Some properties for the automatically created
CIs can be edited, however, if the CI is configured to **Allow CI Update** (in the
General Properties), then DFM may override your changes when it updates
the CI. A description of the selected property can be found in the
Description area at the bottom of the Configuration Item Properties dialog
box.

Some of the CIT-specific properties for DFM CIs are set by default to be
monitored for changes. When one of these properties has been modified,
information on the change can be viewed in a CI change report, and in
some cases, an icon is displayed in Service Health. For more information, see
"CI Change Report" in the *Reports* guide.

Removing Out of Date CIs Using the Aging Mechanism

If a CI or relationship is not updated or refreshed over a period of time (for example, a CI is not rediscovered by DFM and no manual update occurs), an aging mechanism deletes the CI from the RTSM. For details, see "CI Lifecycle and the Aging Mechanism" in the *Run-time Service Model Administration Guide*.

Working with Relationships

Many of the relationships between CIs in the RTSM are created automatically, for example, by DFM. In addition, you can create relationships manually in IT Universe Manager, Enrichment Manager, Impact Analysis Manager, or the Modeling Studio. You can also create relationships in System Availability Management and End User Management Administration.

This section includes the following topics:

➤ "Creating Relationships" on page 230

➤ "Creating Hierarchical Relationships" on page 231

➤ "Attaching Existing CIs" on page 232

➤ "Setting the View Hierarchy" on page 233

➤ "Viewing Related CIs" on page 234

➤ "Deleting Relationships" on page 234

➤ "Inter-Layer Links" on page 234

Creating Relationships

You can create relationships in IT Universe Manager by right-clicking a CI or multiple CIs in the CI Selector pane or the Topology Map and selecting **Relate to CI** from the shortcut menu. In the Topology Map, you can define a relationship between two CIs in the view by drawing a line between the two, using the **Create Relationship** button from the toolbar. Either of these actions opens the Insert Relationship dialog box. For details, see "Insert Relationship Dialog Box" on page 261.

You can create as many relationships as necessary between a CI in the RTSM and other CIs. Each new relationship exists as its own entity in the RTSM, and has its own properties that can be edited in IT Universe Manager (as described in "Configuration Item Properties Dialog Box" on page 254). You can also create more than one relationship between the same two CIs, when each relationship is based on a different relationship type. In the following example, host7 has both a **Backbone** and a **Talk** relationship with switch3.
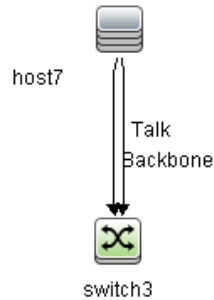
Creating Hierarchical Relationships

By attaching one CI to another in IT Universe Manager or System Availability Management or End User Management Administration you create a hierarchical relationship (parent-child) between them, so that one CI is influenced by the other.

Certain relationships defined in this way are restricted to the relationship type **usage** (if the relationship is between two non-monitoring CIs), or the relationship type **Monitored By** (if the child CI in the relationship is a monitor type CI); however, other relationship types are used between specific types of CIs. For example, if a relationship is defined between two node CIs, there are several possible relationship types.
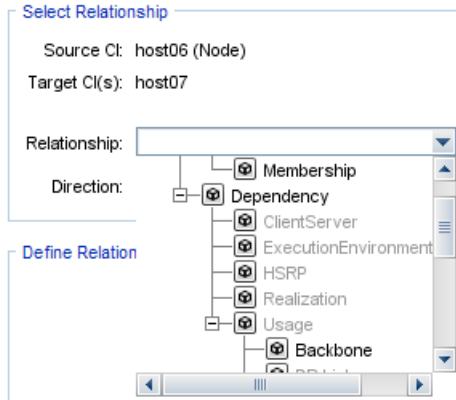
Note: When you attach a child CI to a parent CI, you are creating that relationship in the RTSM. The child therefore impacts on the parent CI in every view where the relationship exists, and is displayed in every view where the child and relationship match the TQL query.

When performing status calculations, the Business Logic Engine only recognizes calculated relationships. For details on calculated relationships, see "Impact Rules" on page 107.

Attaching Existing CIs

You can attach existing CIs using the Insert Relationship dialog box. The dialog box has two modes:

➤ Selecting the CIs that you want to attach.

➤ Defining the relationship between the original CI and the CIs to attach.

When selecting the CIs to attach, you can select multiple CIs from a view to attach to the original CI. However, all CIs that you want to attach in one operation must have the same relationship type. For example, you cannot attach a CI that uses the relationship **usage** in the same operation as a CI that uses the relationship **Monitored By**.

Note: SiteScope monitor CIs should not be attached to other CIs from within the RTSM. You should only create links to SiteScope monitor CIs from within SiteScope.

Setting the View Hierarchy

After setting the query node and relationship definitions of a view, you can set a hierarchy for the view. This enables you to define the organizational structure of CIs in the view by displaying selected CIs at different levels. When no hierarchy is defined, the Topology Map or table displays all CIs included in the query results on one level by default. For example, if the query results include nodes and IP Subnets, both CI types are displayed on the same level in the Topology Map or table.

Note: The maximum number of CIs that can be displayed in a single layer of the Topology Map is 900. If a view contains a layer with more than 900 CIs, the view is not displayed in the Topology Map until the hierarchy is changed. However, a layer with more than 900 CIs can be displayed in a table in Text mode.

For details on setting the hierarchy, see "Setting the View Hierarchy" on page 324.

Viewing Related CIs

You can view all the CIs related to a selected CI in the topology map. Select a CI in a view and then select the **Related in View** tab. The topology map displays only the selected CI and its related CIs in the view (no matter where it is in the view hierarchy). Select the **Related in DB** tab to display the selected CI and all of its related CIs in the RTSM.

You can also display Related CIs using the Related CIs Map. For details, see "Related CIs Map" on page 281.

Deleting Relationships

The Topology Map shows only the relationships for the CIs that are part of the current view; however, the same relationships may also be part of other views. When you delete a relationship in IT Universe Manager, it is deleted from the RTSM and from all views.

When a relationship is deleted, the CI on the other end of the relationship may remain in the view, if it still matches the pattern of the view. However, if the deleted relationship is a composition link, the target CI is deleted with it.

In a perspective-based view, you can remove the CI completely from the view (without deleting it from the RTSM), by hiding it from the view in the Perspective-based View Editor in the Modeling Studio.

When you delete a relationship that was created by the DFM process, the relationship is restored the next time that DFM runs (if the relationship is still valid), and it reappears in all relevant pattern views.

It can take a few minutes to delete subtrees, or multiple CIs and relationships, from a view.

Inter-Layer Links

In certain circumstances, IT Universe Manager displays a relationship between CIs in a layer of a view that does not reflect an actual relationship between the CIs in that layer, but rather a relationship between CIs on deeper layers of the view. Such a relationship is known as an **inter-layer link**.

For example, in the following view, two node CIs are related to each other with a dependency link. Each is also related to an IP Subnet by a membership link and the view hierarchy is defined such that the nodes are on the layer beneath the IP Subnet.
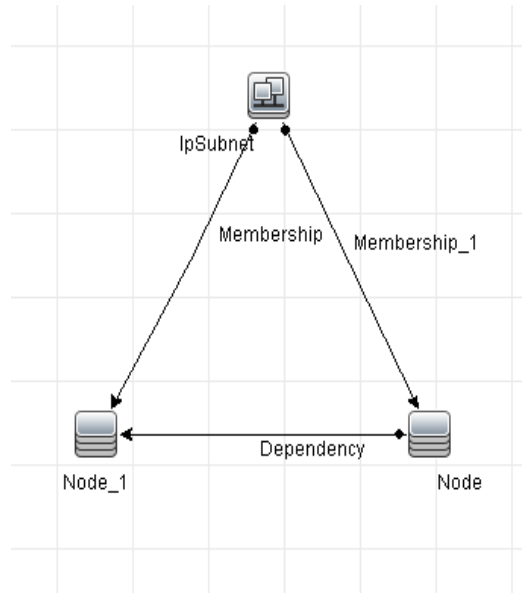
When you consume the view in IT Universe Manager, the link between the node CIs (which are under different IP Subnets) is displayed in the higher layer of the view as a link between the parent IP Subnets, even though the actual relationship only exists between the CIs in the lower layer of the view. You can double-click the link to display the full path between the IP Subnets.

Tasks

Create CIs and Relationships in the RTSM

This task describes how to create related and non-related CIs, as well as relationships between CIs, in the RTSM.

This task includes the following steps:

➤ "Define a New Non-related CI" on page 237

➤ "Define a New Related CI" on page 237

➤ "Attach Existing CIs" on page 237

Define a New Non-related CI

Click the **New CI** button in the toolbar. In the New CI dialog box, select a CI type from the tree and define the properties for the new CI. For details, see "New CI/New Related CI Dialog Box" on page 275.

Define a New Related CI

Click the **New Related CI** button in the toolbar. In the **New Related CI** dialog box, select a CI type from the tree and define the properties for the new CI. On the Relationship page of the dialog box, select the type of relationship and define its properties. For details, see "New CI/New Related CI Dialog Box" on page 275.

Attach Existing CIs

Select a CI in a view. Right-click the CI and select **Relate to CI**. In the Insert Relationship dialog box, select a target CI. On the Relationship page of the dialog box, select the type of relationship and define its properties. For details, see "Insert Relationship Dialog Box" on page 261.

Check Status of Application Discovery (Rediscover a View)

You, the application owner or administrator, need to be kept informed of any problems to your application. So, for example, you need to know that discovery is working correctly and that its current configuration can connect to the application database. This section explains how to run the rediscovery procedure that enables you to check the current status of the discovery of an application.

Note:

➤ Set up and configuration is performed by the HP Business Service Management administrator. For details, see "Prerequisites" on page 238.

➤ Rediscovery is performed by the application owner/administrator. For details, see "Access the View" on page 239.

➤ You do not need any knowledge of Data Flow Management (DFM) to run this procedure.

➤ By default, you can run the rediscovery procedure on views that include less than 10,000 CIs. For details on changing this number, see "Important information" on page 259.

This task includes the following steps:

➤ "Prerequisites" on page 238

➤ "Access the View" on page 239

➤ "View Results in the View" on page 239

➤ "Schedule the Rediscovery" on page 240

1 Prerequisites

Note: This step is performed by the HP Business Service Management administrator.

a In DFM, create a module that contains the jobs that must discover the application. For details, see "Discovery Control Panel – Advanced Mode Workflow" in the *Run-time Service Model Data Flow Management Guide*.

b Activate the module and all the jobs. The jobs must remain activated.

c Verify that the module has run without errors. For details, see "Error Messages Overview" in the *Run-time Service Model Developer Reference Guide* and "Discovery Status Pane" in the *Run-time Service Model Data Flow Management Guide*.

d Correct any errors in the application and confirm that DFM finds no errors during the next run.

Caution: The application owner cannot rediscover a view if DFM is reporting errors. You must set an error-free baseline.

e In the Modeling Studio, define a view that includes the application CI or CIs to be rediscovered. These are the CIs that are created when you activate the jobs that discover the application. For details, see "Create a Pattern View" on page 341.

f Notify the application owner of the name of the view.

2 **Access the View**

Note: This step is performed by the application owner/administrator.

In IT Universe Manager, access the view that includes the application CIs to be rediscovered. For details, see "Search for CIs in Search Mode" on page 153.

3 **View Results in the View**

a **You need to check the complete application**. You click the **Show Discovery and Changes Summary** button in the CI Selector toolbar. The **Show Discovery Status and Changes of View** dialog box is displayed. The dialog box displays information about which jobs and trigger CI discovered the CIs in the view, on the last occasion that DFM ran the discovery for the jobs. For details, see "Discovery and Changes Summary Dialog Box" on page 259.

To run the discovery, click the **Rerun Discovery** button. To view information about the jobs and trigger CIs, use the links to drill down. For details, see "Error Messages Overview" in the *Run-time Service Model Developer Reference Guide*.

   b **You need to check specific components of your application**. You select
   the component's CI in the Topology Map pane and display the
   Discovery tab in the Advanced pane. For details, see "Discovery and
   Changes Summary Dialog Box" on page 259.

   To rediscover several CIs, press CTRL, select the CIs and display the
   Discovery tab.

   To run the discovery, click the **Rerun Discovery** button.

4 Schedule the Rediscovery

You can schedule how often the rediscovery procedure should run. In the
Job Definition window, choose the **Rerun Discovery on View** action. For
details, see "Job Definition Dialog Box" on page 80.

🦴 Retrieve Impact Analysis Results – Scenario

Impact Analysis Manager enables you to create an Impact rule that allows
you to simulate the impact certain infrastructure changes have on your
system. The results of the Impact rule are displayed in IT Universe Manager.
The Impact Analysis results in this task describe how a change in CPU
operation impacts the node to which it is connected.

This task includes the following steps:

➤ "Define an Impact Analysis TQL Query" on page 241

➤ "Define an Impact Rule" on page 241

➤ "Create a View in the Modeling Studio" on page 243

➤ "Get Impact Analysis Results" on page 243

1 Define an Impact Analysis TQL Query

To define an Impact Analysis TQL query, you need to create an Impact rule and then add the TQL query nodes and relationships that define the query.

To create an Impact Analysis TQL query, select **Admin** > **RTSM Administration** > **Modeling** > **Impact Analysis Manager**. For details about how to add query nodes and relationships to a query, see "Add Query Nodes and Relationships to a TQL Query" on page 30.

Example of an Impact Analysis TQL Query:

In this Impact Analysis TQL query, a CPU and a node are linked by a Composition relationship.
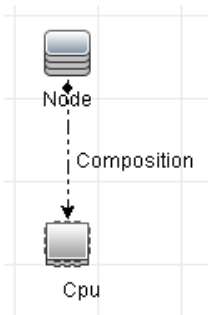
2 Define an Impact Rule

When you define an Impact rule, you must specify the required causal relationship between the query nodes. Define one query node as the trigger, or the query node that represents the changes you want to make to the system, and another query node as the one that is impacted.

Right-click the query node you want to define as the trigger and select **Define Impacted** to open the Impacted Query Nodes dialog box. Select the query node you want the trigger query node to impact. Then click the **Add** button to open the Impact Rules Definition dialog box to set conditions for defining impacted query nodes. For details about how to define an Impact rule, see "Impact Rules Definition Dialog Box" on page 439.

Note: The **change** state option in the Impact rule definition is no longer relevant for Impact Analysis. The only supported state is **operation**.

Example of an Impact Rule:

The Conditions area in the Impact Rules Definition dialog box defines the conditions under which the simulated change in the system is triggered. The Severity area defines the severity of the impact on the impacted query node.

The Impact rule in this example states that when the CPU operation is not in the normal state, the node is impacted. Since the severity is set to 100% of the trigger's severity, the severity of the node is the same as the severity of the CPU, which is determined when Impact Analysis is run.

In the resulting TQL query, an upward arrow appears next to the query node defined as the trigger query node and a downward arrow appears next to the query node defined as the impacted query node.

3 Create a View in the Modeling Studio

Go to the Modeling Studio and create a view matching the TQL query of the Impact rule you defined. For details, see "Pattern View Editor" on page 392.

4 Get Impact Analysis Results

Select **Admin > RTSM Administration > Modeling > IT Universe Manager** and select the required view in the CI Selector. To get Impact Analysis results, you need to run the Impact rule on a CI instance in the topology map that is a trigger. Right-click a trigger CI and select **Run Impact Analysis** to open the Run Impact Analysis dialog box. For details on how to run an Impact rule, see "Run Impact Analysis Dialog Box" on page 282.

Example for Getting Impact Analysis Results:

An Impact Analysis TQL query is created containing a CPU and node connected by a Composition relationship. The CPU query node is defined as the trigger query node and the query node of type node is defined as the impacted query node.

The following Impact rule is defined for the query.

Right-click a CPU CI in the view, and select **Run Impact Analysis** to open the Run Impact Analysis dialog box. Set the trigger severity to a value other than **Normal**.
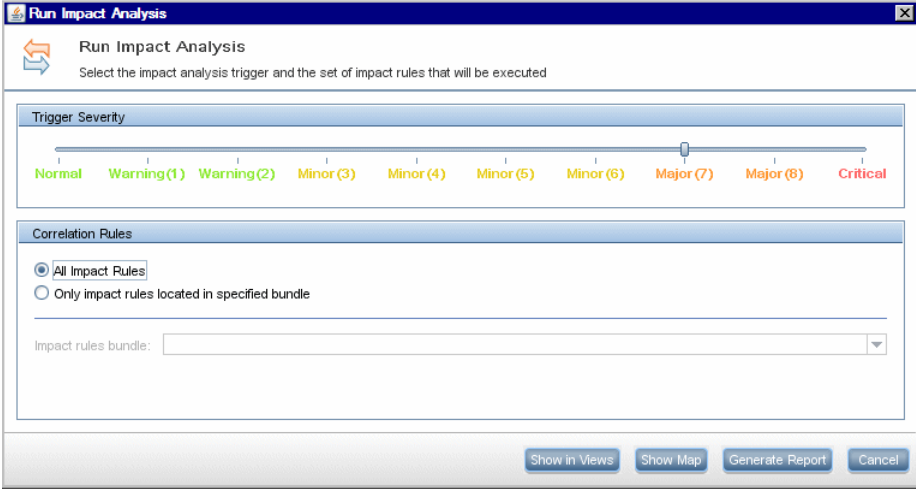
To see results, click one of the following:

➤ **Show in Views**. This assigns a status to all the CIs in the view. Only the node CI connected to the CPU CI (whose severity was changed), becomes impacted. The trigger CI and the impacted CI turn orange because the trigger severity was set as **Major (7)** on the scale in the Run Impact Analysis dialog box, which is assigned an orange color.
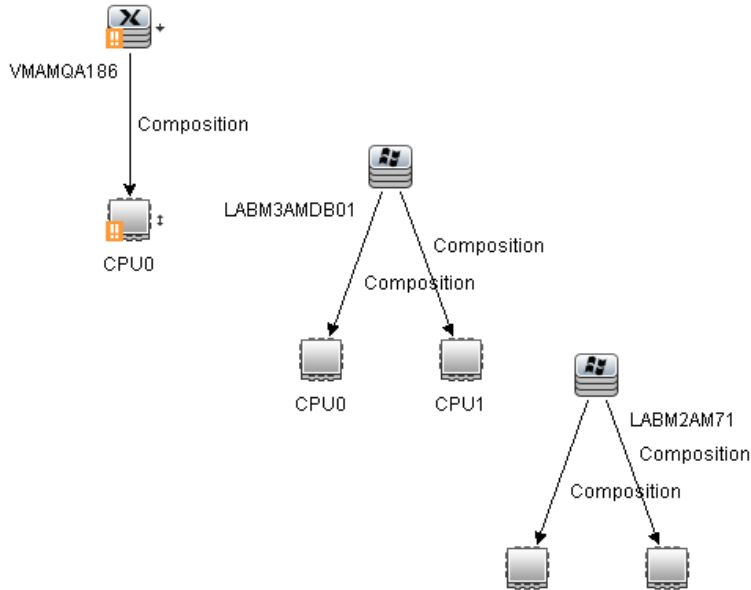
➤ **Show Map**. A map appears in a separate window containing only the trigger CPU CI and the node CI it impacted. The relationship connecting the two CIs contains the name of the Impact rule defined in Impact Analysis Manager.

Note: Optionally, you can create a URL that enables you to embed the map. For details, see "Direct Link Parameters – Impact Map Page" on page 126.
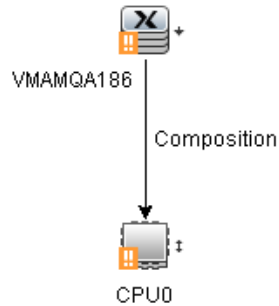
➤ **Generate Report**. Generates an Impact Analysis report that displays a list of CIs that are impacted in the system as a result of the simulated changes. For details, see "Run Impact Analysis Dialog Box" on page 282.

⚓ **Take a Snapshot of a View**

You can take a snapshot of a view in IT Universe Manager, save it, and then compare snapshots of the same view taken at different times using the Compare Snapshots Report. For details on how to take a snapshot of a view, see "Save Snapshot Dialog Box" on page 284. For details on how to view actual differences in the compared views, see "Compare Snapshots Report" on page 302.

⚓ **Print and Save a Topology Map to File**

You can print the content of any topology map and then save it to file. Before printing, it is recommended to define your print settings and arrange the contents of the topology map according to your requirements. For details on how to define print settings, see "Print Setup Dialog Box" on page 195. For details on how to preview the content of the topology map before printing, see "Print Preview Dialog Box" on page 195. For details on how to print the content of a topology map, see "Print Dialog Box" on page 194. For details on how to save a topology map to file, see "Run Impact Analysis Dialog Box" on page 282.

Reference

🔍 IT Universe Manager User Interface

This section includes (in alphabetical order):

✦ Change Timeframe Dialog Box

This dialog box enables you to display changes in the topology map and set the time frame for the changes to display.

To access	Select **Admin > RTSM Administration > Modeling > IT Universe Manager**. Click the **Set Change Timeframe** button 🔘 in the main toolbar or the IT Universe status bar.
Important information	When the change indicators are displayed in the topology map, a message appears in the IT Universe status bar **Change Timeframe is Active**.
	To hide the indicators, open the dialog box and select **Do not display changes**, or select the **Reset Change Timeframe** button 🔘 in the IT Universe status bar.

User interface elements are described below:

UI Elements (A-Z)	Description
Display changes according to the selected timeframe	Select this option to display an indicator next to each CI that was added or changed within the selected period as follows:
	➤ 🏷 Indicator for an added CI
	➤ △ Indicator for a changed CI
	Select a time period from the drop-down list. The changes to the CIs of the view within this period are displayed in the map.
	When the indicators are displayed, you can click the indicator to open the CI History dialog box, which displays the history for the CI over the selected period.
Do not display changes	Select this option to hide the change indicators.

CI/Relationship History Dialog Box

This dialog box displays a list of attributes in which changes have occurred as well as the differences between two configuration files.

To access	➤ In IT Universe Manager, right-click the selected CI or relationship in the CI Selector or the Topology Map and select **CI History**.
	➤ In Data Flow Management, in the **Discovered by [Module or Job Name] CIs** dialog box, right-click a CI and choose **CI History**.

User interface elements are described below:

UI Elements (A-Z)	Description
⟳	Click **Refresh** to refresh the data in the table.
🔍	View the difference between two configuration files. Select two CIs of type **configfile** and click the **Show difference** button to open the Visualdiff report, which displays a comparison of the two files. Text added to the second file appears highlighted in yellow. Text removed from the first file appears highlighted in red. Differences between the files appear highlighted in green.

UI Elements (A-Z)	Description
	Choose the export format for the table data. The available options are: ➤ **Excel.** The table data is formatted as an .xls (Excel) file that can be displayed in a spreadsheet. ➤ **PDF.** The table data is exported in PDF format. ➤ **RTF.** The table data is exported in Rich Text Format. ➤ **CSV.** The table data is formatted as a comma-separated values (CSV) text file that can be displayed in a spreadsheet. **Note:** For the CSV formatted table data to display correctly, the comma (,) must be defined as the list separator. In Windows, to verify or modify the list separator value, open Regional Options from the Control Panel, and on the Numbers tab ensure that the comma is defined as the List Separator value. ➤ **XML.** The table data is formatted as an XML file that can be opened in a text or XML editor. **Tip:** To extract HTML code from the report: ➤ Save the file as HTML ➤ Open the file in an HTML editor ➤ Copy the relevant table into the target file
Attribute	The name of the attribute.
Change Date	The date when the last change occurred.
Filter by	Filter the data in the table by one or more of the following filters: ➤ **Time Range.** Select the time period for which the CI history is displayed. ➤ **Change Type.** Select the type of changes displayed in the table. ➤ **Attribute.** Select the attribute types displayed in the table.
Modified By	Indicates the cause of the change. For example, the field can contain the name of a user or a DFM job.
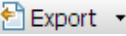
UI Elements (A-Z)	Description
New Value	The new value of the attribute.
Old Value	The previous value of the attribute.

Configuration Item Properties Dialog Box

This dialog box enables you to view and edit basic information for an existing CI or relationship.

To access	Select **Admin > RTSM Administration > Modeling > IT Universe Manager** and use one of the following: ➤ Select a CI in the topology map or the CI Selector. In the Advanced Pane, select the **Properties** tab and click **Edit**. ➤ Right-click a CI in the CI Selector or the Topology map and select **Properties**.
Important information	The Configuration Item Properties dialog box contains two types of properties: ➤ General properties, which include general information about the CI or relationship. These properties are common to all CITs and are documented below. ➤ CIT-specific properties, which include properties specific to that CI. These properties vary according to the type of CI or relationship and are not documented except in the case of TransactionVision Monitor CIs. For details about TV Monitor CIs, see "Transaction Configuration Page, Tracing Tab" in *Using Transaction Management*. When you sort the properties by category, the CIT-specific properties appear at the top of the list and the general properties appear at the bottom. You can view a description of the selected property in the Description Area at the bottom of the dialog box. Click the **Show/Hide Description Area** button to display the Description Area. When accessing the Configuration Item Properties dialog box from within certain applications, the fields are not editable. Mandatory fields are denoted by an asterisk.
See also	"CI Lifecycle and the Aging Mechanism" in the *Run-time Service Model Administration Guide*

User interface elements are described below:

UI Elements (A-Z)	Description
🗄	Click to display the properties by category.
🔡↓	Click to display the properties alphabetically.
ℹ	Toggles between showing and hiding the description area at the bottom of the CI Properties dialog box.
⌄	Click **Expand** to expand the properties tree when the properties are displayed by category.
⌃	Click **Collapse** to collapse the properties tree when the properties are displayed by category.
📄 Export ▾	Choose the export format for the table data. The available options are: ➤ **Excel.** The table data is formatted as an .xls (Excel) file that can be displayed in a spreadsheet. ➤ **PDF.** The table data is exported in PDF format. ➤ **RTF.** The table data is exported in Rich Text Format. ➤ **CSV.** The table data is formatted as a comma-separated values (CSV) text file that can be displayed in a spreadsheet. **Note:** For the CSV formatted table data to display correctly, the comma (,) must be defined as the list separator. In Windows, to verify or modify the list separator value, open Regional Options from the Control Panel, and on the Numbers tab ensure that the comma is defined as the List Separator value. ➤ **XML.** The table data is formatted as an XML file that can be opened in a text or XML editor. **Tip:** To extract HTML code from the report: ➤ Save the file as HTML ➤ Open the file in an HTML editor ➤ Copy the relevant table into the target file

UI Elements (A-Z)	Description
Actual Deletion Period	The number of days after which the CI or relationship is deleted.
Allow CI Update	When selected, this option allows the DFM process to automatically update the CI or relationship properties with information that it discovers. If you change the value of a property supplied by the DFM process, the value is overridden by the discovered value. When this option is cleared, the CI or relationship properties are not overridden by the DFM process.
Apply	Click **Apply** to save the changes made to the CI or relationship properties.
CI Type	The type of the CI or relationship (read-only value). For information about CITs in HP Business Service Management, see "CI Type Manager" on page 447.
Created By	The user name of the administrator who manually created the CI or relationship, where applicable (read-only value).
Create Time	The date and time when the CI or relationship was created.
Deletion Candidate Period	The period after which the CI becomes a candidate for deletion when the aging mechanism is enabled.
Description	A brief description of the CI or relationship.
Display Label	The name of the CI or relationship as it appears in the CI Selector.
Edit	In the Properties tab of the Advanced pane, you can view a CI's properties but you cannot edit them. Click **Edit** to open the Configuration Item Properties dialog box where you can edit the properties.

UI Elements (A-Z)	Description
Enable Aging	If a CI or relationship is not updated or refreshed over a period of time (for example, a CI is not rediscovered by DFM and no manual update occurs), an aging mechanism deletes the CI from the RTSM. For details, see "CI Lifecycle and the Aging Mechanism" in the *Run-time Service Model Administration Guide*. **True**: the aging mechanism is enabled for this CI or relationship. **Default value**: **false**. The default value for DFM CIs is **true**. **Note**: ➤ If the aging mechanism is disabled, this field is ignored. ➤ This field is displayed for certain CIs only.
Global Id	The internal ID of the CI or relationship in the RTSM (read-only value).
Last Access Time	The time that the CI or relationship was last accessed, whether when being updated or being discovered by DFM. This field is only displayed for certain CIs or relationships. This parameter is used by the aging mechanism. For details, see "CI Lifecycle and the Aging Mechanism" in the *Run-time Service Model Administration Guide*.
Last Modified Time	The date and time when the CI or relationship properties were last updated.
Monitored By	Indicates whether the CI is monitored by a SiteScope monitor or an EMS Integration monitor.
Name	The name of the CI or relationship.
Note	Enables you to enter other information about the CI or relationship.
Origin	An ID for the source that automatically created the CI or relationship, or the application where the CI or relationship was created (read-only value).
Reset	Click the **Reset** button to restore the original property settings of the CI or relationship.

UI Elements (A-Z)	Description
Updated by	The user name of the administrator who updated the CI or relationship properties.
User Label	Enables you to define a display label for the CI or relationship. If no value is entered, the CI name appears as the default label.

Shortcut Menu

Menu Item	Description
Copy Property Name	Copies the name of the selected property to the memory.
Copy Property Value	Copies the value of the selected property to the memory.

🔍 Discovery and Changes Summary Dialog Box

This dialog box enables you to find recent changes, for example, to an application, by rediscovering the CIs and jobs in a view.

To access	In IT Universe Manager: ➤ To rediscover all CIs of a view, click the **Show Discovery and Changes Summary** button 📶 in the CI Selector toolbar. The **Discovery and Changes Summary** dialog box is displayed. ➤ To rediscover one CI or several CIs in a view, select the CI and display the Discovery tab in the Advanced pane. To rediscover CIs, you can also select **Operations** > **Show Discovery and Changes Summary**.
Important information	By default, you can run the rediscovery procedure on views that include less than 10,000 CIs. **To increase the number of CIs that you can rediscover in a view:** **1** Access the Infrastructure Settings Manager (**Admin** > **Platform** > **Setup and Maintenance** > **Infrastructure Settings**). **2** Select the **Max CIs in view supported to rediscover** setting in the infrastructure settings table. **3** Click the **Value** column and change the number. **4** Restart the server for the change to take effect. For details on working with the Infrastructure Settings Manager, see "Infrastructure Settings" in *Platform Administration*.
Relevant tasks	"Check Status of Application Discovery (Rediscover a View)" on page 237
See also	"Discovery Status Pane" in *Run-time Service Model Data Flow Management Guide*

User interface elements are described below:

UI Elements (A-Z)	Description
	Click to refresh the status of the selected CIs.
	This button is disabled when there is no data to be reloaded.
	Click to rerun the discovery.
Discovery Progress Status on View	For details, see "Discovery Status Pane" in the *Run-time Service Model Data Flow Management Guide*.
History Changes on View	For details, see "CI/Relationship History Dialog Box" on page 251.

🔍 Insert Relationship Dialog Box

This dialog box enables you to attach CIs to the CI you selected in the CI Selector.

To access	In IT Universe Manager, right-click a CI in the Topology Map or the CI Selector, and select **Relate to CI**.
Important information	To create a relationship between two CIs, select the source CI in the CI Selector or the Topology Map and then select **Relate to CI** from the shortcut menu. On the first page of the dialog box (the CI Selection page), you select the target CI(s). Then click **Relationship**, to select the relationship type on the second page of the dialog box.
	You can also create a relationship between two CIs graphically by clicking the **Create Relationship** button ⬆ in the toolbar and drawing a line between the two CIs. In this case, a smaller version of the Insert Relationship dialog box opens, which contains the following tabs:
	➤ **Select Relationship.** Displays a tree with the available relationship types. Select the required relationship.
	Note: You can double-click the relationship you select to save using the default properties.
	➤ **Relationship Properties.** Displays the properties of the selected relationship. You can edit the properties as described in "Define Relationship Properties Pane" on page 263.
Relevant tasks	"Create CIs and Relationships in the RTSM" on page 236
See also	"CI Selector" on page 159

User interface elements are described below:

UI Elements (A-Z)	Description
➡	Click to add the selected CIs in the left pane to the Target CIs pane.
⬅	Click to remove selected CIs from the Target CIs pane (this does not delete the CIs from the RTSM).

UI Elements (A-Z)	Description
Select target CIs	Select a view to display in the view tree and select CIs to move to the Target CIs pane. For details on the **Select target CIs** pane, see "CI Selector" on page 159.
Source CI	The CI you selected as the source CI.
Target CIs	Displays the CIs you have selected as target CIs for the relationship.

🔍 Relationship Page

This page enables you to define the relationship to be created between the original CI and the CIs selected in the CI Selection page of the dialog box.

To access	Click the Relationship button from the Insert Relationship dialog box.
Important information	When defining multiple relationships, you can define different descriptions and property values for each relationship. Skip the property definitions here and edit each relationship individually after it is created.

User interface elements are described below:

Select Relationship Pane

UI Elements (A-Z)	Description
Direction	Select the direction of the relationship. For some relationship types (for example, **Composition**, or between a group CI and a monitor CI), only one direction is valid.
Relationship	Define the type of relationship created between the original CI and the CIs being attached. Select an option from the list.

UI Elements (A-Z)	Description
Source CI	Displays the name of the CI on the first end of the relationship. This is the CI that you selected in the view.
Target CI	Displays the name of the CI on the second end of the relationship, that is attached to the original CI.

Define Relationship Properties Pane

UI Elements (A-Z)	Description
Actual Deletion Period	The period after which the relationship is deleted when the aging mechanism is enabled.
Allow CI Update	When the value is set to true, the DFM process automatically updates the relationship.
Created By	The user name of the administrator who manually created the relationship, where applicable.
Create Time	The date and time when the relationship was created.
Deletion Candidate Period	The number of days after which the relationship becomes a candidate for deletion.
Description	A detailed description of the relationship.
Destination Network Address	Defined only for route links. Indicates the destination network address to which this route is configured.
Enable Aging	If a CI or relationship is not updated or refreshed over a period of time (for example, a CI is not rediscovered by DFM and no manual update occurs), an aging mechanism deletes the CI from the RTSM. For details, see "CI Lifecycle and the Aging Mechanism" in the *Run-time Service Model Administration Guide*. **True**: the aging mechanism is enabled for this CI or relationship. **Default value**: **false**. The default value for DFM CIs is **true**. **Note**: ➤ If the aging mechanism is disabled, this field is ignored. ➤ This field is only displayed for certain CIs.

UI Elements (A-Z)	Description
Last Access Time	The time that the relationship was last accessed, whether when being updated or being discovered by DFM. This field is displayed only for certain CIs. This parameter is used by the aging mechanism. For details, see "CI Lifecycle and the Aging Mechanism" in the *Run-time Service Model Administration Guide*.
Last Modified Time	The date and time when the relationship properties were last updated.
Must	When the value is set to true, the child CI is dominant when the percentage rule is used to calculate status for the parent CI. If the CI has low status, the parent must take the child CI status, if necessary overriding the percentage rule calculation. This is useful to give emphasis to an important CI. For example, you might want to define **Must** for a database CI, so that status is **critical** all the way up the subtree if the database falls, regardless of the status of the other CIs in the subtree. The must status defined for a relationship applies for that relationship only – it is not used in any other relationships of the child CI. For details, see "Understanding the Percentage Rule" in *Using Service Health*.
Name	A brief description of the relationship. If no value is entered, the relationship type is used in place of the name.
Note	Enables you to enter other information about the relationship.
Origin	An ID for the source that automatically created the relationship, or the application where the relationship was created.
Updated By	The user name of the administrator who updated the CI properties.

UI Elements (A-Z)	Description
User Label	Enables you to define a display label for the relationship. If no value is entered, the relationship name appears as the default label.
Weight	When a weight value is entered, the child CI is given more weight in percentage calculations, when percentage rule is used to calculate status for the parent CI. For example, if a child CI is given a weight of 3, then it has three times more impact on the parent status calculation than its unweighted siblings.
	The weight defined for a relationship applies for that relationship only – it is not used in any other relationships the child CI may have. For more details, see "Understanding the Percentage Rule" in *Using Service Health*.

🔍 IT Universe Manager Page

This page enables you to define and manage the CIs and relationships in your views.

To access	Select **Admin > RTSM Administration > Modeling > IT Universe Manager**.
Important information	The IT Universe Manager page contains the following panes:
	➤ **CI Selector.** Displays the CIs of a selected view. You can select the view from a drop–down list or search for a specific CI. For details, see "CI Selector" on page 159.
	➤ **Topology Map**. Displays the CIs of a selected view in Map mode or Text mode.
	➤ **Advanced Pane.** Displays properties, history, and discovery for the selected CI or view.
	In IT Universe Manager, you can create new CIs, modify existing CIs, or delete CIs. All of these actions have a direct effect on the entire IT Universe model. For example, if you delete a CI in your view, that CI is deleted from the IT Universe model and no longer appears in any view.

Topology Map

This area displays the CIs of the currently selected view in graphical or table format. By default, the CIs are displayed in graphical format.

To access	Select **Admin** > **RTSM Administration** > **Modeling** > **IT Universe Manager**.
Important information	When you select a CI in the CI Selector or the Topology Map, the Configuration Items drop-down in the Main Menu becomes active. The options available under that drop-down are the same as those available by right-clicking the CI.
	You can customize the Topology Map shortcut menu to include other commands (for example, ping, run a program, open a URL) from within CI Type Manager. For details, see "Create Configuration Item Type/Relationship/Calculated Relationship Wizard" on page 468.
	Note: For grouped CIs and the relationships between them, not all of the shortcut menu options are active. Grouped CIs appear in parentheses in the CI Selector and in the Topology Map. You can double-click a link to a grouped CI to open the Link Map, which displays the individual CIs and relationships. Right-click a CI or relationship in the Link Map to display the regular shortcut menu. For details about grouping CIs, see "Query Node Grouping Dialog Box" on page 403.
See also	"Working with Topology Map" on page 171

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

UI Elements (A-Z)	Description
Show CI instances of: Network ▾	Specify the CIT you want displayed in the table. The table also includes the children of the selected CIT. **Note:** This option is displayed in Text mode only.
<Breadcrumbs>	At the top of the topology map, the breadcrumbs indicate the relevant query nodes in each layer of the view for the path to the selected layer. The first item in the path is the **Top Layer**. When you select a CI from the layer below, the parent CI forms the next item in the breadcrumb path. You can click on any item in the path to display that layer in the topology map.
<CI type attributes>	The columns appearing in Text mode represent the CIT attributes of the selected CIs.
<IT Universe Status Bar>	The status bar below the topology map indicates the status of the following processes: ➤ if Impact Analysis is active or not ➤ if Change Timeframe is active or not ➤ if Candidates for Deletion are shown or not ➤ the time of the last update of the data

UI Elements (A-Z)	Description
<Legend>	Indicates the icons displayed next to CIs with any of the following special statuses: ➤ **Added.** When Change Timeframe is active, indicates that the CI was added. ➤ **Impacted.** When Impact Analysis is active, indicates an impacted CI. ➤ **Impacted and Trigger.** When Impact Analysis is active, indicates a trigger CI that is impacted. ➤ **Candidate for Deletion.** Indicates that the CI is a candidate for deletion. ➤ **Changed.** When Change Timeframe is active, indicates that the CI was changed. ➤ **Note.** Indicates that a note was added for the CI. ➤ **Trigger.** When Impact Analysis is active, indicates a trigger CI.
<Main Menu>	For details, see "Main Menu" on page 193.
<Query Node>	The query nodes in the topology map represent CIs. Hold the pointer over a query node to display its tooltip which describes the type of the CI.
<Relationship>	The links in the topology map represent relationships. Hold the pointer over a relationship to display its tooltip, which describes the type of the relationship. **Note:** When you select a calculated relationship, the Delete ✖ button in the toolbar is disabled.
<Toolbar>	For details, see "Toolbar Options" on page 197. **Note:** When accessing the Topology map via direct links, the toolbar includes options from the Related CIs Map. For details, see "Related CIs Map" on page 281.
<Topology Map Sidebar>	For details, see "Topology Map Sidebar" on page 205.

UI Elements (A-Z)	Description
Get Related CIs	Click to redraw the topology map to display the CIs related to the selected CI. The topology map is redrawn according to the selections in Select Options. **Note:** This option appears in the Get Related CIs toolbar, which is only relevant when the Related in View or Related in DB tabs are selected. Click the Get Related CIs button 🔍 to display the toolbar.
Map	Click **Map** to display the selected layer of CIs in topology map format. **Note:** If the selected layer of the view is too large to display in topology map format, a message appears with a link to display the layer in text format.
Related in DB	Click the **Related in DB** tab to display the interdependencies of the selected CI within the entire RTSM.
Related in View	Click the **Related in View** tab to display the interdependencies of the selected CI within the current view.
Select options	Select the required state for each of the following options: ➤ **Filter related CIs.** When this option is selected, Get Related CIs opens the Filter Related CIs dialog box before displaying the related CIs. When it is not selected, Get Related CIs automatically displays all related CIs. ➤ **Clear before execution.** When this option is selected, Get Related CIs clears the current content of the topology map before displaying the related CIs. When it is not selected, it adds the related CIs to the current topology map. **Note:** This option appears in the Get Related CIs toolbar, which is only relevant when the Related in View or Related in DB tabs are selected. Click the Get Related CIs button 🔍 to display the toolbar.

UI Elements (A-Z)	Description
Select scope	Indicates the selected mode of the topology map: ➤ 👓 Related in View mode. ➤ 🔶 Related in DB mode. **Note:** This option appears in the Get Related CIs toolbar, which is only relevant when the Related in View or Related in DB tabs are selected. Click the Get Related CIs button 🔍 to display the toolbar.
Text	Click **Text** to display the attribute properties of the CIs in the selected layer in table format. For details on some of the toolbar icons in Text Mode, see "Element Instances Dialog Box" on page 75.
View Results	Click the **View Results** tab to display an entire layer within a view.

IT Universe Manager Shortcut Menu

The IT Universe Manager page includes the following elements (listed alphabetically) available by right-clicking a CI or relationship in the CI Selector pane or the Topology Map:

Menu Item	Description
Actions	Select one of the following options:
	➤ **Add CI to Discovery Job**. Displays the Add CI to Discovery Job dialog box, which enables you to manually invoke a DFM job for the selected CI. You can use this option to discover additional information about the CI through one of the available DFM jobs.
	➤ **Remove CI from Discovery Job**. Displays the Remove CI from Discovery Job dialog box, which enables you to manually remove a CI from the DFM job.
	➤ **Open Credentials Information.** Displays the Protocol Parameters dialog box, which enables you to enter credentials for the selected CI. This option is only relevant for CIs that require credentials to be viewed. For details, see "Domain Credential References" in the *Run-time Service Model Data Flow Management Guide*.
	➤ **Show Discovery status.** Opens the Discovery Status dialog box for the selected CI.
CI/Relationship History	Displays the CI History dialog box. For details, see "CI/Relationship History Dialog Box" on page 251.
Compare CIs Report	Run a Compare CIs Report for the selected CI. For details, see "Compare CIs Report" on page 537.
Delete from CMDB	Enables you to delete the selected CI or relationship from the view and from the RTSM.
	Note: When you delete a parent CI, the selected CI and its children are removed from the view, but only the selected CI is removed from the database.

Menu Item	Description
Get Related CIs	The following options are available: ➤ **From View.** Opens the Related CIs in View Map. ➤ **From Database without Filter.** Opens the Related CIs in Database without Filter Map. ➤ **From Database with Filter.** Opens a dialog box that displays the number of related CIs by type. Select the CI type you want to display in the Related CIs Map and click **OK**.
Label	Select one of the following options: ➤ **Edit Label.** Opens the Edit Label dialog box which enables you to edit the name of the CI. ➤ **Restore Default Label.** Resets the CI name to its default value from the RTSM.
Note	Select one of the following options: ➤ **Add Note.** Opens an editing box where you can add a note to the CI. ➤ **Delete Note.** Deletes all text saved in a note for the selected CI.
Properties	Displays the Properties page for the selected CI or relationship. For details, see "Configuration Item Properties Dialog Box" on page 254.
Relate to CI	Opens the Insert Relationship dialog box. For details, see "Insert Relationship Dialog Box" on page 261.
Run Impact Analysis	Enables you to run the Impact rule you defined in the Impact Analysis Manager. Displays the Run Impact Analysis dialog box. For details, see "Impact Analysis Manager" on page 421. **Note**: You can only see Impact Analysis results if you defined an Impact rule for that view in Impact Analysis Manager.
Show Compound Path	Appears only for compound relationships. Displays the Link Map for the selected relationship, which shows the CIs involved in the compound relationship.

Menu Item	Description
Show Impact	Enables you to select a CI that is defined by an Impact rule as a root cause CI, and to display all the CIs that are impacted by it, and their statuses, in a separate window.
	This option appears only after the following has occurred:
	➤ You defined an Impact rule for the selected view in Impact Analysis Manager (for details, see "Impact Analysis Manager" on page 421).
	➤ You clicked **Show in Views** in the Run Impact Analysis dialog box.
	➤ Impact Analysis results appear in the Topology Map.
	For example, suppose an Impact rule is defined (for an **IP Address** CI) that specifies that the rule impacts nodes, ports, and client-servers linked to the IP Address.
	By using the **Show Impact** option, you can display all CIs that are impacted by the **IP Address** CI.
Show Root Cause	This option enables you to retrieve root cause information for CIs that are impacted by a chain of Impact rules. The output of Show Root Cause displays a logical map that describes a chain of trigger/impacted CITs that impact the CI.
	The root cause CI is displayed in a separate window. If only one Impact rule is defined for this CI, the Impact Analysis window is directly displayed.
	This option appears only after the following has occurred:
	➤ You defined an Impact rule for the selected view in the Impact Analysis Manager (for details see, "Impact Analysis Manager" on page 421).
	➤ You clicked **Show in Views** in the Run Impact Analysis dialog box.
	➤ Impact Analysis results appear in the Topology Map.
	A window is displayed containing the root cause CI and all the other CITs in the Impact rule chain.
	To view the information about specific CIs that are triggered or impacted by the Impact rule, double-click the relationship connecting the CIs. A map is displayed.

Advanced Pane

User interface elements are described below:

UI Elements (A-Z)	Description
Discovery tab	Displays the DFM run status for the selected CIs. For details, see "Discovery and Changes Summary Dialog Box" on page 259 and "Discovery Status Pane" in the *Run-time Service Model Data Flow Management Guide*.
History tab	Displays the history for the selected CI. For details, see "CI/Relationship History Dialog Box" on page 251.
Properties tab	Displays the selected CI's properties (the same properties that appear in the Configuration Item Properties dialog box). You can view the properties in the properties tab, but you must open the dialog box to edit the properties. For details, see "Configuration Item Properties Dialog Box" on page 254.

New CI/New Related CI Dialog Box

This dialog box enables you to define a new CI or a new related CI.

To access	In IT Universe Manager, click the **New CI** icon 🐯 in the toolbar to create a non-related CI. Select a CI in the topology map and click the **New Related CI** icon 🐯 to create a related CI.
Important information	To define a new CI, select the CI type from the tree at the top of the dialog box. The CI types in the tree that are available to be instantiated appear in black. The CI types in faded text cannot be instantiated.
	Edit the properties in the Define new CI properties area. The table below includes the properties which are common to all CIs. In addition, there are other properties specific to each CI.
	If you are creating a related CI, click the **Relationship** button to go to the relationship mode of the dialog box. Select a relationship and edit its properties.

Relevant tasks	"Create CIs and Relationships in the RTSM" on page 236
See also	➤ "CI Selector" on page 159
	➤ "CI Lifecycle and the Aging Mechanism" in the *Run-time Service Model Administration Guide*

User interface elements are described below:

UI Elements (A-Z)	Description
Actual Deletion Period	The period after which the CI is deleted when the aging mechanism is enabled.
Allow CI Update	When the value is set to true, this option enables the DFM process to automatically update the CI properties with information that it discovers. If you change the value of a property supplied by the DFM process, the value is overridden by the discovered value.
	When the value is set to false, the CI properties are not overridden by the DFM process.
Created By	The user name of the administrator who manually created the CI, where applicable.
Create Time	The date and time when the CI was created.
Deletion Candidate Period	The period after which the CI becomes a candidate for deletion when the aging mechanism is enabled.
Description	A description of the CI.
Display Label	The label that appears for the CI in the topology map.

UI Elements (A-Z)	Description
Enable Aging	If a CI or relationship is not updated or refreshed over a period of time (for example, a CI is not rediscovered by DFM and no manual update occurs), an aging mechanism deletes the CI from the RTSM. For details, see "CI Lifecycle and the Aging Mechanism" in the *Run-time Service Model Administration Guide*.
	True: the aging mechanism is enabled for this CI or relationship.
	Default value: **false**. The default value for DFM CIs is **true**.
	Note:
	➤ If the aging mechanism is disabled, this field is ignored.
	➤ This field is displayed for certain CIs only.
Last Access Time	The time that the CI was last accessed, whether when being updated or being discovered by DFM. This field is displayed only for certain CIs.
	This parameter is used by the aging mechanism. For details, see "CI Lifecycle and the Aging Mechanism" in the *Run-time Service Model Administration Guide*.
Last Modified Time	The date and time when the CI properties were last updated.
Name	The name of the CI.
Note	Enables you to enter other information about the CI.
Origin	An ID for the source that automatically created the CI, or the application where the CI was created.
Relationship	For a related CI, click **Relationship** to go to the relationship mode of the dialog box.
Select CI Type	Enables you to select the CI type from the tree for the new CI. The CI types that are available for the selected CI or view appear active in the CI type tree. The other CI types appear in faded text and cannot be selected.
	To limit the CI type tree to CI types from the current view, select **CI Types from the current view** on the right. To display all CI types in the tree, select **All CI Types**.

UI Elements (A-Z)	Description
Updated By	The user name of the administrator who updated the CI properties.
User Label	Enables you to define a display label for the CI. If no value is entered, the CI name appears as the default label.

Relationship Dialog Box

This page enables you to define the relationship between the new CI and the CI selected in the view, as well as the properties of the relationship.

To access	Click the Relationship button from the New Related CI dialog box.
Important information	This page only appears for new related CIs.

User interface elements are described below:

UI Elements (A-Z)	Description
Allow CI Update	When the value is set to true, the DFM process automatically updates the relationship.
CI Definition	Click **CI Definition** to return to the CI properties mode of the dialog box.
Created By	The user name of the administrator who manually created the relationship, where applicable.
Create Time	The date and time when the relationship was created.
Description	A description of the relationship.
Direction	Select the relationship direction from the drop-down box.

UI Elements (A-Z)	Description
Enable Aging	If a CI or relationship is not updated or refreshed over a period of time (for example, a CI is not rediscovered by DFM and no manual update occurs), an aging mechanism deletes the CI from the RTSM. For details, see "CI Lifecycle and the Aging Mechanism" in the *Run-time Service Model Administration Guide*. **True**: the aging mechanism is enabled for this CI or relationship. **Default value**: **false**. The default value for DFM CIs is **true**. **Note**: ➤ If the aging mechanism is disabled, this field is ignored. ➤ This field is displayed for certain CIs only.
Last Access Time	The time that the relationship was last accessed, whether when being updated or being discovered by DFM. This field is only displayed for certain relationships. This parameter is used by the aging mechanism. For details, see "CI Lifecycle and the Aging Mechanism" in the *Run-time Service Model Administration Guide*.
Must	When the value is set to true, the child CI is dominant when the percentage rule is used to calculate status for the parent CI. If the CI has low status, the parent must take the child CI status, overriding the percentage rule calculation if necessary. This is useful to give emphasis to an important CI. For example, you might want to define **Must** for a database CI, so that status is critical all the way up the subtree if the database falls, regardless of the status of the other CIs in the subtree. The Must status defined for a relationship applies to that relationship only – it is not used in any other relationships of the child CI.
Name	The name of the CI.
Network Address	Defined only for route links. Indicates the destination network address to which this route is configured.
Note	Enables you to enter other information about the CI.

UI Elements (A-Z)	Description
Origin	An ID for the source that automatically created the relationship, or the application where the relationship was created.
Relationship	Enables you to define the type of relationship that is created between the two CIs.
Source CI	The name of the CI on the first side of the relationship. This is the CI that you selected in the view.
Target CI	The name of the CI on the second side of the relationship. This is the new CI that you are creating.
Updated By	The user name of the administrator who updated the relationship properties.
Update Time	The date and time when the CI properties were last updated.
User Label	Enables you to define a display label for the relationship.
Weight	When a weight value is entered, the child CI is given more weight in percentage calculations, when the percentage rule is used to calculate status for the parent CI. For example, if a child CI is given a weight of 3, then it has three times more impact on the parent status calculation than its unweighted siblings. The weight defined for a relationship applies to that relationship only – it is not used in any other relationships of the child CI.

🔍 Related CIs Map

This dialog box enables you to view the CIs related to a specified CI in the view or the RTSM in map or table format.

To access	In IT Universe Manager, right-click the required CI and select **Get Related CIs** > **From View** or **From Database with Filter** or **From Database without Filter**.
Important information	When you select **From View**, the Related CIs Map displays related CIs in the current view. When you select **From Database without Filter**, the Related CIs Map displays related CIs in the RTSM. When you select **From Database with Filter**, you first select the CI types you want to see in the map, which then displays related CIs of those types in the RTSM.
	For details on the Related CIs map toolbar, sidebar, legend, and shortcut menu, see "IT Universe Manager Page" on page 266.
	The related CIs can be viewed in map mode or in text mode. The text mode format of the map includes the icons found in the Element Instances dialog box. For details, see "Element Instances Dialog Box" on page 75.

Run Impact Analysis Dialog Box

This dialog box enables you to run the Impact rule you defined in Impact Analysis Manager for that view.

To access	Select **Admin > RTSM Administration > Modeling > IT Universe Manager**. Right-click a trigger query node in the Topology Map and select **Run Impact Analysis** or click the **Run Impact Analysis Now** button ▷ in the IT Universe status bar.
Important information	You can: ➤ Display in a new window all the CIs that are impacted by the trigger CI. The relationships in the map represent the Impact rules. The name of the relationship is the name of the Impact rule you defined in the Impact Analysis Manager. For details, see "Show Map" on page 284. ➤ Simulate how the statuses of the impacted CIs are impacted. For details, see "Show in Views" on page 283. ➤ Generate a report that displays a list of CIs that are impacted in the system as a result of the simulated changes. For details, see "Generate Report" on page 283. **Note:** This dialog only appears if an Impact rule is defined for that view. For details, see "Impact Analysis Manager" on page 421.
Relevant tasks	"Retrieve Impact Analysis Results – Scenario" on page 240

User interface elements are described below:

UI Elements (A-Z)	Description
All Impact rules	Select to execute all impact rules in the impact analysis.
Impact rules bundle	Select the bundle containing the required impact rules for the impact analysis.

UI Elements (A-Z)	Description
Generate Report	Generates an Impact Analysis report, which displays information that is divided as follows: ➤ **Grouping by CIT**. All the impacted CIs (the CIs that are impacted in the system as a result of the simulated changes), sorted by CIT. ➤ **Affected Application**. All the impacted CIs that belong to a specific business service. ➤ **Triggered CIs**. The CIs that represent the changes you want to make to the system. For details on the Impact Analysis report, see "Impact Analysis Report" on page 307.
Only Impact rules located in specified bundle	Select to execute the impact rules from the specified bundle in the impact analysis.
Show in Views	Simulates how the statuses of the impacted CIs are impacted for the selected state. The Topology Map displays the statuses of the trigger CIs as well as all statuses of the CIs that are impacted by it. The Topology Map also displays the Impact Analysis indicators: ➤ A trigger CI is marked by this ⬆ indicator. ➤ A CI that is both an impacted and a trigger CI is marked by this ⬍ indicator. ➤ An impacted CI is marked by this ⬇ indicator. **Note:** The statuses that appear here and the colors that represent each status are defined in the severity list for that state in the System Type Manager. For details, see "Create/Update List/Enumeration Definition Dialog Box" on page 484.

UI Elements (A-Z)	Description
Show Map	Enables you to select an Impact rule, and then display in a new window, a simulation of all the CIs that are impacted by the trigger CI for the selected state. If only one Impact rule is defined for this CI, the Impact Rules window is displayed directly. For more details, see "Show Impact Pane" on page 285.
	The relationships in the map represent the Impact rules and the name of the relationship is the name of the Impact rule you defined in the Impact Analysis Manager.
	Note: **Show Map** enables you to view the results of multiple triggers.
Trigger Severity	Select the required severity on the scale.
	Note: The severity scale was defined for the state in the System Type Manager. For details, see "System Type Manager" on page 450.
	For example, you can create an Impact rule in the Impact Analysis Manager that defines the severity of the trigger query node as other than **Warning (1)**. If you select a severity other than **Warning (1)**, for example, **Minor (3)**, the condition is met and the simulated changes in the system are triggered.
	For details, see the "Impact Rules Definition Dialog Box" on page 439.

Save Snapshot Dialog Box

This dialog box enables you to take a snapshot of a view and save it.

To access	In IT Universe Manager, click the **Snapshot** button 🖫 in the CI Selector and select **Save Snapshot**.
Important information	You can compare snapshots of the same view taken at different times using the Compare Snapshots Report. For details, see "Compare Snapshots Report" on page 302.
Relevant tasks	"Take a Snapshot of a View" on page 248

User interface elements are described below:

UI Elements (A-Z)	Description
Description	A description of the snapshot (optional).
Note	A note about the snapshot (optional).
View Name	The name of the view as it appears in the CI Selector. This field cannot be edited.

🔍 Show Impact Pane

This page opens a window that displays the statuses of the trigger CI as well as all statuses of the CIs that are impacted by it.

To access	In the Run Impact Analysis Dialog box, click **Show Map**.
	If Impact Analysis is already active, click on the **Impact Analysis Is Active** link in the IT Universe status bar.
Important information	The following tabs are available:
	➤ **Impact Results.** Displays a map of all CIs impacted by the selected CI.
	➤ **Trigger CIs.** Displays a table of information on the selected trigger CIs.
	You can only see Impact Analysis results if you defined an Impact rule for that view in Impact Analysis Manager. For details, see "Impact Analysis Manager" on page 421.
	To view information about specific CIs that are triggered or impacted by the Impact rule, double-click the relationship connecting the CIs. A map is displayed.
	The relationships in the map represent the Impact rules. The name of the relationship is the name of the Impact rule you defined in the Impact Analysis Manager.
Relevant tasks	"Retrieve Impact Analysis Results – Scenario" on page 240

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

UI Elements (A-Z)	Description
<Legend>	Indicates the icons displayed next to CIs with any of the following special statuses: ➤ **Added.** When Change Timeframe is active, indicates that the CI was added. ➤ **Impacted.** When Impact Analysis is active, indicates an impacted CI. ➤ **Impacted and Trigger.** When Impact Analysis is active, indicates a trigger CI that is impacted. ➤ **Candidate for Deletion.** Indicates that the CI is a candidate for deletion. ➤ **Changed.** When Change Timeframe is active, indicates that the CI was changed. ➤ **Note.** Indicates that a note was added for the CI. ➤ **Trigger.** When Impact Analysis is active, indicates a trigger CI.
<Relationship>	The relationships represent the Impact rule you defined in the Impact Analysis Manager. For details, see "Impact Rules Definition Dialog Box" on page 439.
<The statuses and the colors that represent each one>	The statuses that appear and the colors that represent each status are the ones that are defined in the severity list for that state in the System Type Manager. For details, see "Create/Update List/Enumeration Definition Dialog Box" on page 484.
<Toolbar>	The Show Impact pane toolbar contains most of the buttons in the IT Universe Manager toolbar.
<Topology Map Sidebar>	For details, see "Topology Map Sidebar" on page 205.

9

Reports

This chapter includes:

Concepts

➤ Topology Reports Overview on page 288

Tasks

➤ Compare CIs on page 289

➤ Compare Snapshots on page 291

Reference

➤ Cron Expressions on page 293

➤ Reports User Interface on page 294

Concepts

🍀 Topology Reports Overview

Topology reports provide a method of displaying the data from views in a report format. Every view defined in the Modeling Studio has a corresponding topology report. The report settings are defined in the view definition in Report mode in the Pattern View Editor. For details, see "Pattern View Editor" on page 392.

For details on selecting the CIs to be displayed in a view, see "Working with the CI Selector" on page 151.

Templates and perspectives do not have topology reports. However, template-based views do have topology reports. The reports settings for such views are based on the settings defined in the base template or perspective.

Several additional reports are available in IT Universe Manager, including Asset Report, Compare CIs Report, Compare Snapshots Report, and Impact Analysis Report.

Tasks

⚓ Compare CIs

This task explains how to compare the hierarchies of two compound CIs, view a CI's configuration file, and show the difference between two configuration files.

1 Select the Required CIs

In IT Universe Manager, select the two CIs you want to compare. The hierarchies of the two compound CIs are compared in the Compare CIs report (for details, see "Compare CIs Report" on page 297). You can choose to compare two CIs that appear in a selected view, or in the RTSM. For details, see "CI Selector" on page 159.

Example of Nonmatching CIs:

The following example displays the following:

The **No Matching CI** icon next to the CI **LABM3QCRNDDB03** because it has no corresponding CI on the other side.

The **Show Different Attribute Values** icon is displayed next to the **MemorySize** properties for the CIs **LABM3QCRNDDB02** and **LABM3ASTDB01** since they have different **MemorySize** values.

2 View a CI's Configuration File

Select a CI of the CIT **Configuration File** and view the configuration file. For details, see "Compare CIs Report" on page 297.

3 Show the Difference Between Two Configuration Files

Select two CIs of the CIT **Configuration File** and view the difference between the two configuration files. For details, see "Compare CIs Report" on page 297.

Compare Snapshots

This task describes how to take a snapshot of a view, and then compare two snapshots of a specific view taken at different times.

1 Take a Snapshot of a View

In IT Universe Manager, click the **Snapshot** button and select **Save Snapshot** to take a snapshot of a view and save it. For details, see the "Save Snapshot Dialog Box" on page 284.

2 Save Snapshots on a Periodic Basis

Optionally, you can schedule snapshots to be taken of a certain view at specific times by defining a task. For details, see "Schedule Job Dialog Box" on page 311.

3 Compare Snapshots

Compare the snapshots of a view taken at different times. Click the **Snapshot** button and select **Compare snapshots**. For details, see "Compare Snapshots Report" on page 302.

Example of Snapshots of a View Taken at Different Times:

In the following example, the **Deleted Item** icon next to the **192.168.163.0** CI in the right pane, indicates that the CI has been deleted in the newer view.

Reference

📌 Cron Expressions

A Cron Expression is a string composed of six or seven fields separated by white space. Six of the fields are mandatory, and one is optional.

The following table contains the fields used in a Cron Expression.

Field Name	Allowed Values	Allowed Special Characters
Seconds	0-59	, - * /
Minutes	0-59	, - * /
Hours	0-23	, - * /
Day of month	1-31	, - * ? / L W C
Month	1-12 or JAN-DEC	, - * /
Day of week	1-7 or SUN-SAT	, - * ? / L C #
Year (optional)	empty, 1970-2099	, - * /

The following table contains examples of how to use Cron expressions.

Cron Expression	Meaning
0 0 12 * * ?	The task runs every Wednesday at 12:00 PM.
0 15 10 ? * *	The task runs at 10:15 AM every day.
0 15 10 * * ? 2005	The task runs at 10:15 AM every day during the year 2005.
0 0/5 14 * * ?	The task runs every 5 minutes starting at 2 PM and ending at 2:55 PM, every day.
0 15 10 15 * ?	The task runs at 10:15 AM on the 15th day of every month.

Cron Expression	Meaning
0 15 10 ? * 6L	The task runs at 10:15 AM on the last Friday of every month.
0 15 10 ? * 6#3	The task run at 10:15 AM on the third Friday of every month.

For more details about Cron expressions, go to
http://confluence.zutubi.com/display/pulse0101/Project+Cron+Triggers
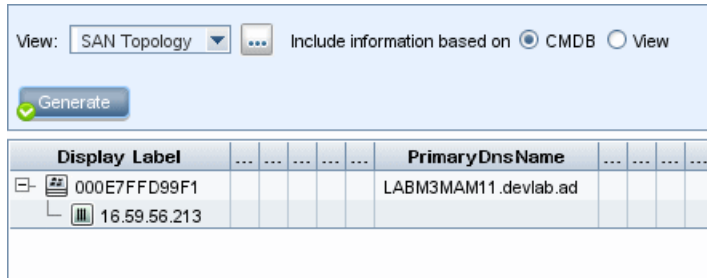
🔍 Reports User Interface

This section includes (in alphabetical order):

✎ Asset Report

This report displays a list of all the CIs in a specified view, their attribute values, as well as their child CIs in the RTSM. You use Asset reports to view and analyze the contents of the view and focus on the data that is of interest to you. For example, an Asset report can display a list of all the servers that are part of a specific application contained in the view.

To access	Select **Admin** > **RTSM Administration** > **Modeling** > **IT Universe Manager** and click the **Asset Report** 📄 button.
Important information	The report contains only the attributes whose **Asset Data** check box was selected in the **Attributes** tab in the CI Type Manager. For more details, see "Add/Edit Attribute Dialog Box" on page 460.

User interface elements are described below (unlabeled elements are shown in angle brackets):
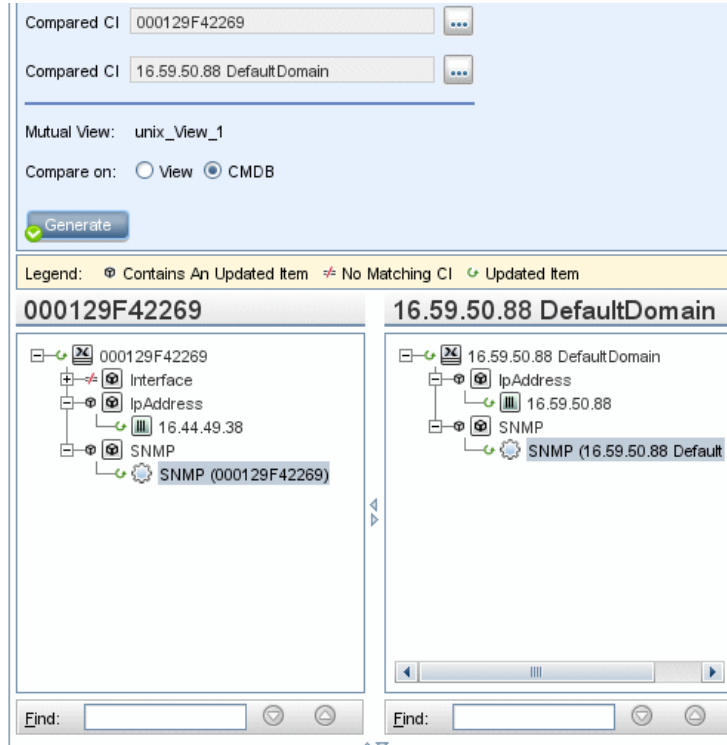
UI Elements (A-Z)	Description
<Toolbar>	For details, see "Toolbar Options" on page 313.
<Shortcut menu>	For details, see "IT Universe Manager Shortcut Menu" on page 272.

UI Elements (A-Z)	Description
Include information based on	Select one of the following: ➤ **CMDB.** Includes information from the selected view as well as information about the child CIs and their attribute values in the RTSM. By choosing this option, the report includes CIs that are connected by the **Container** qualifier to the CIs in selected view. For example, the report would include the CPU and memory of a server that is contained in the view. ➤ **View.** Includes only information about the CIs and their attributes that are contained in the selected view.
View	Enables you to select a view by opening the View Selector. For details, see "CI Selector" on page 159. **Note:** When you generate an Asset report from a specific view, the report retains the same hierarchical structure as the relevant view in the Topology Map.

✎ Compare CIs Report

This report enables you to compare the hierarchies of two compound CIs. A compound CI is a CI that is linked to another CI by a relationship with CONTAINER qualifier. You can display the compared CIs and their child CIs that appear in a selected view, or in the RTSM.

To access	➤ Select **Admin** > **RTSM Administration** > **Modeling** > **IT Universe Manager**. Right-click a CI in the Topology Map and select **Compare CIs Report**.

Important information	➤ The Compare CIs page is divided into two panes. Each side displays a hierarchical tree structure of the CIs you selected. When you select a CI on one side, the corresponding CI on the other side is automatically selected, provided **Synchronize Selection** is pressed. ➤ You can compare only two CIs of the same CI type or one of the CI type's children in the hierarchy.
Relevant tasks	➤ "Compare CIs" on page 289

User interface elements are described below:

UI Elements (A-Z)	Description
	Finds the previous occurrence of an item marked as changed.
	Finds the next occurrence of an item marked as changed.
	Show Configuration Files Differences. Shows the difference between the content of the two configuration files. Configuration files use the **.xml**, **.txt** or **.ini** extensions. Select a CI of the CIT **Configuration File** in both panes and click the **Show Differences** button. A window opens displaying the differences (marked in blue) in the configuration files.
	Show Only Different CIs in Tree. In the <Properties panes>, displays only the part of the tree structure containing CIs that do not match.
	Show Only Different Attribute Values. In the <Properties panes>, toggles between displaying all the comparable attribute values of the selected CI or only the attribute values that are different.

UI Elements (A-Z)	Description
	Enables you to select a CI on one side and have its corresponding CI automatically selected on the other side. The default state for the **Synchronize Selection** button is selected. Deselecting this button allows you to select different CIs from each of the two trees. This enables you to compare two different CIs and see their different properties.
	Contains An Updated Item. Indicates that a CI's attribute value has changed. For example, a **Contains an Updated Item** icon is displayed next to the **IpAddress** CI in the figure below since the attribute of its child CI **10.168.100.2** icon has changed.
	No Matching CI. Indicates that a CI in one pane does not match any corresponding CI in the other pane. The following example displays the **No Matching CI** icon next to the **Windows** icon because it does not have a corresponding CI in the other pane.
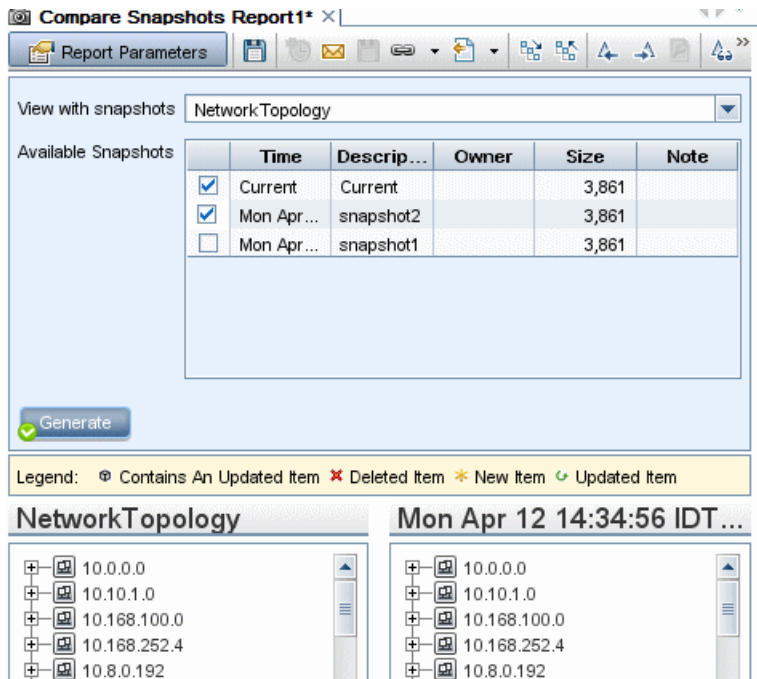
UI Elements (A-Z)	Description
↻	**Updated Item.** Indicates that the attribute value of a CI has changed. For example, the figure below shows that the CIs **10.0.0.2** and **16.59.124.1** display the **Updated Item** icon because they was updated with a new **IP Network Mask** value, as indicated by the **Show Only Different Attribute Values** icons (see the **Name** and **Value** columns in the bottom panes underneath the tree structure).
⊘ ⊘	Enables you to move to the next or previous result of the search for the string entered in the **Find** field.
<Toolbar>	For details, see "Toolbar Options" on page 313.
<Shortcut menu>	For details, see "IT Universe Manager Shortcut Menu" on page 272.

UI Elements (A-Z)	Description
<Properties pane>	Displays the attributes of the selected CI. The Properties pane contains the following fields: ➤ **Name**. Displays the attribute name for the selected CI, which was marked as **Comparable** in the CI Type Manager. "Create Configuration Item Type/Relationship/Calculated Relationship Wizard" on page 468 ➤ **Value**. Displays the attribute value for the currently selected CI.
<Left and right panes>	Displays a tree of the compared CIs and their child CIs that appear in the selected view or in the RTSM, depending on whether you selected the **View** or the **CMDB** options.
Compare in	Select one of the following: ➤ **CMDB.** Includes the selected CIs and their child CIs that appear in the entire RTSM. ➤ **View.** Includes the selected CIs and their child CIs that appear only in a specific view.
Compared CI	Enables you to select the two CIs you want to compare. Click ... to open the CIs Selector dialog box. For details, see "CI Selector" on page 159. The CI you select in the top box is displayed in the left pane and the CI you select in the bottom box is displayed in the right pane.
Find	**Find.** Enter a search name or a portion of a search name in the **Find** field to locate it in the list.
Mutual View	If the CIs that you are comparing both exist within the same view, the name of that view is displayed in this field. Otherwise, the field displays the words **No mutual view**.

Compare Snapshots Report

This feature enables you to compare two snapshots of a specific view taken at different times. It enables you to visualize the differences between the views by comparing the statuses of the view at the times the snapshots were taken.

Compare Snapshots displays the status of a view in one snapshot by comparison with its status taken at a different time. You can compare a current snapshot to a previous snapshot or two snapshots both taken in the past.
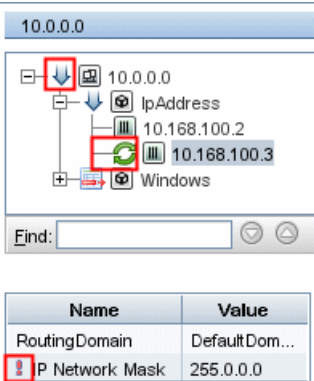
302

To access	Select **Admin > RTSM Administration > Modeling > IT Universe Manager.** Click the **Snapshot** 📠 button and select **Compare snapshots**.
Important information	➤ You can compare a current snapshot to a previous snapshot or two snapshots both taken in the past.
	➤ You can define a schedule that takes snapshots of a specific view on a periodic basis and saves them. For details, see "Schedule Job Dialog Box" on page 311.
	➤ Snapshots of views that are marked as Track Changes are created on a daily basis.
Relevant tasks	➤ "Compare Snapshots" on page 291
See also	➤ "Save Snapshot Dialog Box" on page 284
	➤ "Schedule Job Dialog Box" on page 311

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

UI Elements (A-Z)	Description
🔠	Expands the entire hierarchical tree structure of the CIs you selected.
🔠	Collapses the hierarchical tree structure of the CIs you selected.
🔺	Finds the previous occurrence of an item marked as changed.
🔻	Finds the next occurrence of an item marked as changed.
🖉	**Show Configuration Files Differences.** Shows the difference between the content of the two configuration files. Configuration files use the **.xml**, **.txt** or **.ini** extensions.
	Select a CI of the CIT **Configuration File** in both panes and click the **Show Differences** button. A window opens displaying the differences (marked in blue) in the configuration files.

UI Elements (A-Z)	Description
🔷	**Show Only Different CIs in Tree.** In the \<Properties panes>, displays only the part of the tree structure containing CIs that do not match.
🔲	**Show Only Different Attribute Values.** In the \<Properties panes>, toggles between displaying all the attribute values of the selected CI or only the attribute values that have changed.
🔳	Enables you to select a CI on one side and have its corresponding CI automatically selected on the other side. The default state for the **Synchronize Selection** button is selected. Deselecting this button allows you to select different CIs from each of the two trees. This enables you to compare two different CIs and see their different properties.
🔘	**Contains An Updated Item.** Indicates that a CI's attribute value has changed. For example, a **Contains an Updated Item** icon is displayed next to the **10.0.0.0** CI in the figure below since the attribute of its child CI **10.168.100.3** icon has changed. 10.0.0.0 ⊟ ⬇ 🖥 10.0.0.0 　⊟ ⬇ 🔘 IpAddress 　　─ ▥ 10.168.100.2 　　○ ▥ 10.168.100.3 　⊞ ➡ 🔘 Windows Find: ▢　　　⊙ ⊙ | Name	Value | |---|---| | RoutingDomain | DefaultDom... | | ❗ IP Network Mask | 255.0.0.0 |
❌	**Deleted Item.** Indicates that a CI has been deleted from the view.

UI Elements (A-Z)	Description
✳	**New Item.** Indicates that a new CI has been added to the view.
↻	**Updated Item.** Indicates that the attribute value of a CI has changed. For example, the figure below shows that the CIs **LABM3MAM16** displays the **Updated Item** icon because it was updated with a new **Version** value, as indicated by the **Show Only Different Attribute Values** 🗒 icons (see the **Name** and **Value** columns in the bottom panes underneath the tree structure).
<Left and right panes>	Displays a hierarchical tree structure of all the CIs in the view for that snapshot version. The left side always represents the newer of the two versions.

UI Elements (A-Z)	Description
<Properties pane>	Displays the attributes of the selected CI. The Properties pane contains the following fields: ➤ **Name**. Displays the name of the selected CI as defined in the CI's label. ➤ **Value**. Displays the attribute value for the currently selected CI.
<Toolbar>	For details, see "Toolbar Options" on page 313.
Available Snapshots	Displays the current status and previously saved snapshots of the view selected in the **View with Snapshots** field. Select the two snapshots you want to compare. **Note:** Visible when **Show Report Parameters** button is pressed.
View with snapshots	Displays the name of the view whose snapshots you want to compare. Only views for which snapshots have been taken are displayed. **Note:** Visible when **Show Report Parameters** button is pressed.

✎ Impact Analysis Report

This report displays a list of CIs that are impacted in the system as a result of simulated changes. For details, see "Run Impact Analysis Dialog Box" on page 282.
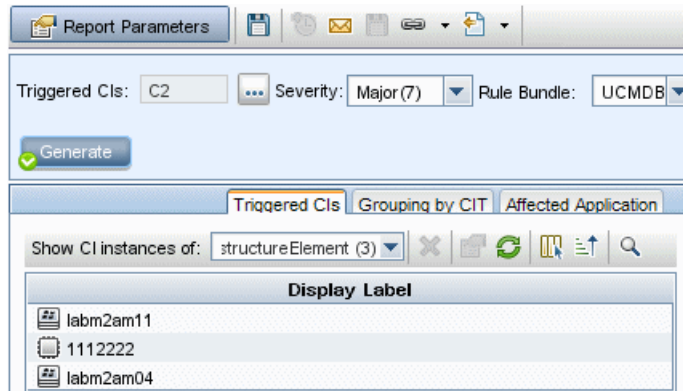
To access	In IT Universe Manager, click **Generate Report** from the Run Impact Analysis dialog box.
See also	➤ "Impact Analysis Manager" on page 421 ➤ "Run Impact Analysis Dialog Box" on page 282

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

UI Elements (A-Z)	Description
<Toolbar>	For details, see "Toolbar Options" on page 313.
Rule Bundle	Enables you to select the rule group with which the Impact Analysis rule works.
Severity	Sets the severity level that we want to simulate for the triggered CIs.
Triggered CIs	Select the CIs that represent the changes you want to make to the system. Opens the CI Selector.

Affected Application Tab

This tab displays all the CIs that belong to a specific business application, which were affected by the triggered CI severity change.

User interface elements are described below:

UI Elements (A-Z)	Description
Display Label	The name of the CI or relationship as it appears in the toplogy map.
Trigger Severity	The severity selected in the **Severity** box.

Grouping by CIT Tab

This tab displays all the CIs related to the triggered CIs that are impacted in the system as a result of the simulated changes, sorted by CI type.

User interface elements are described below:

UI Elements (A-Z)	Description
Display Label	The name of the CI or relationship as it appears in the toplogy map.
Trigger Severity	The severity selected in the **Severity** box.

Triggered CIs Tab

This tab displays all the CIs that represent the changes you want to make to the system. The CIs in this tab are the CIs selected in the **Triggered CIs** box.

User interface elements are described below:

UI Elements (A-Z)	Description
Display Label	The name of the CI or relationship as it appears in the toplogy map.

🔍 Job List Dialog Box

This dialog box displays a list of the reports/snapshots that were scheduled to run in the "Schedule Job Dialog Box" on page 311.

To access	Select **Admin** > **RTSM Administration** > **Modeling** > **IT Universe Manager.** Click the **Snapshots** 📷 button, and select **Show Scheduled Snapshot Jobs**.

User interface elements are described below:

UI Elements (A-Z)	Description
✳	**Insert New Scheduled Report.** Define a new job using the Schedule Job dialog box.
✏	**Edit Job.** Edit the selected job using the Schedule Job dialog box.
📋	**Create Copy.** Enables you to create a copy of the selected job. Opens a new job in the Schedule Job dialog box that uses the details of the selected job.
✖	**Remove Job.** Deletes the selected job from the list of scheduled jobs.
▷	**Run Job Immediate.** Runs the selected job.
⏸	**Pause Job.** Pauses the selected job. Enabled only if the job has a **Pending** status.
🕐	**Resume Job.** Resumes the selected job. **Note:** The **Resume** button is enabled only for jobs that have a **Paused** status.
🔄	Refreshes the list of scheduled jobs.
🔽	Clears the current filter.
▦	**Change visible columns.** Enables you to select the columns to be displayed.

UI Elements (A-Z)	Description
Current Status	The current status of each scheduled job: ➤ **Running.** The job is currently executing. ➤ **Pending.** The job is waiting for the scheduling requirements to be fulfilled. ➤ **Completed.** The job has finished executing. ➤ **Paused.** The job has been paused. **Note.** If a job has a **Completed** status, and you want to resume running the job, you can either click Run Job Immediate or change the **Next Execution Time** to the current time. If you change it to a future time, the status changes to **Pending**.
Description	A description of the scheduled job as defined in the Schedule Job dialog box.
Execution Status	The job's current execution status: ➤ **Success.** The job completed successfully. ➤ **Failure.** The job failed to execute. ➤ **None.** The job has not yet been executed.
Job Type	A scheduled job can either be **Schedule Report** or **Schedule Snapshot**.
Last Execution Time	The last time the report ran.
Name	The name of the scheduled job as defined in the Schedule Job dialog box.
Next Execution Time	The next time the report is scheduled to run.

🔍 Schedule Job Dialog Box

This dialog box enables you to define a schedule for taking snapshots of a specific view. You can see the list of reports/snapshots that have been scheduled to run in the "Job List Dialog Box" on page 309.

To access	Select **Admin > RTSM Administration > Modeling > IT Universe Manager.** Click the **Snapshots** 🖬 button in the CI Selector, and select **Schedule Snapshot**.
Relevant tasks	➤ "Compare CIs" on page 289 ➤ "Compare Snapshots" on page 291

The following elements are included:

UI Elements (A-Z)	Description
Validate	Click to validate the Cron expression you entered in the **Cron Expression** box.
Cron Expression	Enter a Cron expression to schedule a job. For a description of the fields used in Cron expressions and examples of how to use them, see, "Cron Expressions" on page 293.
Description	A description of the scheduled job.
Ends	Select one of the following options: ➤ **Never.** Do not specify an end date. Not relevant if you define a report to run only once. ➤ **Until.** Choose the date and time by which you want the action to stop running. Relevant only if you are using Cron expressions.
Locale	Select the language for the report.
Name	The name of the scheduled job.

UI Elements (A-Z)	Description
Repeat	Select one of the following actions: ➤ **Once**. Activates a job only once. ➤ **Daily.** Runs a job on a daily basis. ➤ **Weekly.** Runs a job on a weekly basis. Select the day or days on which you want the action to run. ➤ **Monthly.** Runs a job on a monthly basis. Select the month or months in which you want the job to run. ➤ **Yearly.** Runs a job on a yearly basis. ➤ **Cron.** Use a Cron expression to schedule a job. For a description of the fields used in Cron expressions and examples of how to use them, see, "Cron Expressions" on page 293.
Repeat every	(Appears only when you select **Daily**, **Weekly**, **Monthly** or **Yearly**.) Select a value for the interval between successive runs. For example, if you select **Weekly** and then **2**, the job runs every second week.
Server Time	The exact server time according to the client's time zone.
Starts	Choose the time and date when you want the job to begin running.
Time Zone	Set the required time zone.

🔍 Toolbar Options

This section describes the toolbar options for the Report pane.

UI Elements (A-Z)	Description
Report Parameters	Displays the parameters that are defined for the report.
💾	**Save Report.** Saves the selected report.
🕐	**Schedule Report.** Opens the Schedule Job dialog box, which enables you to define a job that: ➤ Schedules the generation of a report ➤ Specifies one or more formats in which to send the report, and the report's recipients ➤ Specifies the recurrence of the job For more information on the Schedule Job dialog box, see, "Schedule Job Dialog Box" on page 311. **Note:** This option is available only before you generate a report or when you open a saved report.
✉	**Send Mail.** Opens the Send Mail dialog box. You can send an email containing the generated report in various formats, or as a direct link. For details on the various formats, see "Export Report." on page 314. Select one or more of the available formats for the generated report to be sent as attachments to an email recipient. **Note:** Required fields are marked with an asterisk.
🗔	**Archive Report.** Enables you to save the report results in the database. After the report is archive, a 📷 icon appears next to the report name. **Note:** Enabled only for Topology reports.
🔗	**Generate Direct Link.** Creates a direct link to the specific location on the server of the selected report, or to the data that you have exported as a specific format.

UI Elements (A-Z)	Description
	Export Report.
	Enables you to select the export format for the report. The available options are:
	➤ **Excel.** The report data is formatted as an .xls (Excel) file that can be displayed in a spreadsheet.
	➤ **PDF.** The report data is exported in PDF format.
	➤ **CSV.** The report data is formatted as a comma-separated values (CSV) text file that can be displayed in a spreadsheet.
	Note: For the CSV formatted table data to display correctly, the comma (,) must be defined as the list separator. In Windows, to verify or modify the list separator value, open Regional Options from the Control Panel, and on the Numbers tab ensure that the comma is defined as the List Separator value.
	➤ **XML.** The report data is formatted as an XML file that can be opened in a text or XML editor.
	Tip: To extract HTML code from the report:
	➤ Open the file in an HTML editor
	➤ Copy the relevant table into the target file
Bar Chart	**Bar Chart.** Displays the generated report as a bar chart.
Pie Chart	**Pie Chart.** Displays the generated report as a pie chart.
Table	**Table.** Displays the generated report in tabular format.
	Show Short Labels. Toggles between displaying the chart labels minimal/maximum information.
	Note: This option is available only for pie charts.
	Show Legend. Toggles between hiding and displaying the chart's legend.
	Note: This option is available only for pie charts.

UI Elements (A-Z)	Description
	Slice chart. Toggles between displaying the pie chart with exploded and unexploded segments. **Note:** This option is available only for pie charts.
	Expand All. Expands the tree structure.
	Collapse All. Collapses the tree structure.
	Delete from CMDB. Deletes the selected CI from the CMDB.
	Opens the Configuration Item Properties dialog box for the selected CI.
	Refresh. Refreshes the report tree.
	Select Columns. Select the columns you want to display in the report.
	Sort Column Content. Enables you to set the sort order of the selected column's content.
	Find. Toggles between displaying and hiding the Find utility.
	Find the next occurrence of the phrase/Find the previous occurrence of the phrase. Enables you to move to the next or previous result of the search for the string entered in the **Find** field.
	Highlights all occurrences of the phrase. Highlights all occurrences in the CI tree of the string entered in the **Find** field.
	Generate Report. Enables you to generate the selected report. **Note:** This button appears disabled prior to defining the report parameters.

UI Elements (A-Z)	Description
<breadcrumbs>	Displays the levels through which you have navigated to get to the current level. Appears horizontally across the top of the chart. **Note:** Each level in the list of breadcrumbs is a clickable link.
<Generated report>	Displays the active generated report.
Find	Enter a search name or a portion of a search name in the **Find** field to locate it in the list.

🔍 Topology Report

This report displays the topology of a view in report format.

To access	Select **Admin > RTSM Administration > Modeling > IT Universe Manager** and click the **View Based Report** 🔲 button.
Important information	Every view in the RTSM can be displayed in report format. You define the settings for the report in the Report tab of the view in Modeling Studio.

User interface elements are described below:

UI Elements (A-Z)	Description
<Bar graph/Pie chart>	Each segment of the pie chart/column in a bar graph represents a CI on the selected level of the view.
	Click a slice/bar to drill down to the next level, if one exists. You can also display the information in table format.
	When you hold the mouse over the relevant segment/bar, a tooltip indicates the number of instances there are for that CIT, the percentage of the pie it represents (when viewing the information in pie chart format), and the CIT or CIT attribute the slice/bar represents.
<Toolbar>	For details, see "Toolbar Options" on page 313.

10

Modeling Studio

This chapter includes:

Concepts

Tasks

Reference

➤ Modeling Studio User Interface on page 358

Tip: For more information about using Modeling Studio in HP Business Service Management, see "Best Practices for Modeling" on page 209.

Concepts

🍀 Modeling Studio Overview

Modeling Studio is a tool for creating and managing views. You can create your own views, or work with the out-of-the-box (factory) views provided with your HP Business Service Management installation.

The IT Universe model in the configuration management database can be very large, holding thousands of configuration item (CI)s. A view enables you to build a subset of the overall IT universe 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.

The views are used to display performance status in Service Health, and for setting up SLAs in Service Level Management. HP Business Service Management supports three view formats: pattern views, template based views, and perspective based views, which are populated through different processes. For details, see "View Formats" on page 322.

♣ View Formats

HP Business Service Management supports three view formats, by which to populate your view:

➤ **Pattern views** are built from a Topology Query Language (TQL) query that defines the structure of the view. You can create a new TQL query as you build the view or base the view on an existing query. The view displays only those CIs and relationships that satisfy the query definition. When the view is displayed or refreshed, the Modeling Studio queries the RTSM for all elements that fit the query, and automatically updates the view with those elements.

➤ **Template based views** are based on a TQL query, to which a template is then applied. The template is a reusable view that includes parameters, which are saved as part of the template. This enables you to build multiple views with the same settings without having to re-enter the parameter information. The view displays only those CIs and relationships that satisfy the query definition and the conditions of the template. For details on templates, see "Templates and Perspectives" on page 326.

➤ **Perspective based views** are built by selecting a collection of individual CIs and applying a special type of template, known as a perspective, to it. Instance views, which no longer exist, are replaced by perspective based views. For details on perspectives, see "Templates and Perspectives" on page 326.

When you select a view for editing from the view tree in the left pane, it opens on the editing pane in the appropriate editor.

🔹 Building a Business View

In the Modeling Studio, you can define your own views to model your business environment.

This section includes the following topics:

➤ "The Structure of a View" on page 323

➤ "Setting the View Hierarchy" on page 324

The Structure of a View

The views you create should provide the business users with logical representations of your company's structure, processes, and goals. To meet these requirements, you generally build multiple views representing different aspects of your business; for example, you could build business views that revolve around any of the following:

➤ Company structure, so that data is organized by the geographical location of branches, or by data centers.

➤ Business processes, so that data is organized by line of business, or by applications.

➤ Business goals, so that data is organized by sales, or by key customers.

The views depend on the particular demands of your organization and the actual hierarchical structure of the views should reflect those demands.

The usual hierarchical format of a view is as follows:

➤ **Top level.** The highest levels of the view, consisting of the root CI and the branches below it, are normally built from logical **Business** CI types such as **Location, Line of Business, Customer, Application,** and so on.

➤ **Intermediate level.** The intermediate branches of the view normally consist of **System** CI types, representing actual hardware and software and/or monitoring group CI types, representing groups containing monitors.

> ➤ **Bottom level.** The lowest level of the view, consisting of leaf CIs at the ends of the subtrees, is built from the **Monitor** CI types. These CIs receive the actual data from the data sources, used to determine KPI status all the way up the view subtrees, and so provide business context to the view.

Note: The bottom level is only relevant when a monitoring solution such as HP Business Service Management is connected and modeled in the RTSM.

Setting the View Hierarchy

The Pattern View Editor enables you to set the view hierarchy using the Hierarchy pane on the right side of the screen. There are two methods available for setting the hierarchy: **manual** and **rule-based**. The manual method is selected by default.

Manual Hierarchy Method

In the manual hierarchy method, the query nodes of the view are displayed in a tree format. You can create the hierarchy by manually dragging a selected query node under another query node or by using the toolbar buttons. The system only allows you to move a query node under another query node when the resulting hierarchy is valid. For details, see "Hierarchy Pane" on page 393.

It is possible to place a single query node from the view into the hierarchy multiple times. You can then adjust the hierarchy so that the query node appears in different layers, according to the required layout. The view results in such an instance would be the same as if you added another query node to the TQL query. Using the same query node twice in the hierarchy enables you to achieve the desired view results using a simpler TQL query.

Query Node Grouping

When setting the view hierarchy manually, you can create subgroups to group CIs by different criteria for the convenience of viewing the display. Click the **Add Group by** button and select one of the options. You can create a subgroup for CIs of the same type in the Topology Map using the **Add Group by CI Type** option. You can create a subgroup for a specific query node by selecting the **Add Group by Query Node** option. You can group CIs by a common attribute using the **Add Group by Attribute** button and entering a regular expression as described in "Query Node Grouping Dialog Box" on page 403. For details about regular expressions, see "Regular Expression Examples" on page 543.

You can also create nested groups (a query node group inside another query node group) to help fine-tune the TQL query results that are displayed in the Topology Map.

For example, after grouping query nodes of type node by their CIT, you can use their **operation state** attribute to create more focused groups.

Rule-Based Hierarchy Method

In the rule-based hierarchy method, you define hierarchy rules, using the Hierarchy Rules dialog box. You select a source CIT, target CIT, relationship type, and relationship direction, which define the conditions for a hierarchy rule. Any CIs in the view which satisfy the defined conditions are subject to the rule, that is, the target CI is placed on the layer below the source CI. For details on defining hierarchy rules, see "Hierarchy Rules Dialog Box" on page 368.

🔩 **Templates and Perspectives**

A template is a reusable pattern view with defined parameters. You use templates to build template-based views, setting the values of the parameters for each specific view. Any changes made to a template affect all existing views based on that template.

Template-based views can be opened in IT Universe Manager, like pattern views. You can also open the template itself in IT Universe Manager to view the results for various parameter values. If you want to save the results, you must save it as a template-based view. You define templates, template-based views, and pattern views in the Pattern View Editor.

Perspectives are a type of template designed to be applied to a specific collection of CIs, similar to the pattern in a pattern view. For example, a perspective could comprise a node containing an IP Address. In that case, the resulting perspective-based view would include all the node CIs from among the CIs in the CI selection, along with their contained IP Addresses.

The most basic perspective is known as the Content Only perspective and consists of only the query node itself. If you apply the Content Only perspective to a CI collection, the resulting view contains only the selected CIs themselves.

Perspectives are also created and edited in the Pattern View Editor. You can have multiple views, templates, and perspectives open in the Pattern View Editor simultaneously, each with its own tab.

Perspectives do not appear in the list of views in IT Universe Manager, however perspective-based views can be opened in IT Universe Manager, like all other views. For details, see "Building a Perspective Based View" on page 331.

In summary, the Views tree in the Resources tab of the CI Selector in the Modeling Studio can include five distinct entities:

➤ pattern views

➤ templates

➤ template based views

➤ perspectives

➤ perspective based views

You can filter the tree to select the types of views or templates to display.

The following table summarizes the types of views and where they are created and viewed:

Type of View	Created in:	Can be opened in IT Universe Manager
Pattern view	Pattern View Editor	Yes
Template	Pattern View Editor	Yes, for the current session only
Template-based View	Pattern View Editor	Yes
Perspective	Pattern View Editor	No
Perspective-based View	Perspective-based View Editor	Yes

Predefined Folders and Views

The Views tree in the Resources tab of the CI Selector in the Modeling Studio includes predefined folders and views, as described in the following sections:

➤ "Predefined Folders" on page 327

➤ "Factory Views" on page 328

➤ "Predefined Perspectives" on page 328

Predefined Folders

The hierarchical file folder system in the CI Selector can help you organize your views. Predefined folders are provided for the out-of-the-box views; you can modify these folders, or add additional folders according to your organization's requirements.

Factory Views

Your HP Business Service Management installation includes out-of-the-box pattern views, templates, and perspectives. These views provide a quick start for working with the RTSM for setting up SLAs, and for viewing system performance information in Service Health.

The out-of-the-box views are initially empty. As soon as CIs are added to the RTSM by one of the CI generators, the TQL query built into each pattern view is able to identify the CIs that meet the pattern requirements, and add them to the view.

Views for CIs are created when a discovery process is run; the out-of-the-box views that are provided correspond to the relevant Data Flow Management (DFM) packages. For example, the Oracle view **(Root** > **Database** > **Oracle** > **Oracle)** is populated with CIs that are created when Data Flow Management activates the Database - Oracle module. For details on running DFM, see "Discovery Control Panel – Advanced Mode Workflow" in the *Run-time Service Model Data Flow Management Guide*.

For details on the cross-application processes for setting up the SAP views, see "Application Management for SAP Reports and Views" in *Solutions and Integrations*.

Some of the out-of-the-box views are set by default to display in specific HP Business Service Management applications. There are some out-of-the-box views that are hidden by default.

Some of the out-of-the-box views are considered basic to the system and cannot be deleted from the folders.

Predefined Perspectives

HP Business Service Management also provides out-of-the-box perspectives. One example is the Content Only perspective, which includes only the elements of the view content itself, without any additional CIs.

The following out-of-the-box perspectives are intended to be used in Service Health:

➤ **System Monitors only.** This perspective enriches the model by adding child CIs down to the level of monitors. Use this perspective to create a Service Health view that includes System monitors only.

➤ **End User Monitors.** This perspective enriches the model by adding child CIs down to the level of monitors. Use this perspective to create a Service Health view that includes monitor CIs for End User Management only.

➤ **Impact.** This perspective enriches the model with all child CIs related by impact links. Use this perspective to configure additional monitors using the Monitor Deployment Wizard.

➤ **Model and Dependency Hierarchy.** This perspective enriches the model with all dependent CIs in the RTSM. Use this perspective to create a view with the full model hierarchy.

🔧 Business CI Models

➤ "Building a Model" on page 330

➤ "Pattern-based Models" on page 330

The collection of CIs which compose the view content of perspective-based views can be selected in two ways. You can select CIs from the CI Selector and drag them onto the editing pane. In this case, you can build a view by applying a perspective to the collection and the collection cannot be reused in another view without repeating the selection process. The other way to select the CIs to appear in the view is by creating a model.

A model is a reusable collection of CI instances that define a business entity, such as a business service or line of business. By creating a model, you are building a CI collection that can be reused with other perspectives to create different views. Any changes you subsequently make to the model are reflected in all the views based on that model.

Building a Model

You build a model by first selecting a business CI to serve as its basis. The available business CIs include group, application, business service, business unit, and line of business. Then, you can add CIs to your model in the following ways:

➤ Manually, by dragging CIs from the CI Selector into the Model Editor

➤ Revealing related CIs using a reveal path and selecting the ones to add to the model

➤ Defining a watchpoint for a selected CI and automatically adding CIs to the model

You can also begin building a model by dragging CIs onto the empty canvas and selecting **Create a new model**.

The model you create is a CI itself and the CIs in your model are related to the model by **Contains** relationships. You must save your model before applying a perspective to it to build a view.

Caution: The changes you make in a model affect the entire universe, not just the views based on that model. Thus, if you delete a CI from a model, you are deleting the relationship that existed between the CIs from the RTSM.

Pattern-based Models

Another type of model you can build is a pattern-based model. In a pattern-based model, you define a TQL query to determine the CIs included, rather than selecting them manually. You can base your pattern-based model on an existing TQL query or create a new TQL query.

You must designate at least one query node in the model's TQL query as output for the model. The CIs of that type which match the pattern of the TQL query are the ones included in the model output.

The pattern-based model created is saved as a CI like an ordinary model, and can be used to form the content of a perspective-based view. The new TQL query created is saved as an ordinary query and can be used as the basis for a pattern view.

🔹 Building a Perspective Based View

A perspective based view is composed of perspectives applied to a model or a collection of CIs. The perspective is a special type of template which is designed to be applied to a subset of the IT Universe model.

The Content pane of the Perspective-based View Editor displays the models or CIs you have selected to serve as the basis of your view. The Perspective pane displays the selected perspectives. The Preview pane displays the resulting view based upon your content and perspective selections. When you make a change in the content or perspective selections, the view is updated accordingly in the Preview pane. For details, see "Perspective-based View Editor" on page 397.

This section includes the following topics:

➤ "Content" on page 332

➤ "Perspectives" on page 332

➤ "Views Based on Multiple Perspectives" on page 333

➤ "Including and Excluding Child CIs" on page 334

Content

The content in a perspective based view can be selected in two ways:

➤ You can add individual CIs to the view manually, using the CI Selector. The CIs in the collection are independent of each other. In this case, the collection of CIs is not defined as a model and cannot be reused in another view.

➤ You can add one or more models to the view, using the CI Selector. Alternatively, you can start by working with a model in the Model Editor and select Generate View for Selected Model to build a view based on that model. In this case, the identical content can be used to build another view by selecting the same models.

You can select both individual CIs and models to form the content of a perspective based view, however in that case, the models are treated as ordinary CIs. The models themselves are included in the view without their hierarchy of child CIs.

Perspectives

The perspectives you select for your view determine which CIs are included in the view. A perspective is a reusable pattern, similar to a template. The difference between a perspective and a regular template is that the perspective includes one or more query nodes designated as contact query nodes. A contact query node is a query node in the pattern which is used to apply the pattern to specific content and it is indicated by a small icon that appears next to the query node.

For example, in the following perspective, a query node of type Windows is designated as the contact query node and it has an IP Address related to it by a containment relationship.
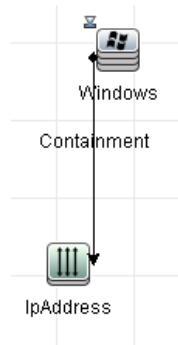
When this perspective is applied to a CI collection, all the Windows CIs in the collection appear in the resulting view, along with the IP Addresses contained in them. The Windows CIs that do not contain IP Addresses, as well as CIs of any other type from the collection, do not appear in the view.

A perspective can have several contact query nodes, but every disconnected graph within a perspective must have at least one contact query node.

If you make a change to a perspective, all views based on that perspective are affected.

Views Based on Multiple Perspectives

You can select multiple perspectives to apply to the content of your view. There are two ways to select multiple perspectives:

➤ Perspective groups

➤ Perspective chains

In a **perspective group**, you select two or more perspectives to apply simultaneously to the same input content.

In a **perspective chain**, you select two or more perspectives at different levels of the view creation. The perspective in the first level is applied to the original view content to generate results in the form of a CI collection that serves as input content for the next level. The perspective in the second level is then applied to this content to generate the view results. You can build views based on multiple levels of perspectives, each one generating input content for the following level.

It is possible to apply both of the above methods at the same time, that is, by selecting multiple perspectives in each of the levels of a perspective selection.

For example, select a collection of **IP Subnet** CIs as your input content and select a perspective that adds the **node** CIs related to the IP Subnets as the first level perspective. The results of this stage consist of the original IP Subnets and their related nodes. Then add a second perspective level and select two perspectives for it: one that adds **CPU** CIs related to nodes and one that adds **File System** CIs related to nodes. The final results include the original IP Subnets, their related nodes, and the CPUs and File Systems related to those nodes.

These options help to simplify the process of creating a perspective-based view, by breaking down the functionality of a perspective into its component parts. Instead of building a separate large and complex perspective for each required view, you can construct a custom perspective to match the requirements of your specific case from smaller and more basic perspectives.

Including and Excluding Child CIs

When adding CIs that have children to a view, the CI and its children are only included in the view if the pattern of the perspective includes children for the selected CI type. In that case, children are included for all CIs of that type. After creating a view, you can hide specific CIs from the view by selecting the CI in the View Results pane and selecting **Hide CI from View** from the shortcut menu or clicking the **Hide CI from View** button in the

toolbar. This option is only available for CIs that were added to the view via the perspective and were not part of the original content on which the view was based. Thus, if the view was based on a collection of CIs, the CIs in that collection cannot be hidden from the view. If the view was based on a model, the model cannot be hidden from the view, but the CIs contained in the model can be hidden.

When KPI status is calculated for a CI and displayed in Service Health, the status is based on all child CIs that exist in the RTSM for the parent CI. The Business Logic Engine calculates status from all child CIs attached to that parent CI, across all views. The calculation is based on all the relationships for the CI in the RTSM, without connection to the child CIs displayed in any particular view. To restrict the number of CIs displayed in the view, you can change the perspective to hide child CIs. This has no effect on KPI status – status is still calculated based on all child CIs, whether they are displayed in the view or hidden.

Whether or not all child CIs are displayed in the view does not influence the status calculations made for the parent CI and the status displayed in Service Health.

For example, the following pictures show status in Service Health for the same CI, Group1, in two views: In the first view, child CIs are included, and in the second, they are excluded. The same status result is shown for the CI in both views, regardless of the perspective in use.

When a CI has child CIs that are excluded from the view, the KPI tooltip in Service Health shows the number of hidden child CIs with KPIs attached, to indicate that the KPI status of the parent is based on CIs that are not in the view.

Details - Performance	
CI name:	fist_bpm_profile_1
Status:	Critical
Calculation Rule:	Worst Child Rule
Held status since:	6/10/06 10:02:50 AM
Hidden child CIs (with attached KPIs):	5

You can use the **Find Visible and Hidden Child CIs** option to view information on hidden children. For details, see "How to Find Visible and Hidden Child CIs" in *Using Service Health*.

Revealed CIs and Watchpoints

The Modeling Studio provides two advanced methods of adding CIs to an existing model: revealing related CIs and defining watchpoints.

This section includes the following topics:

➤ "Revealing CIs" on page 336
➤ "Watchpoints" on page 339

Revealing CIs

One approach to building a model is to add CIs related to the CIs in the model. The Modeling Studio provides a tool to help you reveal those CIs. The process of revealing related CIs involves constructing a reveal path, which is a chain of CI types that are related to each other. The first item in your reveal path is the CI type of the CI from which you started to reveal CIs. The Modeling Studio locates all of its related CIs and lists their CI types. By selecting one of those types, you build the next step of your path. All the related CIs of that type appear in the lower pane of the dialog box. You can select the ones you want to include in your model. The process is repeated to build the following step of the path.

For example, if you begin to reveal CIs from a CI of type Windows, the Modeling Studio may reveal related CIs of types Interface, Network, and IP. If you select Network, the related CIs of type Network appear in the lower pane and can be added to the model by dragging them into the CIs Basket or clicking the CIs Basket icon:
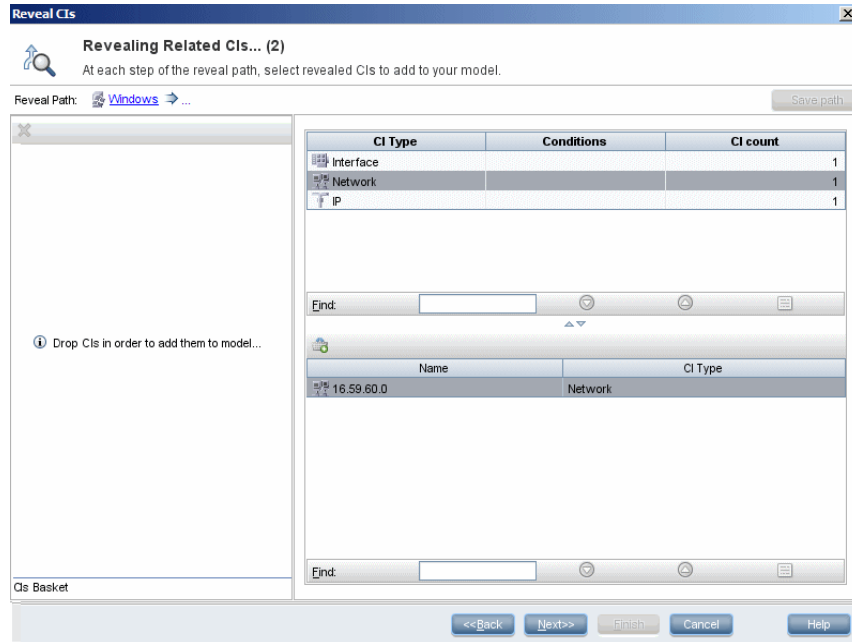
Click **Next** to build the next step of the path using Network as your selection. The Modeling Studio reveals related CIs of type Windows, Unix, and IP. Unix is selected and the Unix CIs appear in the lower pane and can be added to the model by dragging the selected ones into the CIs Basket pane:
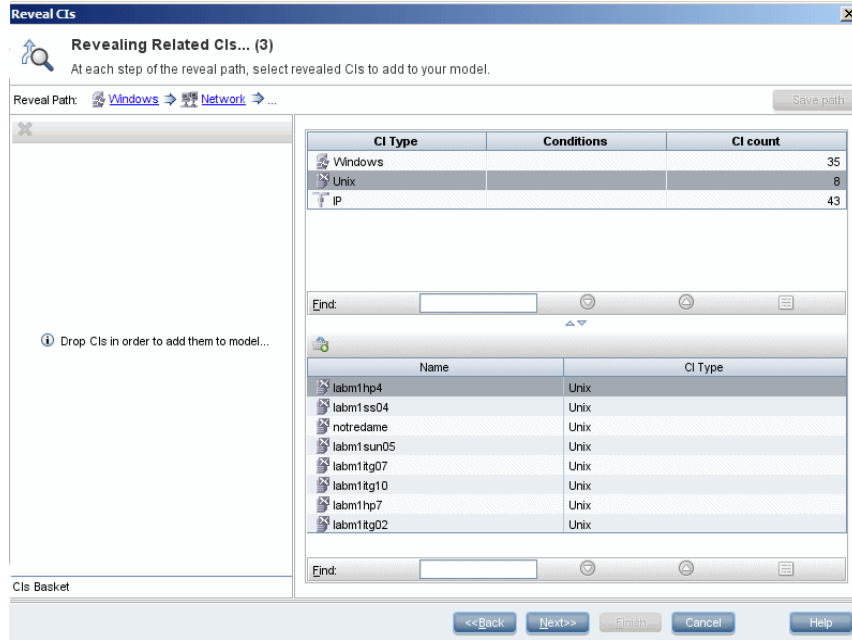
Click **Next** to build the next step of the path using Unix as your selection:
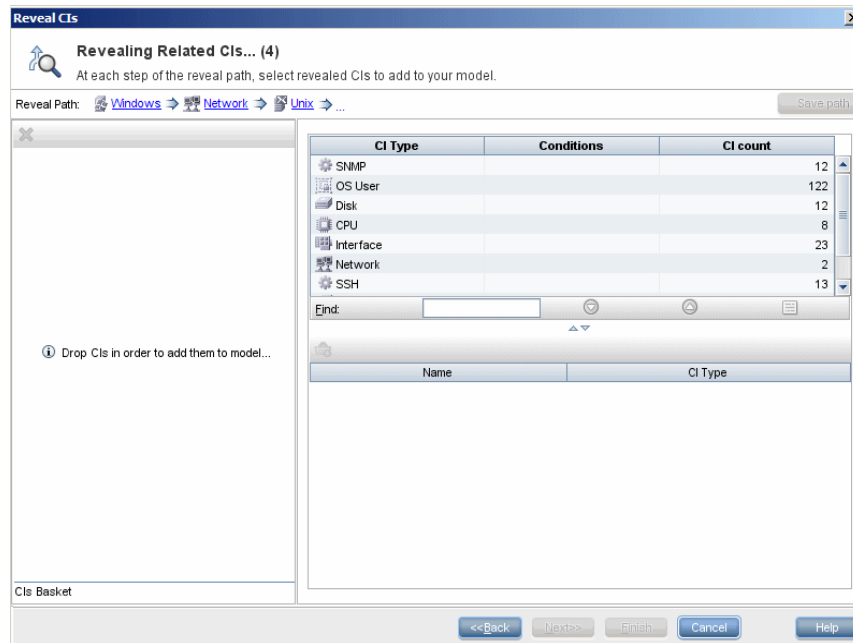
In this case, a reveal path of **Windows** > **Network** > **Unix** was constructed. At each step, you have the option of adding any of the revealed related CIs to your model. For details on revealing CIs, see "Reveal CIs Dialog Box" on page 405.

It is also possible to construct a reveal path without revealing CIs. For details, see "Create/Edit/Save Reveal Path Dialog Box" on page 365.

Watchpoints

Another method of locating related CIs to add to the model is by defining a watchpoint for a selected CI in the model. A watchpoint is a mechanism which is triggered when a new related CI of a specified type is created. Every watchpoint is defined in connection with a reveal path. If a new related CI of any CI type included in the path is created, the watchpoint is triggered and an indicator appears next to the model. For details on defining a watchpoint, see "New Watchpoint Dialog Box" on page 388.

Note: You must save a new model before defining watchpoints for its CIs.

All the related CIs detected by the watchpoint are displayed in the Watchpoints Updates dialog box. The dialog box enables you to select the ones to add to your model and the ones to suppress, or exclude from your model. For details, see "Watchpoints Updates Dialog Box" on page 419.

You also have the option to include the detected CIs in your model automatically by selecting the check box in the New Watchpoint dialog box. In this case, all CIs detected by the watchpoint are added to the model.

A watchpoint can also be used to detect CIs included in the model which are no longer related to the model. If such CIs are found along the reveal path connected to the watchpoint, they also appear in the Watchpoints Updates dialog box. You can accept the suggestion to remove the CIs from your model, or you can suppress the suggestion, thereby keeping the CIs in your model.

Note: Although a watchpoint is defined for an individual CI, the watchpoint results display related CIs of the CI types included in the reveal path for all CIs in the model.

Tasks

🎯 Create a Pattern View

This task describes how to create a pattern view and define its TQL query.

This task includes the following steps:

➤ "Open a New View in the Pattern View Editor" on page 341

➤ "Add Query Nodes and Relationships to a TQL Query" on page 341

➤ "Set the View Hierarchy" on page 342

➤ "Define the Report Settings - Optional" on page 342

➤ "Set Permissions" on page 342

1 Open a New View in the Pattern View Editor

Click the **New** button ✳ and select **Pattern View**. In the New Pattern View dialog box, select the base TQL query on which your new view is based, or select **Create new query** to build a new TQL query. The Pattern View Editor opens. For details, see "New Pattern View/Template/Perspective Dialog Box" on page 386.

2 Add Query Nodes and Relationships to a TQL Query

Add the query nodes and relationships that define the query. For details on how to add query nodes and relationships to a TQL query, see "Add Query Nodes and Relationships to a TQL Query" on page 30.

Note: If you are starting with a blank view, you must add at least one query node in order to save your view.

---

3 **Set the View Hierarchy**

Set the hierarchy for the view by moving the required query nodes in the hierarchy pane. For details, see "Setting the View Hierarchy" on page 324.

When you are finished, click **Save** 🖫 to save the view.

4 **Define the Report Settings - Optional**

Select the Report tab in the Pattern View Editor. Select the attributes you want to include in the report for each query node of the view. You can also set the order of the report columns, set the sort order of each column, and add a chart. For details, see "Define Report Settings" on page 349.

5 **Set Permissions**

Apply viewing and editing permissions to users and user groups for the new view. You set permissions in **Admin** > **Platform** > **Users and Permissions**, select a user or a group and select **Permissions**. For details, see "How to Assign Permissions" in *Platform Administration*.

🪄 Create a Template

This task describes how to define a new template.

This task includes the following steps:

➤ "Open a New Template in the Pattern View Editor" on page 343

➤ "Add Query Nodes and Relationships to a TQL Query" on page 343

➤ "Set Parameter Values" on page 343

➤ "Set the Template Hierarchy" on page 343

➤ "Define the Report Settings - Optional" on page 344

➤ "Set Permissions" on page 344

1 Open a New Template in the Pattern View Editor

Click the **New** button ✳ and select **Template**. In the New Template dialog box, select the base TQL query on which your new template is based, or select **Create new query** to build a new TQL query. For details, see "New Pattern View/Template/Perspective Dialog Box" on page 386.

2 Add Query Nodes and Relationships to a TQL Query

Add the query nodes and relationships that define the query. For details on how to add query nodes and relationships to a TQL query, see "Add Query Nodes and Relationships to a TQL Query" on page 30.

Note: If you are starting with a blank template, you must add at least one query node in order to save your template.

---

3 Set Parameter Values

Right-click a query node or relationship in the TQL query and select Query Node Properties. In the Attributes tab, add an attribute with a parameterized value. For details, see "Query Node/Relationship Properties Dialog Box" on page 82.

Note: If you do not set any parameters, when you try to save your template, you must save it as a pattern view.

---

4 Set the Template Hierarchy

Set the hierarchy for the template by moving the required query nodes in the hierarchy pane. For details, see "Setting the View Hierarchy" on page 324.

When you are finished, click **Save** 💾 to save the template.

5 **Define the Report Settings - Optional**

Select the Report tab in the Pattern View Editor. Select the attributes you want to include in the report for each query node of the view. You can also set the order of the report columns, set the sort order of each column, and add a chart. For details, see "Define Report Settings" on page 349.

6 **Set Permissions**

Apply viewing and editing permissions to users and user groups for the new template. You set permissions in **Admin** > **Platform** > **Users and Permissions**, select a user or a group and select **Permissions**. For details, see "How to Assign Permissions" in *Platform Administration*.

🔨 **Create a Perspective**

This task describes how to define a new perspective.

This task includes the following steps:

- ➤ "Open a New Perspective in the Pattern View Editor" on page 345
- ➤ "Add Query Nodes and Relationships to a TQL Query" on page 345
- ➤ "Select a Contact Query Node" on page 345
- ➤ "Set the Perspective Hierarchy" on page 345
- ➤ "Define the Report Settings - Optional" on page 346
- ➤ "Set Permissions" on page 346

1 Open a New Perspective in the Pattern View Editor

Click the **New** button ✳ and select **Perspective**. In the New Perspective dialog box, select the base TQL query on which your new Perspective is based, or select **Create new query** to build a new TQL query. For details, see "New Pattern View/Template/Perspective Dialog Box" on page 386.

2 Add Query Nodes and Relationships to a TQL Query

Add the query nodes and relationships that define the query. For details on how to add query nodes and relationships to a TQL query, see "Add Query Nodes and Relationships to a TQL Query" on page 30.

3 Select a Contact Query Node

Select at least one query node in the TQL query to be a contact query node. Right-click the query node and select **Use As Contact Query Node**.

Note: If you do not select a contact query node, when you try to save your perspective, you must save it as a pattern view.

---

4 Set the Perspective Hierarchy

Set the hierarchy for the perspective by moving the required query nodes in the hierarchy pane. For details, see "Setting the View Hierarchy" on page 324.

When you are finished, click **Save** 💾 to save the perspective.

5 **Define the Report Settings - Optional**

Select the Report tab in the Pattern View Editor. Select the attributes you want to include in the report for each query node of the view. You can also set the order of the report columns, set the sort order of each column, and add a chart. For details, see "Define Report Settings" on page 349.

6 **Set Permissions**

Apply viewing and editing permissions to users and user groups for the new perspective. You set permissions in **Admin** > **Platform** > **Users and Permissions**, select a user or a group and select **Permissions**. For details, see "How to Assign Permissions" in *Platform Administration*.

🪝 Create a Template Based View

This task describes how to define a new template based view.

This task includes the following steps:

➤ "Prerequisites" on page 347

➤ "Define a New Template Based View" on page 347

➤ "Select a Template" on page 347

➤ "Set Parameters" on page 347

➤ "Set Permissions" on page 348

1 Prerequisites

If you want to base your view on a new template, create the template first. For details, see "Create a Template" on page 342.

2 Define a New Template Based View

You define a new template based view using the Template-based View wizard. Click the **New** button ✳ and select **Template Based View**.

3 Select a Template

On the Select Template page of the wizard, select a template on which to base your view. For details, see "Select Template Page" on page 413.

4 Set Parameters

On the Parameters page, enter the parameter values for the view. For details, see "Parameters Page" on page 413.

Note: You can also edit the parameters from within the Editor after creating the view, by selecting Edit Parameters 🖼 from the toolbar or the shortcut menu.

When you are finished, click **Save** 🖫 to save the view.

5 Set Permissions

Apply viewing and editing permissions to users and user groups for that view. You set permissions in **Admin** > **Platform** > **Users and Permissions**, select a user or a group and select **Permissions**. For details, see "How to Assign Permissions" in *Platform Administration*.

🪈 Define Report Settings

This task describes how to define report settings for a view, template, or perspective.

This task includes the following steps:

➤ "Prerequisites" on page 349

➤ "Select Attributes to Appear as Report Columns" on page 349

➤ "Add Function Columns to the Report - Optional" on page 350

➤ "Set the Sort Order of the Column Content" on page 350

➤ "Add a Chart to the Report - Optional" on page 350

1 Prerequisites

After defining the content and hierarchy of a view, template, or perspective, you can define the report settings. Select the Report tab in the Pattern View Editor.

2 Select Attributes to Appear as Report Columns

For each query node in the view, select the query node in the Hierarchy pane and select the attributes to appear as columns in the report for that query node. You select attributes in the Query Node Definition pane by moving them from the Attributes list to the Report Layout list. Set the order of the columns using the arrow buttons in the Report Layout list. For details, see "Query Node Definition Pane" on page 395.

3 **Add Function Columns to the Report - Optional**

You have the option of adding a column for a selected query node consisting of data derived from a function performed on one of its child query nodes. Click the Add Function button ⚹ to open the Add Function dialog box where you can select the relevant settings. For details, see "Add/Edit Function Dialog Box" on page 359.

4 **Set the Sort Order of the Column Content**

Click the Set Sort Order button ≣↑ to open the Sort Column Content dialog box. Determine the columns by which to sort the report by moving columns from the Available Columns list to the Sorted Columns list. Use the arrow buttons to set the sort order of the columns. Use the Sort Ascending/Sort Descending buttons to set the sort direction for each column. For details, see "Sort Column Content Dialog Box" on page 411.

5 **Add a Chart to the Report - Optional**

You have the option of adding a chart to your report, in place of a table, for a selected layer of the view. When the necessary conditions for adding a chart are satisfied, the **Define Chart** link in the Chart Properties section of the Query Node Definition pane is active. Click the link and enter the chart settings. For details, see "Chart Properties" on page 397.

🎋 **Build a Business CI Model**

This task describes how to build a business CI model which can serve as the basis for a view.

This task includes the following steps:

➤ "Create the New Model" on page 351

➤ "Add CIs to the Model Manually" on page 351

➤ "Reveal CIs" on page 352

➤ "Define Watchpoints for CIs in the Model" on page 352

1 Create the New Model

In the Modeling Studio, click the **New** ✳ button and select **Model** to open the New Model dialog box. Select a CI type and enter the values for its properties. For details, see "New Model Dialog Box" on page 386.

2 Add CIs to the Model Manually

In the CI Selector, search for the CIs you want to include in your model. Select them and drag them into the model.

Tip: You can select more than one CI by holding the CTRL key while selecting CIs.

---

3 Reveal CIs

Select a CI in the model and reveal its related CIs along a reveal path. Add selected CIs from among the revealed CIs to your model. When you are done, save the model. For details, see "Reveal CIs Dialog Box" on page 405.

4 Define Watchpoints for CIs in the Model

Right-click a CI in the model and select **Watchpoint > New Watchpoint**. The New Watchpoint dialog box opens. Select a reveal path and click **OK**. A small icon appears next to the CI indicating that a watchpoint is defined for it. For details, see "New Watchpoint Dialog Box" on page 388.

Build a Pattern-based Model

This task describes how to build a pattern-based model which can serve as the basis for a perspective-based view.

This task includes the following steps:

➤ "Define the New Model" on page 352

➤ "Enter the Model Details" on page 353

➤ "Select a TQL Query" on page 353

➤ "Add Query Nodes and Relationships to a TQL Query" on page 353

➤ "Set Output Query Nodes" on page 353

➤ "Save the Model" on page 353

1 Define the New Model

You define a pattern-based model using the Pattern-based Model wizard. Click the **New** button ✳ and select **Pattern Based Model**.

2 Enter the Model Details

On the first wizard page, select a CI type for the model and enter the properties. For details, see "Select CI Type Page" on page 390.

3 Select a TQL Query

On the next wizard page, select a TQL query for the model. You can create a new TQL query or select an existing query from the tree. The TQL Query Editor opens with the selected query. For details, see "Query Selection Page" on page 391.

4 Add Query Nodes and Relationships to a TQL Query

Add the query nodes and relationships that define the query. For details on how to add query nodes and relationships to a TQL query, see "Add Query Nodes and Relationships to a TQL Query" on page 30.

5 Set Output Query Nodes

Select one or more query nodes in the TQL query to serve as output for the model by right-clicking them and selecting **Add to Model Output**. The query node is indicated by a small icon next to it.

6 Save the Model

When you are finished, save the model with a unique name. If you created a new TQL query, the query is also saved independently of the model and can be re-used as a regular TQL query.

🪝 Build a Perspective-based View Based on a Model

This task describes how to build a view in the Modeling Studio based on a model and a perspective.

This task includes the following steps:

➤ "Open the Model" on page 354

➤ "Select a Perspective" on page 354

➤ "Save the View" on page 354

1 Open the Model

In the Modeling Studio, select **Models** as the Resource type in the left pane, select the relevant model, and click **Open Model** ⊕ in the left pane toolbar.

2 Select a Perspective

In the Model Editor, right-click the model and select **Generate View for selected model**. The Creating New View dialog box opens. Select perspectives to apply to the model. For details, see "Creating New View Dialog Box" on page 366.

3 Save the View

The Perspective-based View Editor opens with your new view. Optionally, build a perspective chain by selecting perspectives for additional levels of the view creation. Rename the view and save it in the correct folder. For details, see "Perspective-based View Editor" on page 397.

🏗 Build a Perspective-based View Based on a Collection of CIs

This task describes how to build a view in the Modeling Studio based on a collection of CIs and a perspective.

This task includes the following steps:

➤ "Create the New View" on page 355

➤ "Add CIs to the View" on page 355

➤ "Select a Perspective and Save the View" on page 355

1 Create the New View

In the Modeling Studio, click the **New** ✳ button and select **Perspective Based View** to open the Perspective-based View Editor. For details, see "Perspective-based View Editor" on page 397.

2 Add CIs to the View

In the CI Selector, search for the CIs you want to include in your view. Select them and drag them into the view. For details on the CI Selector, see "CI Selector" on page 159.

Tip: You can select more than one CI by holding the CTRL key while selecting CIs.

---

3 Select a Perspective and Save the View

In the Perspective pane, select perspectives to apply to your CI collection. Optionally, you can build a perspective chain by selecting perspectives for additional levels of the view creation. Rename the view and save it in the correct folder. For details, see "Perspective-based View Editor" on page 397.

🪚 Build a Business CI Model – Scenario

This scenario describes how to build a business CI model for use in a human resources application.

This task includes the following steps:

➤ "Create a Model" on page 356
➤ "Create Application CI Models Within Your Model" on page 356
➤ "Add System CIs to Your Model" on page 357
➤ "Add CIs to Your Model as Related CIs" on page 357

1 **Create a Model**

To create a model, you need to select a CI type and enter its key properties.

Select **Admin > RTSM Administration > Modeling > Modeling Studio** to open the Modeling Studio. For details about how to create a model, see "New Model Dialog Box" on page 386.

Example of a Business CI Model:

In this example, a human resources application called Onboard Employee is to be created. Select **Business Process** as the CI type and enter Onboard Employee as the name under the key properties.

2 **Create Application CI Models Within Your Model**

You can create models within your model by clicking the New Model icon 🔁 in the Model Editor. For details, see "Model Editor" on page 375.

Example of Application CI Models:

Within the Onboard Employee model, create a model of type **Application**. Enter HR Enterprise Resource Planning (ERP) as the name under the key properties. The application CI is created as a model within the Onboard Employee model. Repeat the process to create the following applications: Active Directory (AD) and Customer Relationship Management (CRM). The Onboard Employee model now includes three application models.

3 Add System CIs to Your Model

Add to your model the CIs for the servers or other software elements on which the applications are running.

Example of System CI Models:

Under the HR ERP application, drag the System CI **SAP System**. Under the AD application, drag the System CI **Node**. The System CIs are included in the model and their related CIs, such as Hosts and Monitors, are automatically added to the model as related CIs.

4 Add CIs to Your Model as Related CIs

Add the CIs that are to be related to the CIs in the model but are not included in the model. For details, see "Model Editor" on page 375.

Example of Related CIs:

Create an application CI of type Portal. Select the CRM application and click the Related CIs tab in the Information pane. Drag the Portal CI into the Information pane. The CI is added as a related CI to CRM.

Reference

🔍 Modeling Studio User Interface

This section includes (in alphabetical order):

Add/Edit Function Dialog Box

This dialog box enables you to define which of the query node's functions and parameters you want to include in the report.

To access	Click the **Add Function** button under the Report Layout box in the Query Node Definition pane of the Pattern View Editor.
Important information	When defining the report columns for a selected query node in a view, template, or perspective, you can define a column consisting of data deriving from a function defined for one of its child query nodes. Select the relevant child query node, attribute, and function that you want to define.
	First, select the required query node and function. The attribute list adjusts to display the relevant attribute for the selected combination. Select the required attribute.
Relevant tasks	"Define Report Settings" on page 349

User interface elements are described below:

UI Elements (A-Z)	Description
Attribute	Select an attribute from the list.
Function	From the **Function** list, select the function you want to use to calculate the results on these columns. The following are the available options: ➤ **Average**. The average value of the selected attribute for all the CI instances of the selected query node. ➤ **Concatenated List.** Lists the values of the selected attribute for all the CI instances of the selected query node. ➤ **Count**. Calculates the number of CI instances of the selected query node. ➤ **Distinct List.** Lists the unique values of the selected attribute for all the CI instances of the selected query node. ➤ **Max**. The maximum value of the selected attribute for all the CI instances of the selected query node. ➤ **Min**. The minimum value of the selected attribute for all the CI instances of the selected query node. ➤ **Sum**. The sum of the selected attribute values for all the CI instances of the selected query node.
Related Query Node	The child query node on which you want to perform the function.
Title	The name of the function attribute displayed in the report.

🔍 Change Query Node/Relationship Type Dialog Box

This dialog box enables you to change the CI type of a TQL query node or relationship after you have created a TQL query.

To access	In the TQL Query Editor or Pattern View Editor, right-click the required query node and select **Change Query Node Type**. For relationships, right-click the required relationship and select **Change Relationship Type**.
Important information	You can change the CI type of the selected query node to any other valid type based on the existing relationships and conditions of the selected query node.
Relevant tasks	➤ "Define a TQL Query" on page 29 ➤ "Implement a Discovery Adapter" in the *Run-time Service Model Developer Reference Guide* ➤ "Create a Pattern View" on page 341

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

UI Elements (A-Z)	Description
🔲	Click **Expand All** to expand all the folders in the tree.
🔳	Click **Collapse All** to collapse all the folders in the tree.
📋 **Tree View**	Click Tree View to select the display format of the CI type/Relationship tree. The following options are available: ➤ Display label ➤ Class name ➤ Legacy class name
<CI type/Relationship tree>	Select the required CI type or relationship.
Relationship Direction	Select the direction of the relationship. **Note:** Only relevant for relationships.

UI Elements (A-Z)	Description
Relationship Name	The name of the relationship.
	Note: Only relevant for relationships.
Relationship Restrictions	Select an option to define how to handle relationships between identical query nodes or self relationships in the query results. A self relationship is a relationship that leads from a query node to itself.
	➤ **Allow All Relationships**. All relationships appear in the query results.
	➤ **Allow Self Relationships only**. Only self-relationships (a relationship that leads to itself) appear in the query results.
	➤ **Allow Non Self Relationships only**. Self-relationships do not appear in the query results.
	Note: Only relevant for relationships.

🔍 Choose Operation for Selected Item Dialog Box

This dialog box enables you to create models and views from selected CIs.

To access	In the Modeling Studio, drag CIs from the CI Selector onto the empty canvas.
Important information	You can drag individual or multiple CIs onto the canvas. You can select ordinary CIs and/or models to drag onto the canvas. Use the CTRL key while selecting CIs to select multiple CIs.
See also	"Best Practices for Modeling" on page 209

User interface elements are described below:

UI Elements (A-Z)	Description
Create a new model	Select to build a model comprising the CIs in your selection. If the CIs you dragged onto the canvas include at least one CI that has no valid links to any of the model CI types, this option is disabled.
Create a new view	Select to build a view based on the CI collection formed by your selection.
Edit the model of the selected CI	Select to edit the selected model in the Model Editor. **Note:** This option only appears when a single model is dragged onto the canvas.

Conditions of Related CIs Dialog Box

This dialog box enables you to define conditions for the CI types in a reveal path.

To access	Click the **Add Condition** or **Edit Condition** buttons from the Conditions column of the Reveal CIs dialog box.
See also	"Best Practices for Modeling" on page 209

User interface elements are described below:

UI Elements (A-Z)	Description
✚	Add the attribute condition you have defined.
✖	Delete an attribute condition.
⬆	Move a selected row up.
⬇	Move a selected row down.
🔍	View the condition definition.
And/Or	Click inside the **And/Or** field and select either **And** or **Or** to link multiple conditions.
Attribute name	Select an attribute from the list.
{ } **Brackets**	Click inside the **Brackets** box to display a list of brackets you can use to build more complex, logical statements.
Criteria	Contains the attribute condition definition as defined in the Element Instances dialog box.
Not	Select **NOT** if you want the condition statement to do the opposite of what is defined.
	Note: If you select **NOT**, query results do not include data from the CI instances that were not assigned a value. For example, your system contains three node CIs: Node1 is assigned the value A, Node2 is assigned the value B and Node3 is not assigned a value. You create a query to retrieve all nodes that are equal to A and select **NOT**; the results of your query only include Node2 because Node3 is not assigned a value.
Operator	Select the required operator. For details, see "Attribute Operator Definitions" on page 44.
Value	Enter or select the value of the attribute. The **Value** options vary according to the attribute type you select.

🔍 Create/Edit/Save Reveal Path Dialog Box

This dialog box enables you to define a new reveal path or edit an existing path.

To access	To define a new reveal path, click the **Reveal** 🔍 button from the Model Editor, and select **Create Reveal Path**.
	To edit an existing reveal path, select a path from the Open Saved Reveal Path dialog box and click **Edit**.
	To save a reveal path, click **Save Path** from the Reveal CIs dialog box.
See also	"Best Practices for Modeling" on page 209

User interface elements are described below:

UI Elements (A-Z)	Description
Description	Enter a description of the path.
Name	Enter the name of the path.
Preview	Opens the Reveal CIs dialog box displaying the related CIs in the path.
	Note: This button does not appear in the Save Reveal Path dialog box.
Reveal Path	Build the path by clicking the ➕ icon to open a dialog box with a CI type tree. Select the CI type for the next item in the path.
	When you hold the pointer over a reveal path item, the following options are available:
	➤ **Delete.** Deletes the item from the reveal path.
	➤ **Add condition.** Opens the Conditions of Related CIs dialog box, which enables you to set conditions for the reveal path item.
	➤ **Refine Query Node Type.** Opens a CI type tree, which enables you to change the CI type of the reveal path item.

❧ Creating New View Dialog Box

This dialog box enables you to select a perspective to create a view from a model.

To access	In the Modeling Studio, right-click a model in the Model Editor, Perspective-based View Editor, or CI Selector and select **Generate view for selected Model** or click the **Generate view for selected model** icon 🖫 from the Model Editor.
Important information	You select perspectives in the left pane and move them to the right pane using the arrow buttons.
Relevant tasks	"Build a Perspective-based View Based on a Model" on page 353
See also	"Best Practices for Modeling" on page 209

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

UI Elements (A-Z)	Description
Available Perspectives	A list of the available perspectives to apply to your model.
Selected Perspectives	The perspectives you selected to apply to your model.

✎ Cycle Definition Dialog Box

This dialog box enables you to define a cyclical hierarchy in a view.

To access	In the Modeling Studio, right-click a query node in the Hierarchy pane of the Pattern View Editor and select **Define Cycles**.
Important information	You can extend the TQL query definition of a view by defining a cycle in the view hierarchy. Select a query node in the Hierarchy pane to be the source query node. The Cycle Definition dialog box displays the valid target query nodes for that source. The target query node in the cycle, along with its hierarchy, is treated as a child or sibling of the source query node (depending on your folding rule selection).
See also	"Best Practices for Modeling" on page 209

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

UI Elements (A-Z)	Description
Folding Rule	Select one of the following options: ➤ **Folded cycle under source.** The target query node becomes a child of the source query node. ➤ **Flattened cycle under parent.** The target query node becomes a sibling of the source query node.
Target	Displays the valid target query nodes for the selected source query node. A query node is defined as a valid target query node if all of the following conditions are true: ➤ it is related to the source query node ➤ it is an ancestor of the source query node (or the source query node itself) ➤ it is a query based node (not a grouping node)

🔖 Hidden CIs Dialog Box

This dialog box enables you to restore hidden CIs to a view.

To access	From the Perspective-based View Editor, click the **Show Hidden CIs** icon from the toolbar of the View Results pane.
See also	"Best Practices for Modeling" on page 209

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

UI Elements (A-Z)	Description
<check box>	Select the check boxes for the CIs you want to restore.
CI Type	The CI type of the excluded CI.
Name	The name of the excluded CI.
Restore	Click **Restore** to include the selected CIs in the view.
Select All	Click **Select All** to select all the CIs in the list for inclusion in the view.
Unselect All	Click **Unselect All** to clear the check boxes of all the CIs in the list.

🔖 Hierarchy Rules Dialog Box

This dialog box enables you to set the hierarchy of a view by defining hierarchy rules.

To access	From the Hierarchy pane of the Pattern View Editor, when Rule Based is selected as the hierarchy method, click the Add Hierarchy Rule button ➕ from the toolbar.
Important information	For each hierarchy rule you define, select a source CI type, target CI type, relationship, and direction.
See also	"Best Practices for Modeling" on page 209

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

UI Elements (A-Z)	Description
✚	Click to add a hierarchy rule.
✖	Click to delete the selected hierarchy rule.
Relationship	Select a relationship from the drop-down list to edit the selected hierarchy rule.
Relationship Direction	Select a direction from the drop-down list to edit the selected hierarchy rule.
Source	Select a CI type for the source CI type from the drop-down tree to edit the selected hierarchy rule.
Target	Select a CI type for the target CI type from the drop-down tree to edit the selected hierarchy rule.

🔍 Left Pane

This area enables you to browse views and TQL queries, search for CIs or models to open in the Editor pane, and select CI types to use in the TQL Query Editor or Pattern View Editor.

To access	Located to the left of the Editor pane in Modeling Studio.
Important information	The following tabs are available: ➤ **CI Selector.** See "CI Selector" on page 159. ➤ **Resources.** Enables you to select a model, view, or TQL query to open in the Editor pane. ➤ **CI Types.** Enables you to select CI types from the tree to add as a query node to your TQL query in the Editor pane.
See also	"Best Practices for Modeling" on page 209

Resources Tab

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

UI Elements (A-Z)	Description
	Click **New Folder** to create a new folder in the resource tree. **Note:** This button only appears when Queries or Views are selected as the resource type.
	Click **Delete** to delete the selected resource from the RTSM.
	Click **Refresh** to refresh the resource tree.
	Click **Expand All** to expand all the folders in the resource tree. **Note:** This button only appears when Queries or Views are selected as the resource type.
	Click **Collapse All** to collapse all the folders in the resource tree. **Note:** This button only appears when Queries or Views are selected as the resource type.
	Click **Hide Empty Folders** to display only folders containing models, views or TQL queries.
	When **Views** is selected as the resource type, click **Filter Tree** to filter the types of views and templates that appear in the tree. When **Queries** is selected as the resource type, it enables you to filter the TQL queries that appear in the tree by query type. When **Models** is selected as the resource type, click **Filter Table** to filter the models in the table by CI type.

UI Elements (A-Z)	Description
	Click **Open Query** to open the selected TQL query in the Editor pane. **Note:** This button only appears when Queries is selected as the resource type.
	Click **Open View** to open the selected view in the Editor pane. **Note:** This button only appears when Views is selected as the resource type.
	Click **CI Properties** to view the properties of the selected model. **Note:** This button only appears when Models is selected as the resource type.
	Click **Show views containing selected CI/model** to display a list of views including the selected CI or model. **Note:** This button only appears when Models is selected as the resource type.
	Click **Open Model** to open the selected model in the Model Editor. **Note:** This button only appears when Models is selected as the resource type.
	Click **Import From XML** to import XML files that contain saved views or queries to the Modeling Studio. **Note:** This button only appears when Queries or Views are selected as the resource type.
	Click **Export To XML** to export the view or query as an XML script. This option can be used to move a view or query from one workstation to another. **Note:** This button only appears when Queries or Views are selected as the resource type.

UI Elements (A-Z)	Description
\<Resource tree\>	The available views, models, or TQL queries are displayed under their respective folders in tree format.
	The following view types are included:
	➤ 🖼 Denotes a pattern view.
	➤ 📋 Denotes a template.
	➤ 🗂 Denotes a template-based view.
	➤ 📱 Denotes a perspective.
	➤ 🗂 Denotes a perspective-based view.
Resource Type	Select the resource type to display in the resource tree. The available options are Models, Views, and Queries.

Resources Tab Shortcut Menu

The Resources tab includes the following elements (listed alphabetically) available by right-clicking a resource:

Menu Item	Description
Delete	Delete the selected resource from the RTSM.
Export	Export the view or query as an XML script. This option can be used to move a view or query from one workstation to another.
New Folder	Create a new folder in the resource tree.
New Template-based View	Edit the parameters of the selected template to define a new template-based view.
	Note: This option is only active when a template is selected in the view tree.
Open Query/View	Open the selected view or TQL query in the Editor pane.
Refresh	Refresh the resource tree.
Rename Folder	Rename the selected folder.
Save As	Save the selected TQL query with a new name.
	Note: This option is only relevant for queries.

CI Types Tab

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

UI Elements (A-Z)	Description
	Click **Expand All** to expand all the folders in the CI Type tree.
	Click **Collapse All** to collapse all the folders in the CI Type tree.
Tree View	Click Tree View to select the display format of the CI type tree. The following options are available: ➤ Display label ➤ Class name ➤ Legacy class name
	Click to add the selected CI type to the TQL query which is open in the Editor pane. **Note:** This button is only active when a view or TQL query is open in the Editor pane.
	Click **Refresh** to refresh the CI Type tree.
<CI Type tree>	The available CI types are displayed in tree format.

CI Types Tab Shortcut Menu

The CI Types tab includes the following elements (listed alphabetically) available by right-clicking a CI type:

Menu Item	Description
Add Selected CITs to Query	Select to add the selected CI type to the TQL query open in the Editor pane.
Go to CI Type Definition	Takes you directly to the selected CI type in CIT Manager.
Show Element Instances	Opens the CI Instances window, which displays all instances of the selected CIT. For details, see "Element Instances Dialog Box" on page 75.

🔍 **Manage CI Watchpoints Dialog Box**

This dialog box enables you to add or remove watchpoints for a CI in a model.

To access	From within a model in the Model Editor, click the **Watchpoint** 🔍 button and select **Manage CI Watchpoints** or right-click a CI in the model and select **Watchpoint** > **Manage CI Watchpoints**.

User interface elements are described below:

UI Elements (A-Z)	Description
➕ **Add**	Click to open the New Watchpoint dialog box which enables you to add a new watchpoint.
✖ **Remove**	Click to delete the selected watchpoint.
Automated	A check mark indicates that the new CIs found by the watchpoint are to be added to the view automatically.
Source CI	Displays the CI forming the beginning of the reveal path.
Watchpoint Name	The name of the reveal path associated with the watchpoint.
Watchpoint Path	Displays the reveal path for the watchpoint.

✎ Model Editor

This feature enables you to create and edit models.

To access	In the Modeling Studio, click the **New** button ✳ and select **Instance Based Model** to create a new model or select **Models** as the Resource type and open an existing model.
Important information	The Model Editor contains the following panes: ➤ **Content pane.** Lists the CIs and models contained in the model. ➤ **Information pane.** Displays the properties, related CIs and watchpoints for the selected CI or model. You can drag CIs from the CI Selector into the Content pane of an existing model to add them to the model. However, you cannot drag in a CI that is already included in the model. You can drag CIs from the CI Selector into the Related CIs tab of the Information pane provided that the selected source and target CI can be related by a **usage** relationship.
See also	"Best Practices for Modeling" on page 209

Content Pane
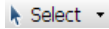
User interface elements are described below:

UI Elements (A-Z)	Description
▦ Map	Select **Map Mode** to display the CIs as icons in a diagram.
▥ Text	Select **Text Mode** to display the CIs in a list.
▤	Click **CI Properties** to open the Configuration Item Properties dialog box for the selected CI.
⬡	Click **Show models containing selected CI** to display a list of the models containing the selected CI.

UI Elements (A-Z)	Description
	Click **Show views containing selected CI/model** to display a list of the views containing the selected CI or model.
	Click **Open selected model in a new tab** to open the selected model in a separate Model Editor tab.
	Click **Generate view for selected model** to create a view based on the current model. The Creating New View dialog box opens, which enables you to select a perspective to apply.
	Click to remove a selected CI from the model (it remains in the RTSM).
	Click **Insert new model** to open the New Model dialog box which enables you to define a new model within the existing model.
	Click **Expand All** to expand the model hierarchy.
	Click **Collapse All** to collapse the model hierarchy.
	Click **Reveal** for the following options: ➤ **Start Revealing.** Opens the Reveal CIs dialog box. For details, see Reveal CIs dialog box. ➤ **Create Reveal Path.** Opens the Create Reveal Path dialog box. For details, see Create Reveal Path dialog box. ➤ **Open Reveal Path.** Opens the Open Saved Reveal Path dialog box. For details, see Open Saved Reveal Path dialog box.

UI Elements (A-Z)	Description
	Click **Watchpoint** for the following options: ➤ **Watchpoints Updates.** Display the watchpoint results and select CIs to add to the model. For details, see Watchpoints Updates dialog box. ➤ **New Watchpoint.** Define a new watchpoint for the selected CI. For details, see New Watchpoint dialog box. ➤ **Manage CI Watchpoints.** Add new watchpoints to the CI or remove existing ones. For details, see Manage CI Watchpoints dialog box.
	Click **CI Collection** to group CIs in a collection under a model. Select one of the following options: ➤ **Insert New CI Collection.** Create a new empty CI Collection. After creating the collection, you can drag CIs into it from the CI Selector, the related CIs tab, or from the model itself. ➤ **Join to CI Collection.** Select a CI or several CIs in the model and join them to an existing CI collection or form a new collection. ➤ **Decompose CI Collection.** Select a CI collection and decompose it. Its CIs remain directly under the main model.
	Click **Find** to toggle between displaying and hiding the Find box and arrow controls. **Note:** This button only appears in Text mode.
	Click to refresh the map and optimize the map layout. **Note:** This button only appears in Map mode.
	Click **Fit to Window** to resize the map to fit the size of the pane. **Note:** This button only appears in Map mode.

UI Elements (A-Z)	Description
Select ▾	Select the functionality of the cursor from the **Mode** drop-down. The following options are available: ➤ Select ➤ Drag Map ➤ Zoom **Note:** This feature only appears in Map mode.
Print...	Click the **Print** button to select Print, Print Preview or Print Setup.
	Select a CI and click **Show External Relationships** to display the related CIs for that CI. **Note:** This button only appears in Map mode.
	Click **Hide External Relationships** to hide the related CIs. **Note:** This button only appears in Map mode.
	Indicates that watchpoints are defined for the current CI.
	Indicates that the watchpoints have detected new CIs related to the current model. Click it to open the Watchpoints Updates dialog box.
CI Type column	Displays the type of each CI in the model.
Find	Enter a CI name or a portion of a CI name in the Find box to locate a CI in the model.
Find Next	Click to go to the next occurrence of the selected search phrase in the model.
Find Previous	Click to go to the previous occurrence of the selected search phrase in the model.
Highlight	Click to highlight all occurrences of the search phrase in the model.
Name column	Displays the name of each CI in the model.

Shortcut Menu Options

Menu Item	Description
CI Collection	Click **CI Collection** to group CIs in a collection under a model. Select one of the following options: ➤ **Insert New CI Collection.** Create a new empty collection. After creating the collection, you can drag CIs into it from the CI Selector, the related CIs tab, or from the model itself. ➤ **Join to CI Collection.** Select a CI or several CIs in the model and join them to an existing CI collection or form a new group. ➤ **Decompose CI Collection.** Select a CI collection and decompose it. Its CIs remain directly under the main model.
Fit to Window	Resizes the map to fit the size of the pane. **Note:** This option only appears in Map mode.
Generate view for selected model	Select to create a view based on the current model. The Creating New View dialog box opens which enables you to select a perspective to apply.
Hide External Relationships	Hides the related CIs from the map. **Note:** This option only appears in Map mode.
Insert New Model	Opens the New Model dialog box which enables you to create a new model within the existing model.
Open selected model in a new tab	Opens the selected model in a separate Model Editor tab.
Print	Select one of the following options: ➤ Print ➤ Print Preview ➤ Print Setup
Properties	Opens the Configuration Item Properties dialog box for the selected CI.
Refresh Layout	Refreshes the map and optimizes the map layout. **Note:** This option only appears in Map mode.

Menu Item	Description
Reveal	The following options are available: ➤ **Start Revealing.** Opens the Reveal CIs dialog box. For details, see Reveal CIs dialog box. ➤ **Open Reveal Path.** Opens the Open Saved Reveal Path dialog box. For details, see Open Saved Reveal Path dialog box.
Remove Selected CI(s) from the Model	Deletes the selected CIs from the model (it remains in the RTSM).
Select	Select the functionality of the cursor. The following options are available: ➤ Select ➤ Drap Map ➤ Zoom **Note:** This option only appears in Map mode.
Show Containing Models	Click to display a list of the models containing the selected CI.
Show Containing Views	Click to display a list of the views containing the selected CI or model.
Show External Relationships	Displays the related CIs for the selected CI. **Note:** This option only appears in Map mode.
Watchpoint	The following options are available: ➤ **Watchpoints Updates.** Display the watchpoint results and select CIs to add to the model. For details, see Watchpoints Updates dialog box. ➤ **New Watchpoint.** Define a new watchpoint for the selected CI. For details, see New Watchpoint dialog box. ➤ **Manage CI Watchpoints.** Add new watchpoints to the CI or remove existing ones. For details, see Manage CI Watchpoints dialog box.
Zoom	Select the size of the map from the list of percents. **Note:** This option only appears in Map mode.

Information Pane - Properties Tab

This area displays the properties of the selected CI.

Important information	This pane is identical to the Properties tab of the Information pane in IT Universe Manager. For details, see "Configuration Item Properties Dialog Box" on page 254.

Information Pane - Related CIs Tab

This area displays the CIs related to the model by one of the triplets that includes an Impacted By (Potentially) relationship.

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

UI Elements (A-Z)	Description
✖	Click to delete the relationship to the selected CI.
⇄	Click **Invert Direction** to switch the direction of the relationship for the selected CI. **Note:** This option is only active for CIs related by a **usage** relationship.
<CI list>	Lists the name and CI type of the CIs related to the model by usage relationships, as well as the direction of the relationship.
Filter by	Select a field by which to filter the results and enter the value in the **by** box.

Information Pane - Watchpoints Tab

This area displays the watchpoints defined for the selected CI.

User interface elements are described below:

UI Elements (A-Z)	Description
	Click to open the Manage CI Watchpoints dialog box, which enables you to edit the watchpoint.
Automated	Indicates whether the new CIs found by the watchpoint are automatically added to the view.
Source CI	Displays the CI forming the beginning of the reveal path.
Watchpoint Name	The name of the reveal path associated with the watchpoint.
Watchpoint Path	Displays the reveal path of the watchpoint.

🔍 **Modeling Studio Page**

This page enables you to create and edit models and views.

Tip: For more information about using Modeling Studio in HP Business Service Management, see "Best Practices for Modeling" on page 209.

To access	Select **Admin** > **RTSM Administration** > **Modeling** > **Modeling Studio**.
Important information	The Modeling Studio page contains the following panes: ➤ **Left pane.** Enables you to search for CIs or select a view, model, or TQL query to open. For details, see "Left Pane" on page 369. ➤ **Editor pane**. Displays the topology map of a selected view, model, or TQL query. The Editor pane is a blank canvas before any views or models are opened. When you open a view, model, or TQL query, the relevant editor appears there. Multiple views, models, and queries can be open at the same time in the Editor pane, each within a separate tab.
See also	Model Editor, Perspective-based View Editor, Pattern View Editor, TQL Query Editor

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

UI Elements (A-Z)	Description
New	Click the click the **New** button to select one of the following options: ➤ **Instance Based Model.** To create a new instance based model. ➤ **Pattern Based Model.** To create a new pattern based model. ➤ **Pattern View.** To create a new pattern view. ➤ **Template Based View.** To create a new template-based view. ➤ **Perspective Based View.** To create a new perspective-based view. ➤ **Template.** To create a new template. ➤ **Perspective.** To create a new perspective. ➤ **Query.** To create a new TQL query.
	Click **Save** to save the changes to your view, model, or query. For views, a dialog box opens which enables you to rename your view and save it in the appropriate folder.
	Click **Save As** to save your view, model, or TQL query under a new name.
	Click **Undo** to reverse the last change you made.
	Click **Redo** to repeat the last action you took.
	Click **Maximize Workspace** to toggle between the regular display and a full-screen display of the editor.
<Menu>	For details, see "Main Menu" on page 193.

Models Containing Selected CI Dialog Box

This dialog box enables you to display a list of the models containing the selected CI.

To access	Click the **Show models containing selected CI** button in the Model Editor or select **Show containing models** from the shortcut menu.
See also	"Best Practices for Modeling" on page 209

User interface elements are described below:

UI Elements (A-Z)	Description
	Click **CI Properties** to open the Configuration Item Properties dialog box for the selected model.
	Click **Show views containing selected CI/model** to display a list of views containing the selected model.
	Click **Remove model** to delete the selected model.
CI Type	Displays the CI types of the models containing the selected CI.
Find	Enter a model name or a portion of a model name in the Find box to locate it in the list.
Find Next	Click to go to the next occurrence of the selected search phrase in the list.
Find Previous	Click to go to the previous occurrence of the selected search phrase in the list.
Name	Displays the names of the models containing the selected CI. **Note:** The name of the current model appears in faded text.

🔖 New Model Dialog Box

This dialog box enables you to define a reusable model containing a collection of CIs.

To access	Click the **New** ✳ button and select **Instance Based Model** or drag a CI from the tree in the CI Selector onto the editing pane and select **Create a new model**.
Relevant tasks	"Build a Business CI Model" on page 350
See also	"Best Practices for Modeling" on page 209

User interface elements are described below:

UI Elements (A-Z)	Description
Define new CI Properties	Enter the values for the CI properties. You must enter values for key properties and required properties. The key properties are marked with a key symbol 🔑 and the required properties are marked with an asterisk.
Select CI Type	Select a CI type from the list to serve as the basis for your model.

🔖 New Pattern View/Template/Perspective Dialog Box

This dialog box enables you to define a new pattern view, template, or perspective using the Pattern View Editor.

To access	In the Modeling Studio, click the **New** ✳ button and select **Pattern View, Template,** or **Perspective** from the drop-down menu.
Important information	After making your selection and clicking OK, you go directly to the Pattern View Editor to begin building your view. For details, see "Pattern View Editor" on page 392.

Relevant tasks	"Create a Pattern View" on page 341, "Create a Template" on page 342, "Create a Perspective" on page 344
See also	"Best Practices for Modeling" on page 209

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

UI Elements (A-Z)	Description
⊙	Click to go to the next occurrence of the selected search phrase in the list of TQL queries.
⊙	Click to go to the previous occurrence of the selected search phrase in the list of TQL queries.
▤	Click to highlight all occurrences of the search phrase in the list of TQL queries.
<TQL query tree>	Displays the existing TQL queries in tree format.
Choose base query	If you want to base your new view on an existing TQL query, select this option and select a TQL query from the tree. The Pattern View Editor opens with the selected TQL query on the canvas.
Create new query	If you want to base your new view on a new TQL query, select this option. The Pattern View Editor opens with a blank canvas.
Find	Enter a TQL query name or a portion of a query name in the Find box to locate a TQL query in the list.

🔍 New Watchpoint Dialog Box

This dialog box enables you to define a watchpoint for a CI in a model.

To access	From within a model in the Model Editor, click the **Watchpoint** 🔍 button and select **New Watchpoint** or right-click a CI in the model and select **Watchpoint** > **New Watchpoint**.
Important information	If no reveal paths are found for the selected CI, no watchpoints can be defined.
	You cannot define watchpoints for CIs in a new model until you save the model.
Relevant tasks	"Build a Business CI Model" on page 350

User interface elements are described below:

UI Elements (A-Z)	Description
Automatically update model	Select to automatically add all revealed CIs from the selected path to the model.
Control updates manually	Select to manually add revealed CIs from the selected path to the model.
Select Watchpoint reveal path	Select a reveal path from the drop-down list.
Show reveal paths for CI type	Select a CI type from the drop-down list. All reveal paths beginning with that CI type appear in the list in the lower drop-down box.

🔍 Open Saved Reveal Path Dialog Box

This dialog box enables you to open an existing path.

To access	From within a model in the Model Editor, click the **Reveal** 🔍 button and select **Open Reveal Path** or right-click a CI in the model and select **Reveal** > **Open Reveal Path**.
Important information	After selecting the reveal path you want to use, click **Execute**. If CIs are found on the selected path, the Reveal CIs dialog box opens for that path. If no CIs are found, a message appears stating that no CIs were found on the path.

User interface elements are described below:

UI Elements (A-Z)	Description
Description column	Displays the descriptions of the existing paths.
Edit	Opens the Edit Reveal Path dialog box which enables you to edit the selected path.
Execute	Opens the Reveal CIs dialog box for the selected reveal path.
Find	Enter a path name or a portion of a path name in the Find box to locate a path in the list.
Find Next	Click to go to the next occurrence of the selected search phrase in the list of paths.
Find Previous	Click to go to the previous occurrence of the selected search phrase in the list of paths.
Highlight	Click to highlight all occurrences of the search phrase in the list of paths.
Name column	Displays the names of the existing paths.
Remove	Deletes the selected path.
Show reveal paths for CI type	Select a CI type from the drop-down list. All paths beginning with the selected CI appear in the table below.

Pattern-based Model Wizard

This wizard enables you to build a pattern-based model.

To access	In the Modeling Studio, click the **New** ✳ button and select **Pattern Based Model** from the drop-down menu.
Important information	When you create a pattern-based model, the model is saved as a CI, as with an ordinary model. If you based your model on a new TQL query, the query is also saved and appears in the TQL query tree.
Relevant tasks	"Build a Pattern-based Model" on page 352
Wizard map	The Pattern-based Model Wizard contains: Select CI Type Page > Query Selection Page
See also	"Pattern-based Models" on page 330

Select CI Type Page

This wizard page enables you to select a CI type for the model and define its details.

Wizard map	The Pattern-based Model Wizard contains: **Select CI Type Page** > Query Selection Page

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

UI Elements (A-Z)	Description
Define new CI Properties	Enter the values for the CI properties. You must enter values for key properties and required properties. The key properties are marked with a key symbol 🔑 and the required properties are marked with an asterisk.
Select CI Type	Select a CI type from the list to serve as the basis for your model.

🔍 Query Selection Page

This wizard page enables you to select a TQL query upon which the model is based.

Wizard map	The Pattern-based Model Wizard contains:
	Select CI Type Page > **Query Selection Page**

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

UI Elements (A-Z)	Description
⊘	Click to go to the next occurrence of the selected search phrase in the list of TQL queries.
△	Click to go to the previous occurrence of the selected search phrase in the list of TQL queries.
▤	Click to highlight all occurrences of the search phrase in the list of TQL queries.
<TQL Query tree>	Displays the existing TQL queries in tree format.
Choose base query	If you want to base your model on an existing TQL query, select this option and select a query from the tree. The TQL Query Editor opens with the selected query on the canvas.
Create new query	If you want to base your model on a new TQL query, select this option. The TQL Query Editor opens with a blank canvas.
Find	Enter a TQL query name or a portion of a query name in the Find box to locate a query in the list.

🔍 Pattern View Editor

This feature enables you to build and edit pattern views, templates, and perspectives.

To access	To open a new view in the Pattern View Editor, go to the Modeling Studio, click the **New** ✳ button and select the required type of view.
	To open an existing view in the Pattern View Editor, go to the Resources tab of the left pane in the Modeling Studio and select **Views** as the Resource type. Right click a view in the tree and select **Open View** or double click a view or drag a view onto the Editor pane. The topology map of the view opens in the Editor pane.
Important information	You can access the Editor in **View** mode or in **Report** mode.
	➤ In **View** mode, the following panes are included:
	➤ **Editing pane.** For details, see "TQL Query Editor" on page 414.
	➤ **Advanced pane.** For details, see "Advanced Pane" on page 416.
	➤ **Hierarchy pane.** Enables you to set the hierarchy of the view. (Located in the right portion of the Editor page.)
	➤ In **Report** mode, the following panes are included:
	➤ **Hierarchy pane.** Enables you to set the hierarchy of the view. (Located in the left portion of the Editor page.)
	➤ **Query Node Definition.** Enables you to select the attributes to be included in the report and to set their order.
	Note: To save your view, template, or perspective, use the **Save** button in the Modeling Studio main toolbar.
Relevant tasks	"Create a Pattern View" on page 341, "Create a Template" on page 342, "Create a Perspective" on page 344
See also	"Best Practices for Modeling" on page 209

Hierarchy Pane

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

UI Elements (A-Z)	Description
	Click **Add Group By** to create a subgroup in the hierarchy. The following options are available: ➤ **Add Group By Attribute.** Opens the Query Node Grouping dialog box, which enables you to select an attribute for a subgroup in the hierarchy. ➤ **Add Group By CI Type**. Create a subgroup in the hierarchy for the CI type of the selected query node. ➤ **Add Group by Query Node**. Create a subgroup in the hierarchy for the selected query node only.
	Click **Edit Group By Attribute** to open the Query Node Grouping dialog box, which enables you to edit the attribute for a subgroup in the hierarchy.
	Click **Rename** to rename the selected query node.
	Click **Delete Query Node** to delete the selected query node from the hierarchy tree.
	Click **Move Query Node Layer Up** to place the selected query node one layer higher in the hierarchy.
	Click **Move Query Node Layer Down** to place the selected query node under the query node above it in the hierarchy. **Note:** If the selected query node is located at the top of the hierarchy tree, clicking **Move Query Node Layer Down** places it under the query node beneath it in the hierarchy.
	Click **Move Query Node Up** to move the selected query node up in the hierarchy tree. The query node order in the hierarchy determines the query node order in the report generated for the view in Reports.

UI Elements (A-Z)	Description
⬇	Click **Move Query Node Down** to move the selected query node down in the hierarchy tree. The query node order in the hierarchy determines the query node order in the report generated for the view in Reports.
🔍	Click **Preview** to display a preview of the topology report. **Note:** This option only appears in the Hierarchy pane when Report mode is selected.
<Hierarchy tree>	The query nodes of the TQL query are arranged in a hierarchical tree reflecting the hierarchy defined for the view. You can click and drag query nodes to change the hierarchy. When you click a query node and begin to drag it, the query nodes under which it is possible to place your query node are highlighted in green.
Hierarchy Method	Select the method of setting the hierarchy: ➤ **Manual.** Set the hierarchy manually, by dragging query nodes and using the toolbar buttons. ➤ **Rule Based.** Open the Hierarchy Rules dialog box which enables you to set rules for the hierarchy.

Shortcut Menu

The Hierarchy pane includes the following elements (listed alphabetically) available by right-clicking a query node in the hierarchy tree:

Menu Item	Description
Add Group By Attribute	Select **Add Group By Attribute** to open the Query Node Grouping dialog box, which enables you to select an attribute for a subgroup in the hierarchy.
Add Group By CI Type	Select **Add Group By CI Type** to create a subgroup in the hierarchy for the CI type of the selected query node.
Add Group By Query Node	Select **Add Group By Query Node** to create a subgroup in the hierarchy for the selected query node only.

Menu Item	Description
Define Cycles	Select **Define Cycles** to define a cyclical hierarchy. For details, see "Cycle Definition Dialog Box" on page 367.
Delete Query Node	Select to delete the selected query node from the hierarchy tree.
Move Query Node Down	Select to move the selected query node down in the hierarchy tree.
Move Query Node Layer Down	Select **Move Query Node Layer Down** to place the selected query node under the query node above it in the hierarchy. **Note:** If the selected query node is located at the top of the hierarchy tree, selecting **Move Query Node Layer Down** places it under the query node beneath it in the hierarchy
Move Query Node Layer Up	Select **Move Query Node Layer Up** to place the selected query node one layer higher in the hierarchy.
Move Query Node Up	Select to move the selected query node up in the hierarchy tree.
Rename	Select to rename the selected query node.
Subgraph Hierarchy	Enables you to define whether the subgraph defined for the selected query node is displayed as flat or as folded under the query node. **Note:** This option is only relevant for query nodes that have a defined subgraph.

Query Node Definition Pane

User interface elements are described below:

UI Elements (A-Z)	Description
⬆	Click **Up** to move a selected attribute up in the report layout order.
⬇	Click **Down** to move a selected attribute down in the report layout order.

UI Elements (A-Z)	Description
✎	Click **Edit** to edit the function for the selected attribute.
✖	Click **Delete** to delete a selected attribute from the report layout.
➡	Click to move the selected attributes to the Report Layout list.
Add Function	Click **Add Function** to open the Add Function dialog box, which enables you to define the functions to include in the report for the selected query node. Each function that you add is treated as an attribute and becomes a column in the report. **Note:** This button is only active if there is a query node below the selected query node in the view hierarchy.
Attributes	The list of available attributes for the selected query node.
Define Chart	Click **Define Chart** to display the data for the current layer of the view in a graphical chart format. The Chart Properties fields are displayed. The Define Chart option is only active for a query node or a grouping node that: ➤ has a layer below it in the view hierarchy ➤ is the only query node on its layer of the view ➤ has at least one numeric attribute selected for the report layout
Report Layout	Displays the list of attributes selected to appear in the report. Use the toolbar buttons to change the order of the attributes in the report and to add functions.
Set Sort Order	Click to open the Set Column Sort Order dialog box which enables you to set the order of the report columns.

Chart Properties

The Chart Properties portion of the pane includes the following elements (listed alphabetically):

UI Elements (A-Z)	Description
	Click Remove Chart to remove the chart from the report. The report is generated in table format.
Breakdown by	The chart is broken down by the CI or grouping node display label. This is fixed for all reports.
Chart Type	Select **Pie** to create a pie chart or **Bar** to create a bar chart.
Value	Select a value from the drop-down list.

Perspective-based View Editor

This feature enables you to create and edit perspective-based views.

To access	In the Modeling Studio, click the **New** button ✳ and select **Perspective Based View** to create a new view or drag CIs from the CI Selector onto the blank canvas and select **Create a new view**. To open an existing view in the Editor, select Views as the resource type in the Resources pane, select the required perspective-based view from the tree, and click **Open View** 🖼 or double-click the view.
Important information	The Perspective-based View Editor contains the following panes: ➤ **Content pane.** Drag CIs and/or models onto this pane to include them in your view. ➤ **Perspective pane.** Select perspectives to apply to the content to build a view. ➤ **View Results pane.** Displays a topology map with a preview of the current view. This pane includes most of the IT Universe Manager functionality.

Relevant tasks	"Build a Perspective-based View Based on a Model" on page 353, "Build a Perspective-based View Based on a Collection of CIs" on page 354
See also	"Best Practices for Modeling" on page 209

Content Pane

User interface elements are described below:

UI Elements (A-Z)	Description
●	Go directly to IT Universe Manager for the current view.
▣	Click **CI Properties** to open the Configuration Item Properties dialog box for the selected CI.
▣	Click **Show models containing selected CI** to display a list of the models containing the selected CI.
▣	Click **Show views containing selected CI/model** to display a list of the views containing the selected CI or model.
◈◈	Click **Open selected model in a new tab** to open the selected model in a separate Model Editor tab.
▣	Click **Generate view for selected model** to create a view based on the selected model. The Creating New View dialog box opens which enables you to select a perspective to apply.
✖	Click to remove a selected CI from the view content.
▣	Click **View Definition Properties** to open the View Definition Properties dialog box which enables you to set properties for the view.
🔍	Click **Find** to toggle between displaying and hiding the Find box and arrow controls.
CI Type column	Displays the type of each CI in the view.
Find	Enter a CI name or a portion of a CI name in the Find box to locate a CI in the view

UI Elements (A-Z)	Description
Find Next	Click to go to the next occurrence of the selected search phrase in the view.
Find Previous	Click to go to the previous occurrence of the selected search phrase in the view.
Highlight	Click to highlight all occurrences of the search phrase in the view.
Name column	Displays the name of each CI in the view.

Shortcut Menu Options

Menu Item	Description
Generate view for selected model	Select to create a view based on the selected model. The Creating New View dialog box opens which enables you to select a perspective to apply.
Open selected model in a new tab	Opens the selected model in a separate Model Editor tab.
Properties	Opens the Configuration Item Properties dialog box for the selected CI.
Remove Base CIs	Deletes the selected CI or model from the view content.
Show Containing Models	Click to display a list of the models containing the selected CI.
Show Containing Views	Click to display a list of the views containing the selected CI or model.

Perspective Pane

User interface elements are described below:

UI Elements (A-Z)	Description
	Delete the selected level of the perspective selection.
	Shift the perspective selection from the current level to the previous one.

UI Elements (A-Z)	Description
⬇	Shift the perspective selection from the current level to the following one.
➕	Add a new level to the perspective selection. The results of the previous perspective level serve as the input content for the new level.
⋯	Open a dialog box with the available perspectives. Move the required perspectives from the available column to the selected column using the arrow buttons.
Apply Over Model Hierarchy	For views based on models, select the **Apply Over Model Hierarchy** check box to include the model hierarchy in the view and apply the perspectives to the CIs included in the model as well as to the model itself. Clear the check box to exclude the model hierarchy from the view and apply the perspectives to the model itself only. In this case, the model is treated as an ordinary CI. **Note:** This option is disabled for a view based on a collection of CIs or on a model and a collection of CIs.
Perspectives	Lists the selected perspectives.

View Results Pane

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

UI Elements (A-Z)	Description
Map	Click to display the view results in Map mode.
Text	Click to display the view results in Text mode.
⬆	Create a relationship between two CIs in the view.
▤	Toggle between hiding and displaying the topology map legend.
⬆	Move up one level in the topology map.

UI Elements (A-Z)	Description
⬇	Move down one level in the topology map.
✖	Delete the selected CI from the view.
	Click **Show CI Properties** to open the Configuration Item Properties dialog box for the selected CI.
⟳	Click **Refresh** to refresh the view results.
🗑	Click **Hide CI from View** to hide the selected CI from the view. This option is only relevant for CIs that were added to the view via the perspective. You cannot hide CIs from the original view content from the view. **Note:** Hidden CIs can be restored from the Hidden CIs dialog box.
	Click **Show Hidden CIs** to open the Hidden CIs dialog box which enables you to restore CIs that were hidden from the view manually.
	Click **Create view based on selected CI/s** to create a new view based on the CIs selected from the View Results pane.
▭	Click **Expand preview display** to display the preview in a separate pane.
<Breadcrumbs>	At the top of the topology map, the breadcrumbs indicate the relevant query nodes in each layer of the view for the path to the selected layer. The first item in the path is the **Top Layer**. When you select a CI from the layer below, the parent CI forms the next item in the breadcrumb path. You can click on any item in the path to display that layer in the topology map.

UI Elements (A-Z)	Description
<Legend>	Indicates the icons displayed next to CIs with any of the following special statuses: ➤ **Added.** When Change Timeframe is active, indicates that the CI was added. ➤ **Affected.** When Impact Analysis is active, indicates an affected CI. ➤ **Affected and Trigger.** When Impact Analysis is active, indicates a trigger CI that is affected. ➤ **Candidate for Deletion.** Indicates that the CI is a candidate for deletion. ➤ **Changed.** When Change Timeframe is active, indicates that the CI was changed. ➤ **Note.** Indicates that a note was added for the CI. ➤ **Trigger.** When Impact Analysis is active, indicates a trigger CI.
<Topology Map>	The topology map in the View Results pane follows the layout of the topology map in IT Universe Manager. For details, see "Topology Map" on page 267.
<Topology Map Sidebar>	For details, see "Topology Map Sidebar" on page 205.

Shortcut Menu Options

Menu Item	Description
<IT Universe Shortcut Menu options>	The IT Universe Manager shortcut menu options are available. For details, see "IT Universe Manager Shortcut Menu" on page 272.
Create view based on selected CI/s	Select **Create view based on selected CI/s** to create a new view based on the CIs selected from the View Results pane.

Menu Item	Description
Hide CI from View	Click to hide the selected CI from the view. This option is only relevant for CIs that were added to the view via the perspective. You cannot hide CIs from the original view content from the view. In the case of a view based on a model, the model cannot be hidden but its CIs can.
Show Hidden CIs	Restore hidden CIs to the view.

🔍 Query Node Grouping Dialog Box

This dialog box enables you to define a new grouping of CIs or to edit an existing grouping.

To access	Click the **Add Group by** button 📁 in the Hierarchy pane of the Pattern View Editor and select **Add Group by Attribute** or right click the required query node and select **Add Group by Attribute** from the shortcut menu.

User interface elements are described below:

UI Elements (A-Z)	Description
Expression capture group index	Enter the number of the relevant portion of the regular expression. Enter **0** if the entire expression is relevant.
Group by	Select an attribute from the drop-down list.
Mask to group by	Enter a regular expression pattern representing the structure of the selected attribute. For details, see "Query Node Grouping" on page 325.

🔍 Query/View Definition Properties Dialog Box

This dialog box enables you to configure the properties of a TQL query or view.

To access	In the Modeling Studio, click the **Query/View Definition Properties** 🖼 button in the TQL Query Editor or Pattern View Editor.
See also	"Best Practices for Modeling" on page 209

User interface elements are described below:

UI Elements (A-Z)	Description
Base Query	Select an existing TQL query on which to base your new query. **Note:** ➤ This field is only relevant for TQL queries. ➤ This field is optional.
Bundles	A method of grouping TQL queries or views by category. Select the bundles associated with the current query or view or create a new bundle for it. **Note:** This field is optional.
Description	A description of the TQL query or view.
Inter-Layer Links	Select to display inter-layer links in the topology results. **Note:** This field is only relevant for views.
Persistent	Select to define the TQL query as persistent. A persistent query remains in the memory permanently. **Note:** This field is only relevant for TQL queries.

UI Elements (A-Z)	Description
Priority	Select a priority level for the TQL query or view from the drop-down list (Low, Medium, High, Express, Not Active). This setting determines how often the query should be rerun automatically by the system to include updated information from the RTSM. **Note:** When you change the priority of a view, the priority of the TQL query on which the view is based is also changed.
Scope	Select the scope of the TQL query from the drop-down list. **Note:** This field is only relevant for Integration TQL queries.
Type	Select the type of the TQL query from the drop-down list. **Note:** This field is only relevant for TQL queries.

Reveal CIs Dialog Box

This dialog box enables you to search for CIs related to the CIs in a model and add them to the model.

To access	In the Model Editor of the Modeling Studio, select a CI, click the **Reveal** button, and select **Start Revealing** or right-click a CI in the model and select **Reveal > Start Revealing**.

Important information	The upper pane displays the CI types of the CIs related to the selected CI. The lower pane displays the CIs of the type selected in the upper pane.
	The first step in the reveal path is the CI type of the CI you began with. When you select a CI type from the list in the upper pane, that CI type becomes the second step in the path. Click **Next** to display the CI types available for the next step of the path.
	The number at the top of the box in parentheses indicates the length of the constructed path thus far.
Relevant tasks	"Build a Business CI Model" on page 350

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

UI Elements (A-Z)	Description
✖	Click to delete a selected item from the CIs basket.
🛒	Click to add a selected CI from the lower pane to the CIs basket.
⊘	Click to go to the next occurrence of the selected search phrase in the list of CIs.
⊙	Click to go to the previous occurrence of the selected search phrase in the list of CIs.
<Lower pane>	Displays a list of related CIs of the type selected in the upper pane.
CI count	Indicates how many related CIs of each type were found.
CIs Basket	Displays the related CIs you selected to include in the model.
CI Type	Displays a list of CI types of the CIs related to the selected CI.

UI Elements (A-Z)	Description
Conditions	A check mark indicates that conditions were defined for the selected CI type. Click the Conditions column for the CI type you want to select and click the **Add Condition** or **Edit Condition** button to open the Conditions of Related CIs dialog box. This enables you to define and edit conditions for the CI type.
Find	Enter a CI name or a portion of a CI name in the Find box to locate a CI in the list of CIs.
Finish	Click **Finish** when you have finished adding CIs to the CI basket.
Next	Click **Next** to display the CI types available for the next step of the path.
Reveal Path	Displays the reveal path being constructed. Clicking the blue arrows in the path ➝ displays a drop-down list of the CI types available for the next step of the path. Clicking the CI types in the path displays the following options: ➤ **Jump to page.** Refreshes the table with the available CI types for the selected step of the path. ➤ **Edit Condition.** Opens the Conditions of Related CIs dialog box. ➤ **Delete Selected Item(s).** Deletes the selected CI type from the reveal path (the path ends at the previous CI type).
Save Path	Opens the Save Reveal Path dialog box which enables you to save the path. This option is only active when a unique reveal path has been constructed.

🔍 Save Query Dialog Box

This dialog box enables you to save a new TQL query.

To access	In the Modeling Studio, click the **Save** 💾 button when defining a new TQL query.
See also	"Best Practices for Modeling" on page 209

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

UI Elements (A-Z)	Description
📁	Click **New Folder** to create a new folder in the resource tree.
✖	Click **Delete** to delete the selected resource from the RTSM.
🔄	Click **Refresh** to refresh the resource tree.
🔽	Click **Expand All** to expand all the folders in the resource tree.
🔼	Click **Collapse All** to collapse all the folders in the resource tree.
▽	Click to go to the next occurrence of the selected search phrase in the list of queries.
△	Click to go to the previous occurrence of the selected search phrase in the list of queries.
☰	Click to highlight all occurrences of the search phrase in the list of queries.
<Resource tree>	Select a folder in the tree in which to save the query.
Find	Enter a view name or a portion of a name in the Find box to locate a query in the list.
Query Name	Enter the name of the new TQL query.

⚹ Save View/Template/Perspective Dialog Box

This dialog box enables you to save a new pattern view, template-based view, perspective-based view, template, or perspective.

To access	In the Modeling Studio, click the **Save** 💾 button when defining a new pattern view, template-based view, perspective-based view, template, or perspective.
See also	"Best Practices for Modeling" on page 209

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

UI Elements (A-Z)	Description
📁	Click **New Folder** to create a new folder in the resource tree.
✖	Click **Delete** to delete the selected resource from the RTSM.
🔄	Click **Refresh** to refresh the resource tree.
🔽	Click **Expand All** to expand all the folders in the resource tree.
🔼	Click **Collapse All** to collapse all the folders in the resource tree.
▽	Click to go to the next occurrence of the selected search phrase in the list of views.
△	Click to go to the previous occurrence of the selected search phrase in the list of views.
☰	Click to highlight all occurrences of the search phrase in the list of views.
<Resource tree>	Select a folder in the tree in which to save the view, template, or perspective.
Find	Enter a view name or a portion of a name in the Find box to locate a view in the list.

UI Elements (A-Z)	Description
New query	Select **New query** if the view is based on a new TQL query.
	Note: This field is not relevant for template-based views and perspective-based views.
View Name	Enter the name of the new view, template, or perspective.

🔍 Select Data Sources Dialog Box

This dialog box enables you to select the required data sources for a TQL query node.

To access	In the Modeling Studio, right-click a TQL query node and select **Set Data Sources**.
Important information	You can select the data sources from which the TQL query generates the results for each query node. For details on data sources, see "Integration Studio Overview" in the *Run-time Service Model Data Flow Management Guide*.
See also	"Best Practices for Modeling" on page 209

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

UI Elements (A-Z)	Description
<Data Source list>	A list of available data sources.
All Data Sources	Select to include CIs from all RTSM and external sources for the selected query node in the TQL query results.

UI Elements (A-Z)	Description
Default Data Sources	Select to include CIs from the default data sources for the selected query node in the TQL query results.
	If there is a federation source defined for the selected CIT, the default is All. If there is a federation source defined for a child of the selected CIT, the default is the RTSM only.
Select Data Sources	Select to include CIs from the selected sources only for the selected query node in the TQL query results.

Sort Column Content Dialog Box

This dialog box enables you to set the order of the column content in a report.

To access	In the Modeling Studio, click **Set Sort Order** in the Query Node Definition pane of the Pattern View Editor (in Report mode).
Important information	The report is sorted by columns following the order of the attributes in the Sorted Columns pane. Each selected column is sorted in ascending or descending order according to your selection.
Relevant tasks	"Define Report Settings" on page 349
See also	"Best Practices for Modeling" on page 209

User interface elements are described below:

UI Elements (A-Z)	Description
➡	Click **Move to Sorted Columns** to move the selected attribute to the Sorted Columns pane.
⬅	Click **Move to Available Columns** to move the selected attribute to the Available Columns pane.

UI Elements (A-Z)	Description
⮑	Click to move all the attributes to the Sorted Columns pane.
⮐	Click to move all the attributes to the Available Columns pane.
⬇	Click to move the selected attribute down in the Sorted Columns list.
⬆	Click to move the selected attribute up in the Sorted Columns list.
⬆	Click **Sort Ascending** to sort the selected column in ascending order.
⬇	Click **Sort Descending** to sort the selected column in descending order.
Available Columns	The attributes selected to appear as columns in the report.
Sorted Columns	The columns selected to be sorted.

🔍 Template-based View Wizard

This wizard enables you to define a template-based view.

To access	Click the **New** ✳ button and select **Template Based View**.
Relevant tasks	"Create a Template Based View" on page 347
Wizard map	The Template-based View Wizard contains: Select Template Page > Parameters Page
See also	"Best Practices for Modeling" on page 209

🔖 Select Template Page

This wizard page enables you to select a template on which to base your view.

Important information	If you don't want to use any of the templates in the tree, you can create a new template first and then build a view based on it. For details on creating a template, see "Create a Template" on page 342.
Wizard map	The Template-based View Wizard contains: **Select Template Page** > Parameters Page

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

UI Elements (A-Z)	Description
⊖	Click to go to the next occurrence of the selected search phrase in the list of templates.
⊙	Click to go to the previous occurrence of the selected search phrase in the list of templates.
▤	Click to highlight all occurrences of the search phrase in the list of templates.
<Template tree>	Displays the existing templates in tree format.
Find	Enter a template name or a portion of a name in the Find box to locate a template in the list.

🔖 Parameters Page

This wizard page enables you to set the values of the template's parameters.

Wizard map	The Template-based View Wizard contains: Select Template Page > **Parameters Page**

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

| UI Elements (A-Z)	Description
Default Value	The default value of the parameter. If you do not enter a value for the parameter, it is assigned this value.
Name	The name of the parameter.
Value	Enter a value for the parameter.

Template Parameter Values Dialog Box

For details on the Edit Parameter Values dialog box, see "Parameters Page" on page 413.

TQL Query Editor

This feature enables you to build and edit TQL queries.

To access	To open a new TQL query in the TQL Query Editor, go to the Modeling Studio, click the **New** ✳ button and select **Query**.
	To open an existing TQL query in the TQL Query Editor, go to the Resources tab of the left pane in the Modeling Studio and select Queries as the Resource type. Right click a TQL query in the tree and select **Open Query** or double click a TQL query or drag a TQL query onto the Editor pane. The TQL query opens in the Editor pane.
Important information	To save your TQL query, use the Save button in the Modeling Studio main toolbar.
Relevant tasks	"Define a TQL Query" on page 29
See also	"Best Practices for Modeling" on page 209

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

UI Elements (A-Z)	Description
⬆	Click **Create Relationship** to draw a relationship from one query node to another.
🔲	Click **Hide/Show Legend** to toggle between hiding and displaying the topology map legend.
🔲	Click **Calculate Query Result Count** to calculate the number of instances found for each TQL query node or relationship.
🔍	Click **Preview** to display a preview of the TQL query results as they would appear in IT Universe Manager.
🖼	For queries, opens the Query Definition Properties dialog box which enables you to edit the type, scope, and priority of the TQL query.
	For views, opens the View Definition Properties dialog box.
✖	Click **Delete** to delete the selected query node or relationship from the query.
‹P›	Opens the Template Parameter Values dialog box which enables you to edit the parameters of a query node in a template-based view.
	Note: This button only appears for template-based views.
<Legend>	Indicates the icons displayed next to CIs with any of the following special designations:
	➤ It is defined as a contact query node in a perspective
	➤ It is defined as the output query node of a pattern-based model
	➤ It has attributes defined
	➤ It has selected identities defined
	➤ It is set as an invisible element
	➤ It has a subgraph defined
<Main menu>	For details, see "Main Menu" on page 193.

UI Elements (A-Z)	Description
\<Shortcut menu options\>	For details, see "Shortcut Menu Options" on page 39.
\<Topology Map Sidebar\>	For details, see "Topology Map Sidebar" on page 205.

Advanced Pane

This area displays the properties, conditions, and cardinality for the selected query node and relationship.

Important information	The Advanced pane appears in the lower part of the window in the following managers and user interfaces: Modeling Studio, Impact Analysis Manager, Enrichment Manager, the Input Query Editor and Trigger Query Editor in DFM. A small green indicator ✳ appears next to the tabs that contain data.
Relevant tasks	➤ "Define an Impact Rule – Workflow" on page 424 ➤ "Define an Enrichment Rule – Scenario" on page 492 ➤ "Define a TQL Query" on page 29 ➤ "Create a Pattern View" on page 341 ➤ "Create a Template" on page 342 ➤ "Create a Perspective" on page 344

User interface elements are described below:

UI Elements (A-Z)	Description
◀▶	If the window is not wide enough to display all the tabs, use the left and right arrows to move to the required tab.
▾	Click **Show List** to display a list of the available tabs for the current module. You can select a tab from the list.
Attributes	Displays the attribute conditions defined for the query node or the relationship. For details, see "Attribute Tab" on page 84.

UI Elements (A-Z)	Description
Cardinality	Cardinality defines how many query nodes you expect to have at the other end of a relationship. For example, in a relationship between a node and an IP Address, if the cardinality is 1:3, the TQL query retrieves only those nodes that are connected to between one and three IP Addresses. For details, see "Cardinality Tab" on page 86.
Data Sources	Displays the data sources set for the selected query node. **Note:** This tab appears only in the Modeling Studio.
Details	Displays the following information: ➤ **CI Type.** The CIT of the selected query node/relationship. ➤ **Visible.** A green check indicates that the selected query node/relationship is visible in the topology map. A red mark indicates that it is not visible. ➤ **Include subtypes.** A green check indicates that both the selected CI and its children are displayed in the topology map. A red mark indicates that only the selected CI appears.
Edit	Click **Edit** to open the relevant dialog box for the selected tab.
Enrichment Rules	Displays the Enrichment rule defined for the selected query node or relationship. If the Enrichment rule is used to update the attributes of a CI, click **Edit** to open the Query Node/Relationship Definition dialog box and edit the rule if required. For details, see "Query Node/Relationship Definition Dialog Box" on page 513. **Note:** This tab appears only in Enrichment Manager.
Impacted Query Nodes	Indicates which query node is affected by the changes that occur in the selected trigger query node. If required, you can click **Edit** to open and modify the Affected Query Nodes dialog box. For details, see "Impacted Query Nodes Dialog Box" on page 437. **Note:** This tab appears only in Impact Analysis Manager.

UI Elements (A-Z)	Description
Qualifiers	Displays the qualifier conditions defined for the query node or the relationship. For details, see "Qualifier Tab" on page 89.
Selected Identities	Displays the element instances that are used to define what should be included in the TQL query results. For details, see "Identity Tab" on page 92.

🔖 Views Containing Selected CI Dialog Box

This dialog box enables you to display a list of the views containing the selected CI.

To access	Click the **Show views containing selected CI/model** 🗔 button in the Model Editor or select **Show containing views** from the shortcut menu.
See also	"Best Practices for Modeling" on page 209

User interface elements are described below:

UI Elements (A-Z)	Description
🌐	Click **Show View Results in IT Universe** to go directly to the selected view in IT Universe Manager.
❌	Click **Delete Selected Item(s)** to delete the selected view.
🖋	Click **Disconnect view from perspective** to disconnect the selected view from its perspective. The view becomes a pattern view.
Find	Enter a view name or a portion of a view name in the Find box to locate it in the list.
Find Next	Click to go to the next occurrence of the selected search phrase in the list.

UI Elements (A-Z)	Description
Find Previous	Click to go to the previous occurrence of the selected search phrase in the list.
Highlight	Click to highlight all occurrences of the search phrase in the list.
View Name	Displays the list of views dependent on the selected template or perspective. **Note:** The name of the current view appears in faded text.

☁ Watchpoints Updates Dialog Box

This dialog box displays the changes found in related CIs by a watchpoint defined for a model.

To access	From within a model in the Model Editor, click the **Watchpoint** ☁ button and select **Watchpoints Updates** or right-click a CI in the model and select **Watchpoint > Watchpoints Updates**.
Important information	The Watchpoints Updates dialog box indicates any changes found involving the CIs related to the model via the associated reveal path. If a new related CI is found which is not included in the model, the suggested update is an added CI. If a CI in the model is found to no longer be related via the path, the suggested update is a removed CI. This option is only enabled when watchpoints are defined for the model and CIs have been found.

User interface elements are described below:

UI Elements (A-Z)	Description
Accept	Select the check boxes for the CIs you want to add to your model or remove from your model.
Accept All	Click **Accept All** to apply all the suggested changes to your model.
CI	The names of the CIs found by the watchpoint.
CI Type	The types of the CIs found by the watchpoint.
Clear All	Click **Clear All** to clear the check boxes for all the found CIs.
Restore	Select the check boxes for the CIs in the Suppressed CIs pane that you want to consider for inclusion in your model.
Show/Hide Suppressions	Toggle between hiding and displaying the Suppressed CIs pane of the dialog box.
Suggested Update	Indicates whether the suggested change is an added CI or a removed CI.
Suppress	Select the check boxes for the CIs you want to exclude from your model or leave in your model.
Suppress All	Click **Suppress All** to decline all the suggested changes to your model.

11

Impact Analysis Manager

This chapter includes:

Concepts

➤ Impact Analysis Manager Overview on page 422

Tasks

➤ Define an Impact Rule – Workflow on page 424

Reference

➤ Impact Analysis Manager User Interface on page 428

Concepts

🔩 Impact Analysis Manager Overview

Impact Analysis Manager enables you to define the interdependencies between components in your IT infrastructure to simulate how infrastructure changes (for example, a new software installation or upgrade) can impact your system.

By creating Impact rules based on TQL queries, you can determine the true origin of a problem and its business impact. Each Impact rule you define is attached to a specific Impact Analysis TQL query. For more information about TQL queries, see "Topology Query Language" on page 21.

You define Impact rules to specify a causal relationship between two or more Impact Analysis query nodes. Define one query node as the trigger, or the query node that represents the changes you want to make to the system, and another query node as the one that is impacted. After the causal relationship is established, Impact Analysis Manager enables you to determine the effect of the changes occurring in root cause query nodes.

You then run the Impact rules in IT Universe Manager to simulate how the changes impact your system and discover the root causes of the changes (for details, see "Run Impact Analysis Dialog Box" on page 282). This enables you to evaluate and handle accordingly, the possible implications of any action, update, new deployment, or a failure of the service delivery.

A simulated change in an impacted CI can alter the CI's map status, which is manifested through an addition of a status icon to the CI's symbol. The Topology Map displays the statuses of the trigger CIs as well as all statuses of the CIs that are impacted by it. Each color represents a different status.

For details about the status icons and the colors that represent them, see "Show Impact Pane" on page 285.

You can then generate a report displaying the following:

➤ CIs in the system that are impacted by the changes.

➤ Trigger CIs (the CIs that represent the changes you want to make to the system).

➤ CIs that belong to a specific business service.

Tasks

� Define an Impact Rule – Workflow

This section describes how to define an Impact rule whereby a change in CPU operation impacts the node to which it is connected.

This task includes the following steps:

➤ "Create an Impact Analysis TQL Query" on page 424

➤ "Define an Impact Rule" on page 425

1 Create an Impact Analysis TQL Query

To create an Impact Analysis TQL query, you need to create an Impact Analysis TQL and then add the TQL query nodes and relationships that define the query.

Select **Admin** > **RTSM Administration** > **Modeling** > **Impact Analysis Manager** to open the Impact Analysis Manager. For details about how to create an Impact Analysis TQL query, see "New Impact Rule/Impact Rule Properties/Save As Impact Rule Wizard" on page 441. For details about how to add query nodes and relationships to a query, see "Add Query Nodes and Relationships to a TQL Query" on page 30.

Example of an Impact Analysis TQL Query:

In this Impact Analysis TQL query, a CPU and a node are linked by a Composition relationship. The TQL query results must comply with the direction of the arrows.
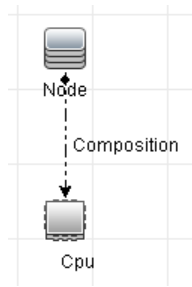
Note: An Impact Analysis TQL query is subject to certain validation restrictions. For details, see "Troubleshooting and Limitations" on page 99.

2 **Define an Impact Rule**

When you define an Impact rule, you must specify the required causal relationship between the query nodes. Define one query node as the trigger, or the query node that represents the changes you want to make to the system, and another query node as the one that is impacted.

Right-click the query node you want to define as the trigger query node and select **Define Impacted** to open the Impacted Query Nodes dialog box. Select the query node you want the trigger query node to impact. Then click the **Add** button to open the Impact Rules Definition dialog box to set conditions for defining impacted query nodes. For details about how to define an Impact rule, see "Impact Rules Definition Dialog Box" on page 439.

Note: The **change** state option in the Impact rule definition is no longer relevant for Impact Analysis. The only supported state is **operation**.

Example of an Impact Rule:

The Conditions area in the Impact Rules Definition dialog box defines the conditions under which the simulated change in the system is triggered. The Severity area defines the severity of the impact on the impacted query node.

The Impact rule in this example states that when the CPU operation is not in the normal state, the node is impacted. Since the severity is set to 100% of the trigger's severity, the severity of the node is the same as the severity of the CPU, which is determined when Impact Analysis is run.

In the resulting TQL query, an upward arrow appears next to the query node defined as the trigger query node and a downward arrow appears next to the query node defined as the impacted query node.

Note: To retrieve the Impact Analysis results, you must run the Impact rule in IT Universe Manager. For details, see "Retrieve Impact Analysis Results – Scenario" on page 240.

Reference

🔍 Impact Analysis Manager User Interface

This section includes (in alphabetical order):

➤ Details Dialog Box on page 429

➤ Impact Analysis Manager Page on page 430

➤ Impacted Query Nodes Dialog Box on page 437

➤ Impact Rules Definition Dialog Box on page 439

➤ New Impact Rule/Impact Rule Properties/Save As Impact Rule Wizard on page 441

🔍 Details Dialog Box

This dialog box displays the new Impact rule you created in the Impact Rules Definition dialog box.

To access	In the Impact Analysis Manager, click **Next** in the Impacted Query Nodes dialog box.
Relevant tasks	"Define an Impact Rule – Workflow" on page 424

User interface elements are described below:

UI Elements (A-Z)	Description
Description	The description of the new Impact rule.
State	The category you chose from the **State** list in the Impact Rules Definition dialog box.

🔍 Impact Analysis Manager Page

This page enables you to define Impact rules.

To access	Select **Admin** > **RTSM Administration** > **Modeling** > **Impact Analysis Manager**.
Important information	When selecting query nodes to function as Impact Analysis triggers, they must comply with certain restrictions. For details, see "Troubleshooting and Limitations" on page 99.
Relevant tasks	"Define an Impact Rule – Workflow" on page 424
See also	"Impact Analysis Manager Overview" on page 422

Impact Rules Pane

This area displays a hierarchical tree structure of predefined folders and Impact rules. Each Impact rule is associated with a TQL query.

Important information	You can create your own query, or work with the default queries provided with your HP Business Service Management installation.
	The predefined folders are provided for the default queries; you can modify these folders, or add additional folders according to your organization's requirements.

User interface elements are described below:

UI Elements (A-Z)	Description
📁	Create a new folder.
✳	Creates an Impact rule. Opens the New Impact Rule Wizard.
✖	Deletes the selected folder or Impact rule.
🔄	Refreshes the data content of the hierarchical tree structure that may have been modified by other users.

UI Elements (A-Z)	Description
	(Enabled only when a new Impact rule is created or when changes are made to an existing one.) Saves the Impact rule to the RTSM.
	Opens the Impact Rule Properties Wizard. Enables you to change the description of the rule.
	Generates a preview of the results of the selected Impact rule.
	Represents a folder.
	Represents an Impact rule.

The following elements are available by right-clicking a folder or Impact rule:

UI Elements (A-Z)	Description
Delete	Delete the selected folder or Impact rule.
Export To XML	Displays a standard Save As dialog box, enabling you to save the Impact rule as an XML script. This option can be used to move an Impact rule from one workstation to another, provided the related TQL query is also relocated.
Import From XML	Imports XML files that contain saved Impact rules to Impact Analysis Manager.
New	Creates an Impact rule. Opens the New Impact Rule Wizard.
New Folder	Creates a new folder.
Preview	Generates a preview of the results of the selected Impact rule.
Properties	Opens the Impact Rule Properties Wizard. Enables you to change the description of the rule.
Rename Folder	Rename the folder.

UI Elements (A-Z)	Description
Save	(Enabled only when a new Impact rule is created or when changes are made to an existing one.) Saves the Impact rule to the RTSM.
Save As	Displays the Save As Impact Rule Wizard, enabling you to create new Impact rules based on an existing query.

Editing Pane

This area displays the selected Impact rule, which consists of query nodes that are defined in the TQL query and the relationships between them.

Important information	➤ When you select a folder in the Impact Rules pane, the editing pane is empty. ➤ When you select an Impact rule in the Impact Rules pane, the editing pane displays the selected rule, which consists of TQL query nodes that are defined in the TQL query and the relationships between them.
Relevant tasks	"Add Query Nodes and Relationships to a TQL Query" on page 30
See also	When selecting query nodes to function as Impact Analysis triggers, they must comply with certain restrictions. For details, see "Troubleshooting and Limitations" on page 99.

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

UI Elements (A-Z)	Description
⊞	Indicates a trigger query node. Located to the right of the trigger query node's icon.
⊟	Indicates an impacted query node. Located to the right of the impacted query node's icon.
⬍	Indicates query nodes that are both impacted and trigger query nodes.

UI Elements (A-Z)	Description
<Main Menu>	For details, see "Main Menu" on page 193.
<Query Node>	A component from which TQL queries are built.
<Relationship>	The entity that defines the relationship between two query nodes.
<Shortcut menu options>	For details, see "Shortcut Menu Options" on page 39.
<Toolbar>	For details, see "Toolbar Options" on page 197.
<Tooltip>	Hold the cursor over a query node or relationship to view its tooltip. The tooltips contain the following information: ➤ **Element name.** The name of the query node. ➤ **CI Type**. The CIT of the query node as defined in the CI Type Manager. For details, see "CI Type Manager" on page 447. ➤ **Definitions of the selected query nodes and relationships**. The attribute conditions, as described in "Query Node/Relationship Properties Dialog Box" on page 82. ➤ **Names of the trigger and the impacted query nodes**. This is only relevant if the query node over which the cursor is hovering is the trigger query node.
Define Impacted	Displays the Impacted Query Nodes dialog box.

CI Type Selector

This area displays a hierarchical tree structure of the CI Types found in the RTSM.

Important information	The CI Type Selector is part of Enrichment Manager, Impact Analysis Manager, and Trigger TQL Editor.
	To create or modify a TQL query, click and drag query nodes to the Editing pane and define the relationship between them. Your changes are saved to the RTSM. For details, see "Add Query Nodes and Relationships to a TQL Query" on page 30.
	Note: The number of instances of each CIT in the RTSM is displayed to the right of each CIT.
Relevant tasks	➤ "Define an Impact Rule – Workflow" on page 424
	➤ "Define an Enrichment Rule – Scenario" on page 492
	➤ "Define a TQL Query" on page 29
	➤ "Create a Pattern View" on page 341

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

UI Elements (A-Z)	Description
←	Click **Add CI Type to Map** to move the selected CI type to the Editing pane.
⟳	Click **Refresh** to refresh the CI type tree.
🔍	Click **Search** to search for the CI type entered.
⯐	Click **Expand All** to expand all subtrees within the CI type tree.
⯐	Click **Collapse All** to collapse the subtrees within the CI type tree.
<Search window>	Enter the name or part of a name of a CI type for which to search.

Shortcut Menu Options

The CI Type Selector includes the following elements (listed alphabetically) available by right-clicking a CI Type:

Menu Item	Description
Add CI Type to Map	Select to add the selected CI type to the Editing pane.
Go to CI Type Definition	Takes you directly to the selected CI type in CIT Manager.
Show CIT Instances	Opens the CIT Instances window, which displays all instances of the selected CIT. For details, see "Element Instances Dialog Box" on page 75.

Advanced Pane

This area displays the properties, conditions, and cardinality for the selected query node and relationship.

Important information	The Advanced pane appears in the lower part of the window in the following managers and user interfaces: Modeling Studio, Impact Analysis Manager, Enrichment Manager, the Input Query Editor and Trigger Query Editor in DFM. A small green indicator ✳ appears next to the tabs that contain data.
Relevant tasks	➤ "Define an Impact Rule – Workflow" on page 424 ➤ "Define an Enrichment Rule – Scenario" on page 492 ➤ "Define a TQL Query" on page 29 ➤ "Create a Pattern View" on page 341 ➤ "Create a Template" on page 342 ➤ "Create a Perspective" on page 344

User interface elements are described below:

UI Elements (A-Z)	Description
◀▶	If the window is not wide enough to display all the tabs, use the left and right arrows to move to the required tab.
▾	Click **Show List** to display a list of the available tabs for the current module. You can select a tab from the list.
Attributes	Displays the attribute conditions defined for the query node or the relationship. For details, see "Attribute Tab" on page 84.
Cardinality	Cardinality defines how many query nodes you expect to have at the other end of a relationship. For example, in a relationship between a node and an IP Address, if the cardinality is 1:3, the TQL query retrieves only those nodes that are connected to between one and three IP Addresses. For details, see "Cardinality Tab" on page 86.
Data Sources	Displays the data sources set for the selected query node. **Note:** This tab appears only in the Modeling Studio.
Details	Displays the following information: ➤ **CI Type.** The CIT of the selected query node/relationship. ➤ **Visible.** A green check indicates that the selected query node/relationship is visible in the topology map. A red mark indicates that it is not visible. ➤ **Include subtypes.** A green check indicates that both the selected CI and its children are displayed in the topology map. A red mark indicates that only the selected CI appears.
Edit	Click **Edit** to open the relevant dialog box for the selected tab.

UI Elements (A-Z)	Description
Enrichment Rules	Displays the Enrichment rule defined for the selected query node or relationship. If the Enrichment rule is used to update the attributes of a CI, click **Edit** to open the Query Node/Relationship Definition dialog box and edit the rule if required. For details, see "Query Node/Relationship Definition Dialog Box" on page 513. **Note:** This tab appears only in Enrichment Manager.
Impacted Query Nodes	Indicates which query node is affected by the changes that occur in the selected trigger query node. If required, you can click **Edit** to open and modify the Affected Query Nodes dialog box. For details, see "Impacted Query Nodes Dialog Box" on page 437. **Note:** This tab appears only in Impact Analysis Manager.
Qualifiers	Displays the qualifier conditions defined for the query node or the relationship. For details, see "Qualifier Tab" on page 89.
Selected Identities	Displays the element instances that are used to define what should be included in the TQL query results. For details, see "Identity Tab" on page 92.

Impacted Query Nodes Dialog Box

This dialog box enables you to define which query node in the TQL query is the trigger Impact Analysis query node and which query nodes are impacted by the changes that occurred in the system.

To access	Right-click the query node or relationship that functions as a trigger and select **Define Impacted**. The Impacted Query Nodes dialog box opens to display the query nodes in the TQL query.

Important information	Before creating the TQL query, you must know which query node in the query is the trigger Impact Analysis query node and which are impacted by the changes beforehand. The definition is performed here.
Relevant tasks	"Define an Impact Rule – Workflow" on page 424.

User interface elements are described below:

UI Elements (A-Z)	Description
Impacted Query Nodes pane	Contains a list of the Impact Analysis query nodes in the Impact rule. Select the query nodes to be impacted by the trigger query node.

🔍 Impact Rules Definition Dialog Box

This dialog box enables you to set conditions for defining impacted query nodes, define the scope of the trigger conditions, and define the severity of the impact.

To access	In the Impact Analysis Manager, click **Add** in the Details dialog box.
Important information	➤ In the Conditions area, set conditions for defining impacted query nodes. When this condition is met, the simulated change in the system is triggered.
	For example, you can define an Impact Analysis condition that states that the operational state of the query node is other than Normal. When the operational state of the query node instance changes and is no longer Normal, the condition is met and the simulated changes in the system are triggered.
	➤ In the Scope area, define how many instances of the trigger query node should fulfill the conditions for triggering the changes in the system.
	You can apply the trigger conditions to a single instance of a trigger query node, to a certain percentage of the trigger instances, or to all of them.
	For example, you can define that impact is calculated when at least 10% of the system's nodes are down.
	➤ In the Severity area, define the severity of the Impact Analysis impact.
Relevant tasks	"Define an Impact Rule – Workflow" on page 424

User interface elements are described below:

UI Elements (A-Z)	Description
All	All instances should fulfill the conditions.
Any	One instance or more should fulfill the conditions.
Description	A description of the Impact rule you are defining.

UI Elements (A-Z)	Description
Fixed severity	Define a fixed severity level for every system change generated. Then, select the required severity level from the list.
Function	Select **Function** (displayed when you selected the **All** and **Range** options in the **Scope** area) to define a severity level for the system changes, as a function of the severity levels of all the trigger query node instances that are included in the range. From the list, select either **Average** or **Max**.
	For example, if you select **Average**, the severity level of the system changes is the average severity of all the trigger instances.
Operator	Select the required operator. For a list of the operators you can use for defining an attribute condition, see "Attribute Operator Definitions" on page 44.
Range	A certain percentage of all instances should fulfill the conditions. For example, if you enter a range of 50% to 100%, the changes are triggered when 50% or more of the instances meet the conditions.
Severity relative to trigger severity (%)	Select **Severity relative to trigger severity (%)** (displayed when you selected the **Any** option in the **Scope** area) to define a severity level for each system change that is relative (as a percentage) to the severity of the trigger event.
	Enter the percentage in the box provided.
State	Choose the required state. The states that appear in the list are the states that are defined in the State Manager. For details, see "State Manager" in the *Run-time Service Model Administration Guide*.
Value Comparison	Select the required attribute.

🔍 New Impact Rule/Impact Rule Properties/Save As Impact Rule Wizard

This wizard enables you to create or modify an Impact rule.

To access	➤ To create an Impact rule, right-click anywhere in the Impact Rules pane and click **New** or click the **New** ✳ button.
	➤ To modify an Impact rule, right-click an Impact rule in the Impact Rules pane and select **Properties**.
	➤ To create a new Impact rule based on an existing query, right-click an Impact rule in the Impact Rules pane and select **Save As**.
Important information	➤ Any major change made to the TQL query after creating an Impact rule causes the system to delete the rule. These changes include deleting a root cause or impacted query node or changing the **Min** and **Max** relationship definitions. For details, see "Cardinality Tab" on page 86.
	➤ Minor changes, such as adding a query node to the TQL query, do not cause the deletion of the rule.
	➤ The Impact Analysis TQL query that serves as the basis of the Impact rule, is subject to certain validation restrictions. For details, see "Troubleshooting and Limitations" on page 99. If the TQL query is not valid, it cannot be used for the creation of an Impact rule.
Relevant tasks	"Define an Impact Rule – Workflow" on page 424
Wizard map	The New Impact Rule/Impact Rule Properties/Save As Impact Rule Wizard contains:
	Impact Rule General Attributes Page > Impact Rule Base Query Page > Impact Rule Groups Page

🔍 Impact Rule General Attributes Page

This wizard page enables you to enter a unique name and description for the Impact rule.

Important information	➤ The Impact Analysis TQL query that serves as the basis of the Impact rule, is subject to certain validation restrictions. For details, see "Troubleshooting and Limitations" on page 99. If the TQL query is not valid, it cannot be used for the creation of an Impact rule.
	➤ For important information on the effects of making changes to the TQL query after creating it, see "New Impact Rule/Impact Rule Properties/Save As Impact Rule Wizard" on page 441.
	➤ By default, this wizard is set to display a Welcome page. You can choose not to display the Welcome page by changing the user preferences. For details, see "User Preferences Dialog Box" on page 99.
Wizard map	The New Impact Rule/Impact Rule Properties/Save As Impact Rule Wizard contains:
	Impact Rule General Attributes Page > Impact Rule Base Query Page > Impact Rule Groups Page
See also	"IT Universe Manager" on page 221

User interface elements are described below:

UI Elements (A-Z)	Description
Rule Description	(Optional) Enter a description of the Impact rule.
Rule Name	Enter a unique name for the Impact rule.
	The rule name cannot contain any of the following characters: \ / : " < >	% ?
	Note: If the Impact rule name is either empty, contains a name used by another Impact rule, or uses invalid characters, the **Next** and **Finish** buttons are disabled.

🔍 Impact Rule Base Query Page

This wizard page enables you to define the properties of the TQL query on which the Impact rule is based. You can use an existing query or create a new query.

Important information	➤ The Impact Analysis TQL query that serves as the basis of the Impact rule is subject to certain validation restrictions. For details, see "Troubleshooting and Limitations" on page 99. If the TQL query is not valid, it cannot be used for the creation of an Impact rule. ➤ For important information on the effects of making changes to the TQL query after creating it, see "New Impact Rule/Impact Rule Properties/Save As Impact Rule Wizard" on page 441.
Wizard map	The New Impact Rule/Impact Rule Properties/Save As Impact Rule Wizard contains: Impact Rule General Attributes Page > **Impact Rule Base Query Page** > Impact Rule Groups Page
See also	"IT Universe Manager" on page 221

User interface elements are described below:

UI Elements (A-Z)	Description
Base the Impact rule on a new Query	Select this check box if you want to base the Impact rule on a new TQL query. The query results are based on the attributes defined for the new TQL query.
Base the Impact rule on an existing Query	Select this check box if you want to base the Impact rule on an existing TQL query. Select the required Impact Analysis TQL query from the drop-down list.
Base Query Description	(Optional) Enter a description of the TQL query.

UI Elements (A-Z)	Description
Base Query Name	Enter a unique name for the Impact Analysis TQL query.
	If you selected the **Base the Impact rule on an existing TQL** option, select the Impact Analysis TQL query on which you want to base the rule.
Base Query Priority	Select a priority level for the new TQL query (Low, Medium, High, Express). This setting determines how often the query is rerun automatically by the system to include updated information from the RTSM.

Impact Rule Groups Page

This wizard page enables you to define where you can run Impact rules.

Important information	➤ The Impact Analysis TQL query that serves as the basis of the Impact rule, is subject to certain validation restrictions. For details, see "Troubleshooting and Limitations" on page 99. If the TQL query is not valid, it cannot be used for the creation of an Impact rule.
	➤ For important information on the effects of making changes to the TQL query after creating it, see "New Impact Rule/Impact Rule Properties/Save As Impact Rule Wizard" on page 441.
	➤ By default, this wizard is set to display a Completion page after clicking **Next** in this page. You can choose not to display the Completion page by changing the user preferences. For details, see "User Preferences Dialog Box" on page 99.
Wizard map	The New Impact Rule/Impact Rule Properties/Save As Impact Rule Wizard contains:
	Impact Rule General Attributes Page > Impact Rule Base Query Page > **Impact Rule Groups Page**
See also	"IT Universe Manager" on page 221

User interface elements are described below:

UI Elements (A-Z)	Description
UCMDB	Enables you to run an Impact rule in IT Universe Manager. For details, see "IT Universe Manager Overview" on page 222.

12

CI Type Manager

This chapter includes:

Concepts

➤ CI Types Overview on page 448

➤ CI Type Attributes on page 449

➤ CI Type Relationships on page 450

➤ System Type Manager on page 450

Tasks

➤ Create a CI Type on page 452

➤ Create a Relationship Type on page 453

➤ Create a Calculated Relationship Type on page 455

➤ Create List and Enumeration Definitions on page 456

➤ Create an Enumeration Definition – Workflow on page 457

Reference

➤ View Descriptions for CI Types and Relationships on page 459

➤ CI Type Manager User Interface on page 459

Note to HP Software-as-a-Service customers: The data in CI Type Manager can be viewed but not edited.

Concepts

♣ CI Types Overview

A configuration item (CI) can represent hardware, software, services, business processes, or any component of your IT infrastructure. CIs with similar properties are grouped under a CI type (CIT). Each CIT provides a template for creating a CI and its associated properties.

Every CI must belong to a CI type. The following are the main categories of CITs:

➤ **Business Element.** CITs that correspond to the logical elements of your business, such as processes and organizational groups.

➤ **IT Process Record.** CITs that correspond to changes that occur in your IT infrastructure.

➤ **Monitor.** CITs that handle incoming metrics collected from your business universe.

➤ **Location.** CITs that correspond to the location of devices and business organizations or people supporting a function.

➤ **Party.** CITs that correspond to an active entity such as a person or organization.

➤ **CI Collection.** A logical collection of CIs.

➤ **Infrastructure Element.** CITs that correspond to the physical elements (hardware and software) installed in your business environment.

The CITs are arranged in a tree structure under these categories in the CI Types pane. You can browse the CI Type model by expanding the tree in the CI Types pane. The CIT selected in the left pane is displayed in the topology map along with all the potential valid relationships to other CITs.

You can also define new CITs to match your business needs. For details on defining new CITs, see "Create Configuration Item Type/Relationship/Calculated Relationship Wizard" on page 468.

◈ CI Type Attributes

Every CI type has attributes which define it such as name, description, and default value. The CITs grouped under other CITs in the CI Type tree inherit attributes from the higher-level CITs.

When you define a new CI type, you first select a Base Configuration Item Type from a list of existing CITs. Your new CIT inherits the attributes of the existing CIT. You can then set the attributes for the new CIT. You edit the attributes of an existing CIT by selecting a CIT from the tree in the CI Types pane and selecting the Attributes tab of the topology map. For details on CIT attributes, see "Attributes Page" on page 470.

Every CIT must have at least one key attribute. A key attribute is an attribute that is used as an identifier of the CIT. When you define an instance of a CIT, the CIT's key attributes are mandatory fields for CIs of that type. You can assign as many key attributes as you want to a given CIT. If you do not assign a key attribute when defining a new CIT, the CIT is created, but it remains abstract, that is, you are unable to create instances of it (you are prompted to include the ABSTRACT_CLASS qualifier on the Qualifier page of the wizard).

Entity names in HP Business Service Management for RTSM-based applications follow the conventions described below:

➤ **CIT attributes values.** All primitive types are supported: long, double, float, string, and so on.

➤ **CIT attributes values-type string.** All special characters are supported. The maximum length is 4000 characters.

➤ **CIT names and attributes names.** The following are permitted: a-z, A-Z, and underscore (_). The length is limited to 200 characters. The CIT name must be in English. The number 0-9 are also permitted, but they must not be the first character in the CIT name.

➤ **CIT attribute length.** The total length of all the attributes in one CIT cannot exceed 8K due to a Microsoft SQL Server limitation.

♣ CI Type Relationships

A relationship defines the link between two CIs. Relationships represent the dependencies and connections between the entities in your IT environment. When you select relationships or calculated relationships in the drop-down box in the CI Types pane, the topology map displays all the valid instances of CITs linked by the selected relationship. For details about calculated relationships, see "Impact Modeling" on page 105.

The same attributes defined for CITs are also defined for relationships. You can also assign key attributes for relationships but it is not required. For details on defining new relationship types, see "Create Configuration Item Type/Relationship/Calculated Relationship Wizard" on page 468.

♣ System Type Manager

System Type Manager enables you to create a predefined list whose values define an attribute type. For more details on System Type Manager, see "System Type Manager Dialog Box" on page 487.

You can create the following attribute types:

➤ **List**. Enables you to create a predefined list of values, for example, Location.

➤ **Enumeration**. Enables you to create a predefined list of values, as well as assign each value a color. Enumerations are designed to be used as severity value lists by states. For details, see "State Manager" in the *Run-time Service Model Administration Guide*.

Severity lists are used for:

➤ Retrieving Impact Analysis results in IT Universe Manager. For details, see "IT Universe Manager" on page 221.

➤ Creating an Impact rule. For details, see "Impact Analysis Manager" on page 421.

You can use both List and Enumeration values for:

➤ Editing the attributes of a CIT. For details, see "Create a CI Type" on page 452.

➤ Defining an attribute condition for a TQL query node or relationship. For details, see "Query Node/Relationship Properties Dialog Box" on page 82.

Tasks

⚓ Create a CI Type

This task describes the process you follow to create a CIT using the Create CI Type wizard.

This task includes the following steps:

➤ "Prerequisites" on page 452

➤ "Define the CI Type" on page 452

➤ "Set the CI Type Attributes" on page 452

➤ "Assign Qualifiers to the CI Type" on page 453

➤ "Assign an Icon to the CI Type" on page 453

➤ "Customize the CI Type Menu" on page 453

➤ "Define the CI Type Default Label" on page 453

1 Prerequisites

From the CI Type Manager, select **CI Types** from the list box in the CI Types pane. Then select **New** to start the Create CI Type Wizard.

2 Define the CI Type

Enter the name, description and base configuration item type for the new CI type. For details, see "Details Page" on page 469.

3 Set the CI Type Attributes

Edit the attributes of the new CI type and define key attributes for it. For details, see "Attributes Page" on page 470.

> **Note:** List and Enumeration definitions are created in the System Type
> Manager. If required, you can create additional List and Enumeration
> definitions. For details, see "Create List and Enumeration Definitions" on
> page 456.

4 Assign Qualifiers to the CI Type

Assign qualifiers to the definition of the new CI type. For details, see
"Qualifiers Page" on page 474.

5 Assign an Icon to the CI Type

Select an icon to assign to the new CI type. For details, see "Icon Page" on
page 477.

6 Customize the CI Type Menu

Select the menu items and commands to appear in the shortcut menu for
the new CI type. For details, see "Attached Menu Page" on page 478.

7 Define the CI Type Default Label

Define the attributes to appear in the CI type label. For details, see
"Default Label Page" on page 482.

🔨 Create a Relationship Type

This task describes the process you follow to create a relationship type using
the Create Relationship wizard.

This task includes the following steps:

➤ "Prerequisites" on page 454

➤ "Define the Relationship" on page 454

➤ "Set the Relationship Attributes" on page 454

➤ "Assign Qualifiers to the Relationship" on page 454

➤ "Customize the Relationship Menu" on page 454

➤ "Define the Relationship Default Label" on page 455

1 Prerequisites

From the CI Type Manager, select **Relationships** from the list box in the CI Types pane. Then select **New** to start the Create Relationship Wizard.

2 Define the Relationship

Enter the name, description and base CI type for the new relationship. For details, see "Details Page" on page 469.

3 Set the Relationship Attributes

Edit the attributes of the new relationship and define key attributes for it. For details, see "Attributes Page" on page 470.

Note: List and Enumeration definitions are created in the System Type Manager. If required, you can create additional List and Enumeration definitions. For details, see "Create List and Enumeration Definitions" on page 456.

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4 Assign Qualifiers to the Relationship

Assign qualifiers to the definition of the new relationship. For details, see "Qualifiers Page" on page 474.

5 Customize the Relationship Menu

Select the menu items and commands to appear in the shortcut menu for the new relationship. For details, see "Attached Menu Page" on page 478.

6 Define the Relationship Default Label

Define the attributes to appear in the relationship label. For details, see "Default Label Page" on page 482.

🔧 Create a Calculated Relationship Type

This task describes the process you follow to create a calculated relationship type using the Create Calculated Relationship wizard.

This task includes the following steps:

➤ "Prerequisites" on page 455

➤ "Define the Calculated Relationship" on page 455

➤ "Assign Qualifiers to the Relationship" on page 455

➤ "Add Required Triplets" on page 455

1 Prerequisites

✳ From the CI Type Manager, select **Calculated Relationships** from the list box in the CI Types pane. Then select **New** to start the Create Calculated Relationship Wizard.

2 Define the Calculated Relationship

Enter the name, description and base CI type for the new calculated relationship. For details, see "Details Page" on page 469.

3 Assign Qualifiers to the Relationship

Assign qualifiers to the definition of the new relationship. For details, see "Qualifiers Page" on page 474.

4 Add Required Triplets

Add the required triplets. For details, see "Triplets Page" on page 475.

🔧 Create List and Enumeration Definitions

This section describes the tasks for creating List and Enumeration definitions.

This task includes the following steps:

➤ "Create a List Definition" on page 456

➤ "Create an Enumeration Definition" on page 456

1 Create a List Definition

You can create a **List** definition of predefined values. For example, a List definition called Location might contain:

➤ New York

➤ Boston

➤ Baltimore

For details, see "Create/Update List/Enumeration Definition Dialog Box" on page 484.

2 Create an Enumeration Definition

You can create an **Enumeration** definition, which enables you to assign a color for each value on the list. For details, see "Create/Update List/Enumeration Definition Dialog Box" on page 484. For an example of an Enumeration definition, see "Create an Enumeration Definition – Workflow" on page 457.

🪝 Create an Enumeration Definition – Workflow

The following steps describe how to create an Enumeration definition.

Note: To retrieve the required results, you must follow each step in this task.

To create an Enumeration definition:

1 Select **Admin** > **RTSM Administration** > **Modeling** > **CI Type Manager**.

2 From the Main Menu, select **CI Types** > **System Type Manager** to open the System Type Manager dialog box.

3 Click the **Add** button to open the Create List Definition dialog box.

Note: Alternatively, you can select **Admin** > **RTSM Administration** > **Administration** > **State Manager** and then click the **New Enumeration** button to open the Create Enumeration Definition dialog box.

---

4 Select **Enumeration**.

5 In the **Name** box, enter the required name.

6 (Optional) In the **Display Name** box, enter the required display name.

This example describes how to create the following severity list:

Key	Value	Severity Represented
0	Green	Normal
1	Orange	Major
2	Red	Critical

 7 Click the **Add** button to create a new row.

 8 In the **Value** box, enter Normal, in the **Key** box, enter 0, and in the **Color** section, select **Green**.

 9 Click the **Add** button to create another row.

 10 In the **Value** box, enter Major, in the **Key** box, enter 1, and in the **Color** section, select **Orange**.

 11 Click the **Add** button to create another row.

 12 In the **Value** box, enter Critical, in the **Key** box, enter 2, and in the **Color** section, select **Red**.

 The following image shows the Enumeration Definition section after the changes:

 13 Click **OK** to save your changes.

Reference

🔍 View Descriptions for CI Types and Relationships

You can view a complete list of available CI types in tree format in the left pane of CI Type Manager. You can search incrementally for a specific CI type as described in "CI Type Manager" on page 463. To see a description for a particular CI type, select it from the tree and hold the pointer over the icon which corresponds to it in the Topology Map. A tooltip containing a description of the CI type is displayed.

For relationships, select **Relationships** in the left pane and search incrementally by the first letter of the relationship. Select the relationship you want and hold the pointer over its icon in the Topology Map to display a tooltip containing a description of the relationship.

For detailed information on CI types and relationships, refer to the HP Software BTO Data Model Reference file.

🔍 CI Type Manager User Interface

This section includes (in alphabetical order):

➤ Add/Edit Attribute Dialog Box on page 460

➤ Add/Remove Relationship Dialog Box on page 463

➤ CI Type Manager on page 463

➤ Create Configuration Item Type/Relationship/Calculated Relationship Wizard on page 468

➤ Create/Update List/Enumeration Definition Dialog Box on page 484

➤ System Type Manager Dialog Box on page 487

🔍 Add/Edit Attribute Dialog Box

This dialog box enables you to define a new attribute to add to a CIT or to edit an existing attribute of a CIT.

To access	In the CI Type Manager, select the Attributes tab, then click the **Add** ➕ button, or select an attribute and click the **Edit** button or double-click the attribute.
Important information	In Edit mode, fields that cannot be changed are disabled.

Details Tab

User interface elements are described below:

UI Elements (A-Z)	Description
Attribute Name	Enter a unique name for the new attribute. The name can contain all characters except the following: " \ / [ ] : | < > + = ; , ? * **Note:** The attribute name is not case sensitive.
Attribute Type	Select one of the following options: ➤ **Primitive.** Choose from one of the following field types: boolean, bytes, date, double, float, integer, integer_list, long, string, string_list, xml. ➤ **Enumeration/List.** Contains a list of Enumerations and Lists defined in the System Type Manager. For details, see "System Type Manager" on page 450. This option enables you to define an attribute with a predefined value. For example, a location attribute might be defined by a **location** list containing the following values: Singapore, Paris, New York.
Default Value	Enter or select a default value for the attribute. The options for the **Default Value** field vary depending on the attribute type you selected. **Note:** If you select the integer_list or string_list **Primitive** attribute type, you can enter multiple values.

UI Elements (A-Z)	Description
Description	Enter a description for the new attribute. **Note:** This field is optional.
Display Name	Enter a name for the new attribute to identify it in HP Business Service Management. **Note:** This field is optional.
Scope	Select the scope of the new attribute (the class model to which it belongs).
Value Size	Enter a value for the maximum physical size of the new attribute. (Enabled for bytes and string only).

Advanced Tab

User interface elements are described below:

UI Elements (A-Z)	Description
Asset Data	Select to display the attribute value in the Asset Report.
Change Monitored	Select to define attributes whose values are being marked as Change Monitored in CI Type Manager. The changes in the values of such attributes are saved in the CMDB History database. **Note**: ➤ When this qualifier is selected for a given attribute, the attribute appears as a visible column in the Element Instances dialog box. For details, see "Element Instances Dialog Box" on page 75. ➤ Change Monitored is only relevant for attributes of CI types and not for attributes of relationships. ➤ Change Monitored is not relevant for attributes of the type list of integers or list of strings.
Comparable	Select to enable this attribute to be used for comparing compound CIs.

UI Elements (A-Z)	Description
Editable	Select to enable future editing of the attribute. Only attributes that are marked as **Editable** (or ones that have values) are displayed in the Properties tab in IT Universe Manager.
Enable Auto Truncate by DFM	If selected, when attributes of type STRING exceed the size limit, Discovery truncates the value. For details, see "Data Validation on the Data Flow Probe" in *Run-time Service Model Data Flow Management Guide*.
Index	Select to accelerate the attribute retrieval performance. This option is recommended for attributes that are used frequently in search conditions. For example, IP address is usually an index attribute of a node.
Lower Case	When this option is selected, the attribute value appears in lower case.
Password	When this option is selected, the attribute value appears as asterisks (a hidden value).
Required	Select to define this attribute as a required one, if its value is required for the creation of the CIT.
Static	Select to define this attribute as static.
Unique	When this option is selected, different instances of this CI type must have unique values.
Upper Case	When this option is selected, the attribute value appears in upper case.
Use Update Value Policy	Select this option to add the ALLOW_VOLATILITY qualifier. For details on this qualifier, see "The ALLOW_VOLATILITY Qualifier" on page 27.
Visible	Select to display this attribute in the Properties tab in IT Universe Manager.

🔩 Add/Remove Relationship Dialog Box

This dialog box enables you to add or remove default or new relationships between CITs, which define their physical or logical connections.

To access	In the CI Type Manager, right-click a CIT or two CITs and select **Add/Remove Relationship**.
Important information	When adding a relationship between two CITs, select the two CITs to be linked by holding down CTRL and clicking the CIT names. Then right-click one of them and select **Add/Remove Relationship**.

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

UI Elements (A-Z)	Description
<query node1 to query node2>	Select the relationships to add in the direction of the first query node to the second.
<query node2 to query node1>	Select the relationships to add in the direction of the second query node to the first.
Relationship Name	A list of the possible relationships.

🔩 CI Type Manager

This page enables you to view the information in the CI Type model, which contains the definitions of all configuration item types (CITs) defined in the system and the relationships that define the connections between them. Each CIT has its own attributes, as well as the attributes inherited from its parent CIT.

To access	Select **Admin** > **RTSM Administration** > **Modeling** > **CI Type Manager**.

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

UI Elements (A-Z)	Description
✳	Click the **New** button to open the Create Configuration Item Type Wizard which enables you to define a new CI type. For details, see "Create Configuration Item Type/Relationship/Calculated Relationship Wizard" on page 468.
✖	Click **Delete** to delete the selected CI type or relationship.
🔄	Click to refresh the data content of the hierarchical tree structure that may have been modified by other users.
💾	Click the **Save** button to save changes made to a CI type.
▤ XML	Enables you to import CITs from an external file.
▤ XML	Enables you to export a CIT as an XML file. Use this option to move CITs from one server to another.
▤	Enables you to export a CIT as a PDF.
<CI Type/Relationship Box>	Select one of the following options: ➤ **CI Types.** Display the CI types in the CIT model. ➤ **Relationships**. Display the relationships in the CIT model. ➤ **Calculated Relationships.** Display the calculated relationships in the CIT model.
<Main Menu>	For details, see "Main Menu" on page 193.
<Toolbar>	For details, see "Toolbar Options" on page 197.

UI Elements (A-Z)	Description
CI Types Pane	A hierarchical tree structure of the CI Type model containing the inheritance relationships among CITs, and displaying the number of instances of each CIT in the RTSM. All CITs included in the CI Type model are classified as either a CIT or a relationship. You can drill down and view the relationships and neighbors of the selected CIT in the topology map. You can search in the list of CITs or relationships using the Incremental Search by entering the first letter of the CIT or relationship repeatedly until you reach the required selection. You can also search for a CIT or relationship by entering its full name.

UI Elements (A-Z)	Description
Editing Pane	The following tabs are available: ➤ **Dependencies.** Displays the CI Type model in a topology map, including the CITs and the relationships between them. The name of the selected CI type or relationship appears in the border at the top of the pane. When you point to a CIT, a tooltip displays the display name of the CIT and its description. ➤ **Details.** Enables you to edit the basic information about the CI type selected in the left pane. For details, see "Details Page" on page 469. ➤ **Attributes.** Enables you to edit the attributes of the selected CIT. For details, see "Attributes Page" on page 470. ➤ **Qualifiers.** Enables you to assign qualifiers to the selected CIT. For details, see "Qualifiers Page" on page 474. ➤ **Triplets.** Enables you to create a calculated relationship. For details, see "Triplets Page" on page 475. This page appears only for calculated relationships. ➤ **Icon.** Enables you to assign an icon to the selected CIT. For details, see "Icon Page" on page 477. This tab does not appear for relationships. ➤ **Attached Menu.** Enables you to customize the shortcut menu of a CI by adding menu items and commands (for example, ping, run a program, open a URL). The customized menu is displayed when you right-click a CI instance in IT Universe Manager. For details, see "Attached Menu Page" on page 478. ➤ **Default Label.** Enables you to define attributes that appear in the CIT label. You can include more than one attribute by using the function buttons. For details, see "Default Label Page" on page 482.

Shortcut Menu

CI Type Manager includes the following options available by right clicking a CI type in the CI Types pane or the Dependencies map:

UI Elements (A-Z)	Description
Add/Remove Relationship	Opens the Add/Remove Relationship dialog box, which enables you to add or remove relationships from CITs. For details, see "Add/Remove Relationship Dialog Box" on page 463.
Delete Selected Item	Deletes the selected CI type. This option is only available for CI types that have no children and no instances.
Export To XML	Enables you to export a CIT as an XML file. Use this option to move CITs from one server to another.
New	Opens the Create Configuration Item Type Wizard which enables you to define a new CI type. For details, see "Create Configuration Item Type/Relationship/Calculated Relationship Wizard" on page 468.
Show CIT Instances	Opens the Show All Instances dialog box, which displays all instances of the selected CIT. For details, see "Element Instances Dialog Box" on page 75.

⚡ Create Configuration Item Type/Relationship/Calculated Relationship Wizard

This wizard enables you to define a new configuration item type or relationship.

To access	Click a CI type or relationship in the topology map or CI Types pane of the CI Type Manager and select **New** or click the **New** button ✳ in the CI types pane.
Wizard map	The Create Configuration Item Type/Relationship/Calculated Relationship Wizard contains: Details Page > Attributes Page > Qualifiers Page > Triplets Page > Icon Page > Attached Menu Page > Default Label Page

The Create Configuration Item Type wizard includes the following pages:

➤ "Details Page" on page 469

➤ "Attributes Page" on page 470

➤ "Qualifiers Page" on page 474

➤ "Triplets Page" on page 475

➤ "Icon Page" on page 477

➤ "Attached Menu Page" on page 478

➤ "Default Label Page" on page 482

🔍 Details Page

This wizard page enables you to enter basic information about the new CI type you are defining.

Important information	For general information about the Create Configuration Item Type Wizard, see "Create Configuration Item Type/Relationship/Calculated Relationship Wizard" on page 468.
Wizard map	The Create Configuration Item Type/Relationship/Calculated Relationship Wizard contains: **Details Page** > Attributes Page > Qualifiers Page > Triplets Page > Icon Page > Attached Menu Page > Default Label Page

User interface elements are described below:

UI Elements (A-Z)	Description
Base CI Type	Select a base CIT for the CIT you are creating. The new CIT inherits the base CIT's attributes. **Note:** This field only appears in the Create CI Type Wizard. It is not relevant when editing an existing CIT in the Details tab of CI Type Manager.
Created By	The user who created the new CIT. **Note:** This field is optional.
Description	A description for the new CIT. **Note:** This field is optional.
Display Name	The name of the CIT as it appears in the HP Business Service Management interface. **Note:** This field is optional.
Identification	Displays the key attributes or reconciliation rule by which the CIT is identified. **Note:** This field only appears when editing an existing CIT in the Details tab of CI Type Manager. It is not relevant in the Create CI Type Wizard.

UI Elements (A-Z)	Description
Name	The unique name of the new CIT. The name can contain all characters except the following: " \ / [ ] : | < > + = ; , ? * **Note:** The name field is case sensitive, but you cannot use the same name with different cases for two different CITs.
Scope	Select the scope of the new CIT (the class model to which it belongs).

Attributes Page

This wizard page enables you to edit the attributes of the CI type.

Wizard map	The Create Configuration Item Type/Relationship/Calculated Relationship Wizard contains: Details Page > **Attributes Page** > Qualifiers Page > Triplets Page > Icon Page > Attached Menu Page > Default Label Page

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

UI Elements (A-Z)	Description
	To define an attribute as a key attribute, click in the **Key** column beside the attribute name. A key icon appears in the cell. A key attribute is an attribute that must be defined for CIs of that CI type.
	To remove the key attribute definition, click in the **Key** column again. The key icon disappears.
	For more information on key attributes, see "CI Type Attributes" on page 449.
	Denotes a static attribute. A static attribute takes the same value for all the CIs of that type. If it is changed, all the CIs of that type are affected and automatically display the new value. A static attribute cannot be defined as a key attribute.
	Note: You cannot define an attribute as static from within the CIT Manager. It is done by deploying the relevant package. Static attributes are for internal use only.
	Click the **Add** button to define a new attribute. For details, see "Add/Edit Attribute Dialog Box" on page 460.
	Select a row and click the **Edit** button to open the Edit Attribute dialog box. For details, see "Add/Edit Attribute Dialog Box" on page 460.
	Note: If you modify an attribute belonging to a CIT's parent, the text turns light blue. If you modify an attribute belonging to the CIT itself, the text remains dark blue.
	Click the **Delete** button to delete a selected attribute. This option is only active for newly defined attributes.
	Click the **Reset** button to reset the attribute settings after editing a pre-existing attribute.
	Click **Select Columns** to select the columns to appear using the Select Columns dialog box.

UI Elements (A-Z)	Description
<Attributes>	Displays all attributes associated with the new CIT. Attributes appearing in black are ones that the new CIT inherits from the base CIT. Attributes appearing in dark blue are ones that are private to this CIT and its descendants. Attributes appearing in light blue are inherited ones that have been modified for the new CIT.
Asset Data	Indicates whether the attribute value is displayed in the Asset Report. For details see "Asset Report" on page 519. **Note:** When this qualifier is selected for a given attribute, the attribute appears as a visible column in the Element Instances dialog box. For details, see "Element Instances Dialog Box" on page 75.
BDM Scope	Indicates whether the attribute is included in the BDM class model.
Change Monitored	Select to define attributes whose values are being marked as Change Monitored in CI Type Manager. The changes in the values of such attributes are saved in the CMDB History database. **Note**: ➤ When this qualifier is selected for a given attribute, the attribute appears as a visible column in the Element Instances dialog box. For details, see "Element Instances Dialog Box" on page 75. ➤ Change Monitored is only relevant for attributes of CI types and not for attributes of relationships. ➤ Change Monitored is not relevant for attributes of the type list of integers or list of strings.
Comparable	Indicates wheher this attribute is to be used for comparing compound CIs. For details, see "Compare CIs Report" on page 537. **Note:** When this qualifier is selected for a given attribute, the attribute appears as a visible column in the Element Instances dialog box. For details, see "Element Instances Dialog Box" on page 75.

UI Elements (A-Z)	Description
Default Value	The default value for the attribute. This value appears when the new CIT is defined and there is no runtime value for the attribute.
Description	A description of the attribute.
Display Name	The attribute name that appears in the HP Business Service Management interface.
Editable	Indicates whether the attribute can be edited.
	Only attributes that are marked as **Editable** (or ones that have values) are displayed in the Properties tab in IT Universe Manager.
Enable Auto Truncate by DFM	Indicates whether the auto-truncate feature for attributes of type STRING is enabled.
Index	Indicates whether the attribute has been defined as an index attribute, which enables you to accelerate the attribute retrieval performance.
	This option is recommended for attributes that are used frequently in search conditions. For example, IP address is usually an index attribute of a node.
Key	When the key icon 🔑 appears in this column, it indicates that the attribute is defined as a key attribute.
	When the static attribute icon 🔑 appears in this column, it indicates that the attribute cannot be defined as a key attribute.
Lower Case	Indicates whether to keep the attribute value in lower case.
Name	The actual name of the attribute (compare to Display Name).
Required	Indicates whether this attribute is defined as a required one, whose value is required for the creation of the CIT.
Static	Indicates whether this attribute is defined as static.
Type	The type of the attribute.
Unique	Indicates whether this attribute is defined as unique, for which different instances of this CI type must have unique values

UI Elements (A-Z)	Description
Upper Case	Indicates whether to keep the attribute value in upper case.
Visible	Indicates whether this attribute is displayed in the Properties tab in IT Universe Manager.

🔍 Qualifiers Page

This wizard page enables you to assign qualifiers to a CI type definition.

Important information	Qualifiers enable you to define added attribute definitions to the CIT. In the **Qualifiers** list, select the required qualifiers using the Add buttons to move your selections to the **Configuration Item Type Qualifiers** list. You can make multiple selections by holding down the CTRL key.
Wizard map	The Create Configuration Item Type/Relationship/Calculated Relationship Wizard contains:

Details Page > Attributes Page > **Qualifiers Page** > Triplets Page > Icon Page > Attached Menu Page > Default Label Page |

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

UI Elements (A-Z)	Description
	Click this button to move all qualifiers to the **Configuration Item Type Qualifiers** list.
	Select the qualifier and click this button to add the qualifier to the **Configuration Item Type Qualifiers** list. Select multiple qualifiers by holding down the CTRL key.
	To remove a qualifier from the CIT definition, select the qualifier from the **Configuration Item Type Qualifiers** list and click this button.
	Click this button to remove all qualifiers from the **Configuration Item Type Qualifiers** list.

UI Elements (A-Z)	Description
Insert	To define a new, custom qualifier, enter the qualifier name in the text box and click **Insert**. The qualifier appears in the **Configuration Item Type Qualifiers** list.
<Configuration Item Type Qualifiers>	The list of qualifiers that define attributes of the new CIT. For example, you can use a qualifier to define a CIT as abstract, which means that you cannot create instances from it.
<Qualifiers>	For a list of the available qualifier options, see "Qualifier Tab" on page 89.

🔍 Triplets Page

This wizard page enables you to create a calculated relationship. Each row on the Triplets page represents one of the allowed steps in the path leading from the source CI to the target CI in the topology map.

Note: This step of the wizard is only relevant for calculated relationships.

Important information	➤ This page is displayed if you select **Calculated Relationships** in the drop-down box in the CI Types pane.
	➤ For details about calculated relationships, see "Impact Modeling" on page 105.
	➤ For general information about the Create Configuration Item Type Wizard, see "Create Configuration Item Type/Relationship/Calculated Relationship Wizard" on page 468.

Wizard map	The Create Configuration Item Type/Relationship/Calculated Relationship Wizard contains: Details Page > Attributes Page > Qualifiers Page > **Triplets Page** > Icon Page > Attached Menu Page > Default Label Page
See also	"Impact Modeling" on page 105

User interface elements are described below:

UI Elements (A-Z)	Description
✚	Click to define the allowed steps in a path in the topology graph leading from the source CI to the target CI in the calculated relationship. Opens the Add Triplet dialog box. For details, see "Add Triplet Dialog Box" on page 71.
✏	Select a row and click the **Edit** button to edit the triplet. Opens the Edit Triplet dialog box. For details, see "Add Triplet Dialog Box" on page 71.
✖	Click the **Delete** button to delete a selected triplet.
Relationship	The required relationship connecting the two query nodes.
Relationship Direction	The source and target of a relationship. ➤ ⇒ The direction is from source to target. ➤ ⇐ The direction is from target to source.
Source	The required source query node.
Target	The required target query node.

�☑ Icon Page

This wizard page enables you to select an icon to assign to the new CI Type.

Note: This step of the wizard is not relevant for relationships.

Important information	Each CIT is displayed with a default icon. However, you can attach different icons to the same CIT when certain conditions apply. For example, you can associate different icons with the same CIT when one of its attribute values changes.
Wizard map	The Create Configuration Item Type/Relationship/Calculated Relationship Wizard contains: Details Page > Attributes Page > Qualifiers Page > Triplets Page > **Icon Page** > Attached Menu Page > Default Label Page

User interface elements are described below:

UI Elements (A-Z)	Description
➕	Click to add a row. **Note:** Only active if **Change the Configuration Item Type icon according to its attribute value** is selected.
✖	Click to remove a row. **Note:** Only active if **Change the Configuration Item Type icon according to its attribute value** is selected.
Attributes	Select an attribute to determine the icon assigned to the CIT.

UI Elements (A-Z)	Description
Change the Configuration Item Type icon according to its attribute value	Enables you to assign an icon for each attribute value. For example, you could define two values for the City attribute: if City=London, one icon is displayed. If City=Beijing, another icon is displayed. **Note:** If you change the icon of a CIT that appears in an existing view, the CIT's icon is not updated in the view.
Configuration Item Type Main Icon	Select the group to which the CIT belongs.
Icon	Select an icon to associate with the value you entered in the Value column.
Value	Enter a value corresponding to the attribute you selected. You can add a new line for each value you enter.

🔖 Attached Menu Page

This wizard page enables you to customize the shortcut menu of a CI by adding menu items and commands (for example, ping, run a program, open a URL). The customized menu is displayed when you right-click a CI instance in IT Universe Manager.
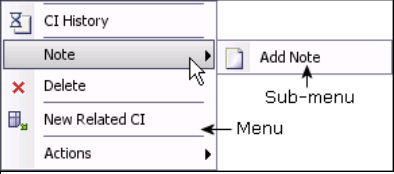
Important information	If a CIT does not have a method defined specifically for it, the CIT inherits all the menus from its parent CIT or the nearest ancestor that does have a method defined for it. If you create or modify a menu, the change occurs only in the specific CIT that is being edited.
Wizard map	The Create Configuration Item Type/Relationship/Calculated Relationship Wizard contains: Details Page > Attributes Page > Qualifiers Page > Triplets Page > Icon Page > **Attached Menu Page** > Default Label Page

User interface elements are described below:

UI Elements (A-Z)	Description
✚	Select a menu item from the tree and click the button. A new entry appears under the selected item.
✖	Click to remove a menu item.
⬆	Click to move a selected menu item up in the menu.
⬇	Click to move a selected menu item down in the menu.
<Tree>	Hierarchical tree containing the default menu items. **Caution:** It is not recommended to edit the definitions of the default menu items.
Command	To connect to a specific location on the World Wide Web, select URL, and enter the exact Internet address, for example, http://www.hp.com/go/software. (Available only if you select the URL command type option.) **Note:** If you use a variable in the Command field, use the format command name %1 and define the CIT attributes as described in Parameters. The parameter values replace %1 according to their order in the list. For example, %1 is replaced by the first parameter in the list, %2 is replaced by the second parameter in the list, and so on.
Description	Enter a description for the method. (This is for internal use only and does not appear in the menu.)
Existing Method	Select to choose a command from a list of defined methods inherited from the IT Universe CIT and all its ancestors.
Icon	Select the icon to appear next to the menu option in the shortcut menu. **Note:** This field is optional.
Menu Item Name	Enter a name for the new menu item as it should appear in the menu.

UI Elements (A-Z)	Description
Method	Enables you to add a command to the menu. **Note:** To create a method and not override the existing method, it is recommended to create a new menu item and place the new method there.
Method Name	Enter a name for the command.
New Method	Select to add an action (for example, ping) to the menu item.
Parameters	To add attributes to the command or URL, click the **Add Parameter** button and select the attribute from the list. To delete an existing entry, select it and click the **Remove Parameter** button. **Note:** Parameters are not relevant when Inner Process is selected.
Require user confirmation?	Select the check box for users to confirm access to a menu item before the item is displayed.
Separator	To place a separator between two menu items: Click **OK** to place a separator underneath the selected menu option.
Shortcut	Press any key combination to create a shortcut for the menu item, for example, CTRL+H. **Note:** This field is optional.

UI Elements (A-Z)	Description
Sub-Menu	Select to create a sub-menu under the selected menu option.
Type	Choose a command type: ➤ **URL.** Opens a web page to the specified URL. Enter the URL of a Web page for the command to open in the URL box. ➤ **Inner Process.** Triggers an internal HP Business Service Management action. Select an action from the drop-down list of actions. ➤ **Execute.** Triggers an executable action. Enter an executable command in the Executable box.

🔍 Default Label Page

This wizard page enables you to define attributes that appear in the CI type label. You can include more than one attribute by using the function buttons. This is the final step of the Create Configuration Item Type Wizard.

Important information	You build a label by selecting attributes in the CI Type Attributes pane and adding them to the Format pane, using the operators in the Format pane to connect them.
	The label appears as the title under a CI of the new CI Type. The label definition can be customized to include different attribute values. For example, if the function label of the node CIT is composed of hostname and network, the displayed label is: server1 10.0.65.0.
	Labels can also be created using regular expressions.
Wizard map	The Create Configuration Item Type/Relationship/Calculated Relationship Wizard contains:
	Details Page > Attributes Page > Qualifiers Page > Triplets Page > Icon Page > Attached Menu Page > **Default Label Page**

User interface elements are described below:

UI Elements (A-Z)	Description
✚	Click to add the selected attribute to the Format pane.
()	Adds parentheses to the formatted text (use in conjunction with the other functions).
&	Places an **AND** operator between two attributes in the formatted text. For example, **network_netaddr&network_domain** displays the network address and the domain of a query node.
‖	Places an **OR** operator between two attributes in the formatted text.

UI Elements (A-Z)	Description
∫	Adds a regular expression (using regular expression syntax) to the label definition. The structure of the entry is **(v1, v2, v3)**, where **v1** represents the selected attribute, **v2** represents the regular expression itself (which divides the value into groups), and **v3** represents the number of the selected group.
	For example, if the selected attribute is a name, consisting of a first name, a space, and a surname, the regular expression would be (name, (\S*)(\s*)(\S*), 3), which indicates that the surname can be used for the name attribute in the default label.
	For examples of how to use regular expression syntax, see "Regular Expression Examples" on page 543.
↺	Click to undo the last change in the Format pane.
✔	Click to clear the Format pane.
CI Type Attributes	Displays the available options of attributes to be included in the CIT label.
CI Type Label Definition Format	Displays the attributes that you select to appear in the CIT label.
	For example, to label a node by its host name and operating system, choose the **host_hostname** and **host_os** attributes. The CIT label is host1 UNIX.
	You can define conditions using AND and OR combinations.
	Note: To delete an attribute from the **Format** pane, highlight it and press the DELETE key.

🔍 Create/Update List/Enumeration Definition Dialog Box

This dialog box enables you to define a new List or Enumeration definition. The List or Enumeration definition you have created appears in the System Type Manager dialog box, where you can edit it if required (for details, see "System Type Manager Dialog Box" on page 487).

To access	Click the **Add** button in the System Type Manager dialog box.
Important information	You can access the Create/Update Enumeration Definition dialog box from the State Manager as well. For details, see "State Manager" in the *Run-time Service Model Administration Guide*.
Relevant tasks	"Create List and Enumeration Definitions" on page 456

User interface elements are described below:

UI Elements (A-Z)	Description
Display Name	Enter the name you want to appear in the list of System Type Definitions. If you leave this field empty, the entry in the Name field is used.
Enumeration	Enables you to create a predefined list of values, as well as assign each value a color. For details, see "Enumeration Definition Area" on page 486.
List	Enables you to create a predefined list of values. For details, see "List Definition Area" on page 485.
Name	Enter a unique name for the definition.

List Definition Area

This area enables you to create a predefined list of values.

To access	Select **List** in the Create List/Enumeration Definition dialog box.
Important information	For example, a Location attribute might be defined by a location list containing the following values: ➤ New York ➤ Boston ➤ Baltimore

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

UI Elements (A-Z)	Description
✚	Add a List definition. Double-click inside the row and either select a date from the calendar that appears (if you chose the type **Date**) or type the required value.
✖	Delete a List definition.
Type	Choose one of following field types: ➤ Date ➤ Double ➤ Integer ➤ Long ➤ String

Enumeration Definition Area

This area enables you to create a list from a predefined list of values (similar to **List**), with capabilities such as assigning a color for every value.

To access	Select **Enumeration** in the Create List/Enumeration Definition dialog box.
Important information	Enumerations are designed to be used as severity value lists by states. You can use Enumerations for lists that require key values.
See also	"Create an Enumeration Definition – Workflow" on page 457

User interface elements are described below:

UI Elements (A-Z)	Description
✚	Add an Enumeration definition.
✖	Remove an Enumeration definition.
Color	Select a color that indicates the severity level.
Key	Type a number to create an enumeration that describes a severity list for a category.
	Assign key values according to the following rules:
	➤ The list of key values must always begin with zero (0). (Zero represents the Normal state.) Otherwise, it does not appear in the State Manager (for details, see "State Manager") in the *Run-time Service Model Administration Guide*.
	➤ The list must always be numbered consecutively.
	For an example of an Enumeration definition, see "Create an Enumeration Definition – Workflow" on page 457.
Value	Type a value, either a string or a number, for example, Red or my value. The value appears in the tooltip for the CI in IT Universe.

🔍 System Type Manager Dialog Box

This dialog box enables you to display the attribute types you defined in the Create List/Enumeration Definition dialog box.

To access	From the CI Type Manager, select **CI Types** > **System Type Manager.**
Relevant tasks	"Create List and Enumeration Definitions" on page 456
See also	"Create an Enumeration Definition – Workflow" on page 457

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

UI Elements (A-Z)	Description
✚	Create a predefined list whose values define an attribute type. You can create a definition for the following attribute types: ➤ List definition. ➤ Enumeration definition. For a description of these attribute types, see "Create/Update List/Enumeration Definition Dialog Box" on page 484.
✎	Enables you to edit an existing definition. For details, see "Create/Update List/Enumeration Definition Dialog Box" on page 484.
✖	Delete an existing definition. Select the system type definition you want to delete and click the **Delete** button.
<System Type Definitions>	The list of Enumeration and List definitions created in the System Type Manager.

13

Enrichment Manager

This chapter includes:

Concepts

➤ Enrichment Manager – Overview on page 490

Tasks

➤ Define an Enrichment Rule – Scenario on page 492

➤ Add Enrichment Query Nodes and Relationships to an Enrichment TQL Query on page 497

Reference

➤ Enrichment Manager User Interface on page 499

Concepts

🟦 Enrichment Manager – Overview

Enrichment rules can be used for several purposes:

➤ Adding new CIs and relationships to the RTSM.

➤ Deleting specific CI instances from the RTSM.

➤ Updating the attribute values of specific CI instances in the RTSM.

Enrichment query nodes and relationships differ from other query nodes and relationships in that they are conceptual deductions that represent real relationships and CIs that cannot be discovered automatically by the discovery process.

Enrichment query nodes and relationships are created as part of a TQL query, whose other TQL query nodes are regular ones, meaning TQL query nodes that already exist in the RTSM. For more information about TQL queries, see "Topology Query Language" on page 21.

The following example displays a regular query node of type **Node** linked to an **IBM Websphere MQ Enrichment** query node by an Enrichment **Container link** relationship.
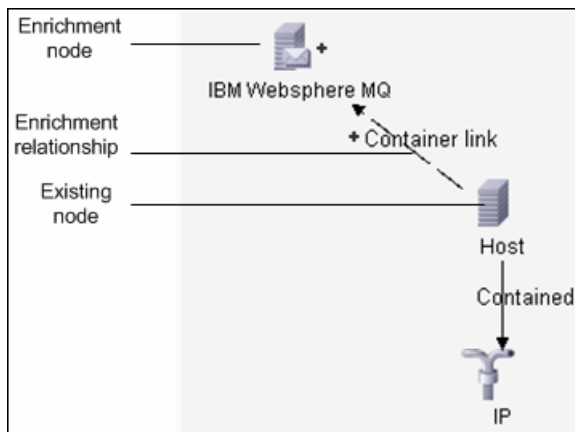
By placing an Enrichment query node within a TQL query context, the query receives data from its attributes, and uses it to insert new information into the RTSM.

When you create Enrichment rules, the following results can occur:

➤ **The RTSM is enlarged**. Add Enrichment query nodes and relationships that are currently not included in the RTSM.

The following Enrichment rule example displays a regular **Windows** query node (that already exists in the RTSM) connected to a **File** Enrichment query node by an Enrichment **Container link** relationship.
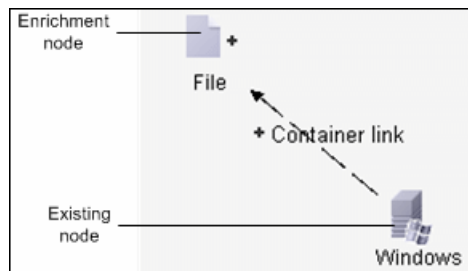
This Enrichment rule states that for every **Windows** CI instance that is found in the RTSM, a new **File** CI instance is created, and linked to the **Windows** CI with a **Container link** relationship.

➤ **Specific CI instances are deleted from the RTSM**. For an example, see "Define an Enrichment Rule – Scenario" on page 492.

➤ **The values of CI attributes are updated.** Use an Enrichment rule to update the attributes of a CI that already exists in the RTSM.

The following Enrichment rule example illustrates that a regular **File System** query node (that already exists in the RTSM) has been updated with an Enrichment rule.

This Enrichment rule states that every **File System** CI found in the RTSM is updated with the attribute value defined in the Enrichment rule.

Tasks

🏴 Define an Enrichment Rule – Scenario

This task describes how to create the following Enrichment rule:

An **IP Address** CI is connected to two identical **Node** CIs: one **Node** CI is identified by its IP address and the other is identified by its lowest MAC address. For every such instance, delete the **Node** CI that is identified by its IP address from the RTSM.

Note: To reach the required result, you must implement each one of the following steps.

This task includes the following steps:

1 **Create an Enrichment TQL Query**

To create an Enrichment TQL query, you need to define an Enrichment rule and then add the regular TQL query nodes and relationships that define the query.
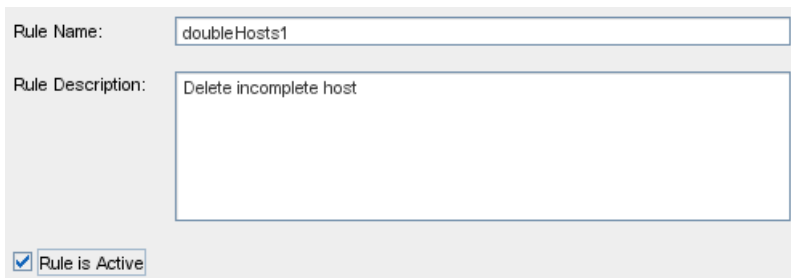
Note: You can add Enrichment query nodes and relationships only after at least one regular query node has been added to the query.

Select **Admin > RTSM Administration > Modeling > Enrichment Manager**. For details about how to create an Enrichment TQL query, see "New Enrichment Rule/Enrichment Rule Properties/Save As Enrichment Rule Wizard" on page 508. For details about how to add query nodes and relationships to a query, see "Add Query Nodes and Relationships to a TQL Query" on page 30.

Example of an Enrichment TQL Query:

A new Enrichment TQL query called doubleHosts1 (located under the **Network** folder) is created in Enrichment Manager.

The **doubleHosts1** Enrichment rule is displayed in the Enrichment Rules pane.
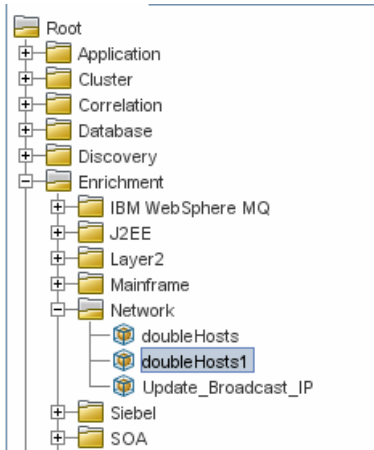
In this Enrichment TQL query, an **IP Address** query node is linked to two query nodes of type **Node** by a **Containment** relationship. The TQL results must comply with the direction of the arrows.
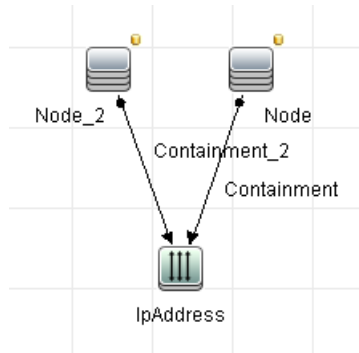
Note: A TQL query is subject to certain validation restrictions. For details, see "Troubleshooting and Limitations" on page 99.

2 Define the Query Node of Type Node that Is Identified by its Lowest MAC Address

At the top of the Enrichment Manager page, select **Query** mode. In the editing pane, right-click the required query node of type **Node**, select **Query Node Properties** to open the Query Node Properties dialog box. Then define an attribute condition in the Attribute tab. For details on how to define an attribute condition, see "Attribute Tab" on page 84.

Example of an Attribute Condition Definition that Identifies the Node by its Lowest Mac Address:

In the Attribute tab, this attribute condition definition identifies the required Node by its lowest MAC address.

➤ **Attribute name** — Node is Complete

➤ **Operator** — Equal

➤ **Value** — True

3 Define the Query Node of Type Node that is Identified by its IP Address

At the top of the Enrichment Manager page, select **Query** mode. In the editing pane, right-click the required query node of type **Node**, and select **Query Node Properties** to open the Query Node Properties dialog box. Then define two attribute conditions in the Attribute tab. For details on how to define an attribute condition, see "Attribute Tab" on page 84.

Example of an Attribute Condition that Enables a Node to Be Identified by its IP Address:

This attribute condition is the first attribute condition you need to define in the Attribute tab to enable the query node of type node to be identified by its IP Address.

Attribute name — Node is Complete

Operator — Equal

Value — False

This is the second attribute condition you need to define in the Attribute tab to enable the query node of type node to be identified by its IP address.

Attribute name — Node is Complete

Operator — Is null

Value — Value cannot be changed

4 **Define the Enrichment Rule**

Define the Enrichment rule that deletes all instances of the query node of type **Node** that are identified by their IP addresses. From the toolbar, select **Enrichment** mode. In the Enrichment Rules pane, select the **doubleHosts1** Enrichment rule. Then right-click the query node of type **Node** that is identified by its IP address and select **Delete Relationship/Query Node Item**.

Example of a Query Node of Type Node Containing a Removed Indicator:

The query node of type **Node** now has a removed indicator to denote that all node instances that have identical attribute and cardinality settings are removed from the RTSM. The Enrichment query now looks like this.
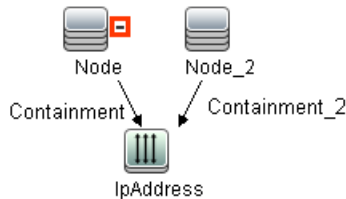
🔨 Add Enrichment Query Nodes and Relationships to an Enrichment TQL Query

This section describes how to add Enrichment query nodes and relationships to an Enrichment TQL query in Enrichment Manager.

To add Enrichment query nodes and relationships to a TQL query:

1 From the tree in the Enrichment Rules pane, select the Enrichment rule to which you want to add Enrichment query nodes and relationships or create a new one. For details, see "New Enrichment Rule/Enrichment Rule Properties/Save As Enrichment Rule Wizard" on page 508.

2 From the **Query/Enrichment** drop-down at the top of the page, select **Enrichment** mode.

> Enrichment Mode ▼
> Query Mode
> Enrichment Mode
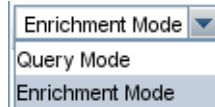
3 From the tree displayed in the CI Type Selector, click and drag the query nodes you want to function as an Enrichment query node on to the editing pane. These are the TQL query nodes that are included in the query. Added Enrichment query nodes are displayed by an added indicator.

Note: You can add more than one Enrichment query node to a rule.

---

4 Link the Enrichment query node to an existing TQL query node or query nodes, to provide the Enrichment query node with the needed context for its operation.

Following are the Enrichment rule validations:

➤ You must link the new Enrichment query node to at least one of the existing TQL query nodes in the rule.

➤ Enrichment query nodes can only be linked to one another with an Enrichment relationship.

> ➤ If the new Enrichment query node must be contained (according to its CIT definition) in another query node, you must use the **Composition** relationship to connect this Enrichment query node to an existing TQL query node.

> ➤ You cannot link an Enrichment query node to a TQL query node that is not visible.

5 To add a relationship between two query nodes:

> ➤ Select the required query nodes by holding down CTRL and clicking the TQL query nodes, right-click and select **Add Relationship**.

or

> ➤ Click the **Create Relationship** icon and draw a line between the required query nodes.

Added Enrichment relationships are displayed by an added indicator.

The Add Relationship dialog box opens. For details, see "Add/Edit Relationship Dialog Box" on page 61.

6 Click **OK**. The selected query nodes are linked by the relationship you have selected.

Reference

🔍 Enrichment Manager User Interface

This section includes (in alphabetical order):

➤ Enrichment Manager Page on page 499

➤ New Enrichment Rule/Enrichment Rule Properties/Save As Enrichment Rule Wizard on page 508

➤ Query Node/Relationship Definition Dialog Box on page 513

➤ Query Node Definition – Advanced Attribute Dialog Box on page 515

🔍 Enrichment Manager Page

This page enables you to define Enrichment rules. These rules, which are based on a specific TQL query, can be used for several purposes, including:

➤ Adding new CIs and relationships to the RTSM.

➤ Deleting specific CI instances from the RTSM.

➤ Updating the attribute values of specific CI instances in the RTSM.

To access	Select **Admin** > **RTSM Administration** > **Modeling** > **Enrichment Manager.**
Important information	Enrichment Manager has two modes in which you can work. Always check the **Enrichment/Query mode** list in the toolbar to verify the currently selected mode.
Relevant tasks	"Define an Enrichment Rule – Scenario" on page 492

Enrichment Rules Pane

This area displays a hierarchical tree structure of predefined folders and Enrichment rules. Each Enrichment rule is associated with a TQL query.

Important information	You can create your own query, or work with the out-of-the-box (factory) queries provided with your HP Business Service Management installation.
	The default folders are provided for the out-of-the-box queries. You can modify these folders, or add additional folders according to your organization's requirements.

User interface elements are described below:

UI Elements (A-Z)	Description
	Creates a new folder.
	Creates an Enrichment rule. Opens the New Enrichment Rule/Properties wizard.
	Deletes the selected folder or Enrichment rule.
	Refreshes the data content of the hierarchical tree structure that may have been modified by other users.
	(Enabled only when an Enrichment rule is created or when changes are made to an existing one.) Saves the Enrichment rule to the RTSM.
	Opens the New Enrichment Rule/Properties wizard. Enables you to change the description and the activation state of the Enrichment rule.
	Generates a preview of the results of the selected Enrichment rule.
	Represents a folder.
	Represents an Enrichment rule.

The following elements are available by right-clicking a folder or Enrichment rule:

UI Elements (A-Z)	Description
Delete	Deletes the selected folder or Enrichment rule.
Export To XML	Displays a standard Save As dialog box, enabling you to save the Enrichment rule as an XML script. This option can be used to move an Enrichment rule from one workstation to another, provided the related TQL query is also relocated.
Import From XML	Imports XML files that contain saved Enrichment queries to the Enrichment Manager.
New	Creates an Enrichment rule. Opens the New Enrichment Rule wizard.
New Folder	Creates a new folder.
Preview	Generates a preview of the results of the selected Enrichment rule.
Properties	Opens the New Enrichment Rule/Properties wizard. Enables you to change the description and the activation state of the rule.
Rename Folder	Renames the folder.
Save	(Enabled only when a new Enrichment query is created or when changes are made to an existing one.) Saves the Enrichment rule to the RTSM.
Save As	Displays the Save As Enrichment Rule wizard, enabling you to define a new name and description for a query. This option can be used for creating a new Enrichment rule based on an existing one.
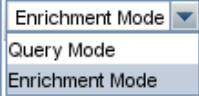
Editing Pane

This area enables you to create and define Enrichment query nodes and relationships.

Important information	➤ When you select a folder in the Enrichment Rules pane, the editing pane is empty.
	➤ When you select an Enrichment rule in the Enrichment Rules pane, the editing pane displays the selected rule, which consists of TQL query nodes that are defined in the TQL query and the relationships between them, and the Enrichment query nodes and relationships that are created and added to the rule.
	➤ The Enrichment Manager has two modes in which you can work: **Enrichment** mode and **Query** mode.
	The mode in which you are working determines the options that appear in the shortcut menu. For details, see the editing pane description below.
	➤ You can calculate the number of instances that were created as a result of an Enrichment rule and remove the instances created from an Enrichment rule from the RTSM. For details, see "Additions Count" on page 197 and "Remove Enrichment Results" on page 203.
Relevant tasks	"Define an Enrichment Rule – Scenario" on page 492
See also	For details on how to create a TQL query, see "Add Query Nodes and Relationships to a TQL Query" on page 30.

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

UI Elements (A-Z)	Description
⊞	Indicates an added Enrichment query node or relationship.
⊟	Indicates a query node or relationship that has been deleted from the RTSM.
↗	Indicates an updated query node or relationship.

UI Elements (A-Z)	Description
Enrichment Mode ▼ Query Mode Enrichment Mode **Query and Enrichment mode**	The Enrichment Manager has two modes in which you can work: **Enrichment** mode and **Query** mode. Working in: ➤ **Query mode** enables you to define regular (non-Enrichment) relationships and query nodes and add them to the TQL query you defined. ➤ **Enrichment mode** enables you to define Enrichment relationships and query nodes and add them to the TQL query you defined.
<Shortcut menu> options	For details, see "Shortcut Menu Options" on page 39.
<Main Menu>	For details, see "Main Menu" on page 193.
<Query Node>	A component from which TQL queries are built.
<Relationship>	The entity that defines the relationship between two query nodes.
<Toolbar>	For details, see "Toolbar Options" on page 197.
<Tooltips>	Hold the cursor over a query node or relationship to view its tooltip. The tooltips contain the following information: ➤ **Element name.** The name of the query node. ➤ **CI Type**. The CIT of the query node as defined in the CI Type Manager. For details, see "CI Type Manager" on page 447. ➤ **Definitions of the selected query nodes and relationships**. The attribute conditions, as described in "Query Node/Relationship Properties Dialog Box" on page 82.

CI Type Selector

This area displays a hierarchical tree structure of the CI Types found in the RTSM.

Important information	The CI Type Selector is part of Enrichment Manager, Impact Analysis Manager, and Trigger TQL Editor.
	To create or modify a TQL query, click and drag query nodes to the Editing pane and define the relationship between them. Your changes are saved to the RTSM. For details, see "Add Query Nodes and Relationships to a TQL Query" on page 30.
	Note: The number of instances of each CIT in the RTSM is displayed to the right of each CIT.
Relevant tasks	➤ "Define an Impact Rule – Workflow" on page 424
	➤ "Define an Enrichment Rule – Scenario" on page 492
	➤ "Define a TQL Query" on page 29
	➤ "Create a Pattern View" on page 341

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

UI Elements (A-Z)	Description
⇐	Click **Add CI Type to Map** to move the selected CI type to the Editing pane.
⟳	Click **Refresh** to refresh the CI type tree.
🔍	Click **Search** to search for the CI type entered.
⊞	Click **Expand All** to expand all subtrees within the CI type tree.
⊟	Click **Collapse All** to collapse the subtrees within the CI type tree.
<Search window>	Enter the name or part of a name of a CI type for which to search.

Shortcut Menu Options

The CI Type Selector includes the following elements (listed alphabetically) available by right-clicking a CI Type:

Menu Item	Description
Add CI Type to Map	Select to add the selected CI type to the Editing pane.
Go to CI Type Definition	Takes you directly to the selected CI type in CIT Manager.
Show CIT Instances	Opens the CIT Instances window, which displays all instances of the selected CIT. For details, see "Element Instances Dialog Box" on page 75.

Advanced Pane

This area displays the properties, conditions, and cardinality for the selected query node and relationship.

Important information	The Advanced pane appears in the lower part of the window in the following managers and user interfaces: Modeling Studio, Impact Analysis Manager, Enrichment Manager, the Input Query Editor and Trigger Query Editor in DFM. A small green indicator ✳ appears next to the tabs that contain data.
Relevant tasks	➤ "Define an Impact Rule – Workflow" on page 424 ➤ "Define an Enrichment Rule – Scenario" on page 492 ➤ "Define a TQL Query" on page 29 ➤ "Create a Pattern View" on page 341 ➤ "Create a Template" on page 342 ➤ "Create a Perspective" on page 344

User interface elements are described below:

UI Elements (A-Z)	Description
◀▶	If the window is not wide enough to display all the tabs, use the left and right arrows to move to the required tab.
▾	Click **Show List** to display a list of the available tabs for the current module. You can select a tab from the list.
Attributes	Displays the attribute conditions defined for the query node or the relationship. For details, see "Attribute Tab" on page 84.
Cardinality	Cardinality defines how many query nodes you expect to have at the other end of a relationship. For example, in a relationship between a node and an IP Address, if the cardinality is 1:3, the TQL query retrieves only those nodes that are connected to between one and three IP Addresses. For details, see "Cardinality Tab" on page 86.
Data Sources	Displays the data sources set for the selected query node. **Note:** This tab appears only in the Modeling Studio.
Details	Displays the following information: ➤ **CI Type.** The CIT of the selected query node/relationship. ➤ **Visible.** A green check indicates that the selected query node/relationship is visible in the topology map. A red mark indicates that it is not visible. ➤ **Include subtypes.** A green check indicates that both the selected CI and its children are displayed in the topology map. A red mark indicates that only the selected CI appears.
Edit	Click **Edit** to open the relevant dialog box for the selected tab.

UI Elements (A-Z)	Description
Enrichment Rules	Displays the Enrichment rule defined for the selected query node or relationship. If the Enrichment rule is used to update the attributes of a CI, click **Edit** to open the Query Node/Relationship Definition dialog box and edit the rule if required. For details, see "Query Node/Relationship Definition Dialog Box" on page 513. **Note:** This tab appears only in Enrichment Manager.
Impacted Query Nodes	Indicates which query node is affected by the changes that occur in the selected trigger query node. If required, you can click **Edit** to open and modify the Affected Query Nodes dialog box. For details, see "Impacted Query Nodes Dialog Box" on page 437. **Note:** This tab appears only in Impact Analysis Manager.
Qualifiers	Displays the qualifier conditions defined for the query node or the relationship. For details, see "Qualifier Tab" on page 89.
Selected Identities	Displays the element instances that are used to define what should be included in the TQL query results. For details, see "Identity Tab" on page 92.

🔍 New Enrichment Rule/Enrichment Rule Properties/Save As Enrichment Rule Wizard

This wizard enables you to create or modify an Enrichment rule.

To access	➤ To create a new Enrichment rule, right-click anywhere in the Enrichment Rules pane and click **New** or click the **New** ✱ button. ➤ To modify an existing Enrichment rule, right-click an Enrichment rule in the Enrichment Rules pane and select **Properties**. ➤ To create a new Enrichment rule based on an existing query, right-click an Enrichment rule in the Enrichment Rules pane and select **Save As**.

Important information	➤ When creating a new Enrichment rule, bear in mind that the application does not allow you to make any changes in the TQL query that are necessary for the rule. These changes include the following:
	  ➤ Deleting, from the Enrichment TQL query, the query nodes or relationships connected to the Enrichment query node, causing a query node to become unattached to any relationship.
	  ➤ You cannot change the cardinality definition to **0** (not required) of a query node or relationship that is used in an Enrichment rule. For details on relationship cardinality, see "Query Node/Relationship Properties Dialog Box" on page 82.
	➤ An Enrichment TQL query that serves as the basis for Enrichment rules, is subject to certain validation restrictions. For details, see "Troubleshooting and Limitations" on page 99. If the TQL query is not valid, you cannot save it.

Relevant tasks	➤ "Define an Enrichment Rule – Scenario" on page 492
Wizard map	The New Enrichment Rule /Enrichment Rule Properties/Save As Enrichment Rule wizard contains: Rule General Attributes Page > Rule Base Query Page
See also	"Topology Query Language" on page 21

🔍 Rule General Attributes Page

This wizard page enables you to enter a unique name and description for the Enrichment rule.

Important information	➤ An Enrichment TQL query that serves as the basis for Enrichment rules is subject to certain validation restrictions. For details, see "Troubleshooting and Limitations" on page 99. If the TQL query is not valid, you cannot save it. ➤ For important information on the effects of making changes to the TQL query after creating it, see "New Enrichment Rule/Enrichment Rule Properties/Save As Enrichment Rule Wizard" on page 508. ➤ By default, this wizard is set to display a Welcome page. You can choose not to display this page by changing the user preferences. For details, see "User Preferences Dialog Box" on page 99.
Wizard map	The New Enrichment Rule/Enrichment Rule Properties/Save As Enrichment Rule Wizard contains: **Rule General Attributes Page** > Rule Base Query Page
See also	"Topology Query Language" on page 21

User interface elements are described below:

UI Elements (A-Z)	Description
Rule Description	(Optional) Enter a description of the rule.
Rule is Active	(Optional) Select this option to activate the rule in the system as soon as it is saved. **Default:** Not selected. **Note**: ➤ If an active Enrichment rule is deactivated (by clearing the **Rule is Active** check box), all changes that occur in the RTSM relating to the rule are deleted from the system. When you deactivate an Enrichment rule, a red X appears next to the Enrichment rule in the Enrichment Rules pane. ➤ To reactivate the rule, right-click the rule in the Enrichment Rules pane and select **Properties**. In the General Attributes page, select **Rule is Active**.
Rule Name	Enter a unique name for the Enrichment rule. The rule name cannot contain any of the following characters: \ / : " < > | % ? **Note**: If the rule name is either empty, contains a name used by another Enrichment rule, or uses invalid characters, the **Next** and **Finish** buttons are disabled.

🔍 Rule Base Query Page

This wizard page enables you to define the properties of the TQL query on which the Enrichment rule is based.

Important information	➤ An Enrichment TQL query that serves as the basis for Enrichment rules, is subject to certain validation restrictions. For details, see "Troubleshooting and Limitations" on page 99. If the TQL query is not valid, you cannot save it.
	➤ For important information on the effects of making changes to the TQL query after creating it, see "New Enrichment Rule/Enrichment Rule Properties/Save As Enrichment Rule Wizard" on page 508.
	➤ By default, this wizard is set to display a Completion page after clicking **Next** in this page. You can choose not to display the Completion page by changing the user preferences. For details, see "User Preferences Dialog Box" on page 99.
Wizard map	The New Enrichment Rule/Enrichment Rule Properties/Save As Enrichment Rule Wizard contains: Rule General Attributes Page > **Rule Base Query Page**
See also	"Topology Query Language" on page 21

User interface elements are described below:

UI Elements (A-Z)	Description
Base the Enrichment rule on a new Query	Select this check box if you want to base the Enrichment rule on a new TQL query. The TQL results are based on the attributes defined for the new TQL query.
Base the Enrichment rule on an existing Query	Select this check box if you want to base the Enrichment rule on an existing TQL query. Select the required Enrichment TQL query from the drop-down list.
Base Query Description	(Optional) Enter a description of the TQL query.

UI Elements (A-Z)	Description
Base Query Name	Enter a unique name for the Enrichment TQL query.
	If you selected the **Base the Enrichment rule on an existing TQL** option, select the Enrichment TQL query on which you want to base the rule.
Base Query Priority	Select a priority level for the new TQL query (Low, Medium, High, or Express). This setting determines how often the query is rerun automatically by the system to include updated information from the RTSM.
Save a new Query based on the current definition	Select to save a new TQL query based on your Enrichment rule definition.
	Note: This field only appears in the Save As Enrichment Rule wizard.

Query Node/Relationship Definition Dialog Box

This dialog box displays the attributes of the selected query node/relationship. The key attributes and the required attributes of the selected query node appear in bold.

To access	Right-click a query node or relationship when in Enrichment mode (select **Enrichment** from the **Query/Enrichment** drop-down at the top of the Enrichment Manager page) and select **Update Relationship/Query Node**.
Important information	Use an Enrichment rule to update the value of CI attributes in the RTSM, or to add data to attributes that currently do not have values. You can use this option, for example, for simultaneously adding a note to all CI instances.
	You must fill in the value of the key attributes and the required attributes of the Enrichment query node. The method you use to define these values determines the number of instances created.
	If you enter a dynamic value, you can create numerous instances. For example, entering the dynamic value of a host_key for the CIT **Node** or an IP address attribute for the CIT **IpAddress**.
Relevant tasks	"Define an Enrichment Rule – Scenario" on page 492

Attributes Area

User interface elements are described below:

UI Elements (A-Z)	Description
Name	The attribute name.
Type	The field type of the selected attribute.
Value	The value as defined in one of the following: ➤ The **Value** box in the **Set Attributes** area. ➤ The combination of the values in the **By Attribute** boxes in the **Set Attributes** area. ➤ The **Value** column if you selected **Simple** in the **Type** column in the Query Node Definition - Advanced Attribute dialog box. ➤ The combination of the values in the **Value** column and the column to the right of the **Value** column if you selected **By Attribute** in the **Type** column in the Query Node Definition - Advanced Attribute dialog box.

Set Attributes Area

User interface elements are described below:

UI Elements (A-Z)	Description
...	(Appears only if you selected an attribute of the field type **string**.) Opens the Query Node Definition - Advanced Attribute dialog box. Define query node and relationship attributes of the type **string** using simple or complex expressions. You can also create complex expressions using regular expression format.
Advanced	(Appears only if you selected an attribute of the field type **string**.) Displays the attribute value you defined in the Query Node Definition - Advanced Attribute dialog box.

UI Elements (A-Z)	Description
By Attribute	Define an attribute using attributes from other query nodes in the TQL query. ➤ In the box to the left, select the required query node. ➤ In the box to the right, select the query node's required attribute. The attribute definition appears in the **Value** column in the **Attributes** area.
RegExp Group	(Appears only when you select an attribute of the field type **string**.) Enter the group number only if you are adding a regular expression using regular expression syntax. This is the part of the regular expression pattern to focus on when creating the attribute. A set of parentheses ( ) constitutes a group.
Regular Expression	(Appears only when you select an attribute of the field type **string**.) Add a regular expression using regular expression syntax. Enter the regular expression pattern.
Value (in the Set Attributes area)	Define a constant value. Enter the required value in the **Value** box or select a value from the **Value** list. **Note**: The value definition appears in the **Value** column in the **Attributes** area.

🔍 Query Node Definition – Advanced Attribute Dialog Box

This dialog box enables you to define query node and relationship attributes of the type **String** using simple or complex expressions. You can also create complex expressions using regular expression format.

To access	Select an attribute of the type **string** in the Query Node Definition dialog box. Select **Advanced** and then click the **Advanced** button.
Relevant tasks	"Define an Enrichment Rule – Scenario" on page 492

User interface elements are described below:

UI Elements (A-Z)	Description
✚	Define an attribute value using simple or complex expressions. Creates a new entry in the **Type** column. Click the new entry and select either **Simple** or **By Attribute**. For details, see the description for the **Type** column below.
✖	Delete an attribute value.
⬆	Move a selected row up.
⬇	Move a selected row down.
Advanced Value	(This list is only available if you select **By Attribute** in the **Type** column.) Click the entry inside the box and select the required attribute.
Concatenate	Use all the attribute values listed in this dialog box.
RegExp Group	(This list is available only if you select **By Attribute** in the **Type** column.) Click inside the **RegExp Group** column, click the ⎡ … ⎤ button, and enter the group number in the Value for RegExp Group dialog box that opens. This is the part of the regular expression pattern to focus on when creating the attribute. A set of parentheses **( )** constitutes a group.
Regular Expression	(This list is only available if you select **By Attribute** in the **Type** column.) Click inside the **Regular Expression** column, click the ⎡ … ⎤ button, and enter the regular expression pattern in the Value for Regular Expression dialog box that opens.

UI Elements (A-Z)	Description
Type	Click the entry inside the **Type** column and select one of the following options: ➤ **Simple**. Define a constant value using a simple expression. ➤ **By Attribute**. Define an attribute using attributes from other query nodes in the TQL. **Default is:** Simple
Use first attribute with value	Use the first attribute value listed in this dialog box that is not empty.
Value	➤ If you select **Simple** in the **Type** column, click inside the **Value** column, click the ⬛ button, and enter the required value in the Value for Simple dialog box. ➤ If you select **By Attribute** in the **Type** column, click inside the **Value** column and select the required value from the list.

Part III

RTSM Data Model

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RTSM Data Model Introduction

This chapter includes:

Concepts

➤ The BDM Data Model Overview on page 522

Reference

➤ Data Model Documents on page 523

➤ Upgrade Documents on page 524

Concepts

🔵 The BDM Data Model Overview

The BTO Data Model (BDM) enables you to manage the business functions, services, processes, and activities of your IT Universe model.

The BDM documents are located in the following folder:

\\<Business Service Management root directory>\AppServer\ webapps\site.war\amdocs\eng\pdfs

Reference

🔍 Data Model Documents

BDM – Conceptual Data Model

The conceptual model presents a high level picture of the BTO Data Model (BDM) organized in structured layers. This document is a map of the concepts being modeled, as well as the scope of the model. This conceptual data model provides a starting point for understanding the semantics of the domain modeled.

Note: As this is an abstract representation of the model, the document does not include every entity or relationship.

BDM – Data Model UMLs

This document represents the data model in a visually appealing set of UML diagrams. Rather than a single, large, complex UML diagram of the entire model, small diagrams with specific points of view are presented. The purpose of the UML diagrams is to provide a pictorial representation of the model entities and their relationships to each other.

Note: To make the UML diagrams easier to understand, some relationships and entities may have been excluded.

BDM – Data Model HTML

This document includes all the BDM class information in HTML format.

BDM – Business Model and Best Practices

This document covers the business part of the RTSM data model, as well as some best practices and guidelines on how to model your business.

CMS Data Model 9.01 Documentation

This document covers all BDM classes and a subset of the CMS classes. It includes the following information:

➤ class descriptions

➤ attribute information

➤ object scoping (BDM/CMS)

➤ qualifier information

➤ hierarchy information

Note: This document can be automatically generated from the RTSM user interface.

🔍 Upgrade Documents

RTSM Class Mapping Summary

This mapping document presents a high level view of the class mappings between versions 8.0x and 9.01, including the hierarchy changes.

RTSM Class Model Comparison

This document covers the differences between the 8.0x class model and the 9.01 data model in greater detail. The document includes the following information:

➤ class and attribute mapping

➤ new classes and attributes

➤ qualifier changes

➤ deprecation information

➤ removed classes

➤ key attribute changes

➤ hierarchy changes

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Exporting the RTSM Data Model to a UML Tool

This chapter includes:

Concepts

➤ Export to UML Tool – Overview on page 528

Tasks

➤ Export the Class Model on page 529

➤ Convert XML of Selected Part of Class Model on page 530

Reference

➤ Export to UML Tool User Interface on page 532

➤ Tool Plug-in Input on page 535

Note: Currently, Altova UModel versions 2008 and 2009 are supported.

Concepts

Export to UML Tool – Overview

The Export to UML tool enables you to export selected sections of the RTSM class model to a format compatible with UML tools, and to view the model as a UML diagram.

The input for the tool is the RTSM class model XML file retrieved by the JMX service **UCMDB:service=Class Model Services/ exportClassModelToXml()** for UCMDB 9.01.

Note: To access the JMX console, enter the following address in your browser: **http://<server_name>:21212/jmx-console**, where **<server_name>** is the name of the machine on which HP Business Service Management is installed.

Tasks

🔧 Export the Class Model

This task describes how to use the Export Class Model to UML tool wizard.

This task includes the following steps:

➤ "Prerequisites" on page 529

➤ "Run the UML Tool" on page 529

➤ "View the Exported File in Altova" on page 529

1 Prerequisites

Set up the tool by extracting the following zip file to any location:

<HP BSM root directory>:\odb\tools\ExportClassModel.zip

2 Run the UML Tool

You use the Export Class Model to UML wizard to choose the CIT and its attributes to be exported to the UML tool.

For details on working with the Export to UML wizard, see "Export Class Model to UML Wizard" on page 532.

3 View the Exported File in Altova

a In Altova, select **File** > **Import From XMI File**.

b Select the XMI file. The class model entry appears in the Model Tree pane.

c Right-click the entry and select **Show in new diagram** > **Content**. Click **OK**.

🪶 Convert XML of Selected Part of Class Model

This task describes how to use the custom plug-in to convert the XML of a selected part of the class model to the UML tool format.

The plug-in can be either a Java class or an XSLT text file. If you use a Java class, it must implement the **ITransformToUML(ExportToUML.jar)** interface; the **transformToUML()** method receives an XML string as a parameter and returns a byte array that is written to the output file.

For details on the custom plug-in input, see "Tool Plug-in Input" on page 535.

This task includes the following steps:

➤ "Activate the Plug-in Using a Java Class" on page 530

➤ "Activate the Plug-in Using an XSLT Text File" on page 531

Activate the Plug-in Using a Java Class

Add the display name and fully-qualified class name to the **config.xml** file in the ExportToUML directory, as follows:

```
<ConverterToUML>
    <Name><display name></Name>
    <Class><fully qualified class name></Class>
</ConverterToUML>
```

Continue with the procedure for exporting the class model. For details, see "Export the Class Model" on page 529.

Activate the Plug-in Using an XSLT Text File

In this case, XSLT from the specified file is applied to the class model XML and is written to the output file.

Add the display name and full path of the XSLT file to the **config.xml** file in the ExportToUML directory, as follows:

```
<ConverterToUML>
    <Name><display name></Name>
    <XsltFile><Full_path_of_the_XSLT_file></XsltFile>
</ConverterToUML>
```

Continue with the procedure for exporting the class model. For details, see "Export the Class Model" on page 529.

Reference

🔍 Export to UML Tool User Interface

This section includes (in alphabetical order):

➤ Export Class Model to UML Wizard on page 532

🔍 Export Class Model to UML Wizard

This wizard enables you to choose the CIT and its attributes to be exported to the UML tool.

To access	Browse to the location where you extracted the tool. Right-click **ExportClassModel.jar** in the ExportClassModel directory. Select **Open With** > **Java 2 Platform SE binary.**
Important information	By default the tool opens the **ClassModel.xml** file in the ExportClassModel directory. You open other files through the **File** > **Open Class Model File** menu.
Relevant tasks	"Export the Class Model" on page 529
Wizard map	The Export Class Model to UML wizard contains: **Export Class Model to UML Wizard** > Select Valid Links > Export Selected Items
See also	"Tool Plug-in Input" on page 535

User interface elements are described below:

UI Elements (A-Z)	Description
File	Displays a list of XML files. Open the file that contains the class model.
Select Attributes Pane	Select the attributes to be displayed in the UML tool.
	The attributes of the selected CIT are displayed in this pane. The attributes are colored as follows:
	➤ Attributes inherited from the parent CIT are black.
	➤ Attributes specific to this CIT are dark blue.
Select CI Types Pane	The CITs displayed here are retrieved from the ClassModel.xml file.
	Select the CIT and its sub nodes to be exported to the UML tool.
	Use the buttons to select or clear all subindex.

Select Valid Links

This wizard page enables you to select links that can be used between two CITs.

Important information	General information about the wizard is available in "Export Class Model to UML Wizard" on page 532.
Wizard map	The Export Class Model to UML wizard contains:
	Export Class Model to UML Wizard > **Select Valid Links** > Export Selected Items

User interface elements are described below:

UI Elements (A-Z)	Description
	Click to remove the filter from the list of CITs.
Filter by	Enables you to filter the list of valid links. You can filter the list of CITs and you can sort the list by CIT or relationship.

Export Selected Items

This wizard page enables you to export the selected CITs and their attributes to the UML tool.

Important information	General information about the wizard is available in "Export Class Model to UML Wizard" on page 532.
Wizard map	The Export Class Model to UML wizard contains:
	Export Class Model to UML Wizard > Select Valid Links > **Export Selected Items**

User interface elements are described below:

UI Elements (A-Z)	Description
Export	Click to browse to the UML file, in XMI format, to which you want to add the UCMDB CITs and their attributes.
	If there are no valid links for a pair of CITs, a **no valid links** message is displayed in the Select Valid Links page.

🔍 Tool Plug-in Input

The input for the plug-in is an XML string (selected classes/attributes/valid links) in the following form:

```
<?xml version="1.0" encoding="ISO-8859-1"?>
<Class-Model>
<Class class-name="hostresource" display-name="Host Resource"
visibility="public">
    <Attribute name="isvirtual" display-name="Is Virtual" visibility="public"/>
   <Attribute name="city" display-name="City" visibility="public"/>
</Class>
<Class class-name="host_node" display-name="Computer" visibility="public">
   <Derived-From class-name="host"/>
</Class>
<Class class-name="vax" display-name="VAX" visibility="public">
   <Attribute name="root_actualdeletionperiod" display-name="Actual Deletion
Period" visibility="public"/>
   <Attribute name="data_allow_auto_discovery" display-name="Allow CI Update"
visibility="public"/>
   <Derived-From class-name="host_node"/>
</Class>
<Class class-name="host" display-name="Host" visibility="public">
   <Attribute name="host_iscomplete" display-name="Host Is Complete"
visibility="public"/>
   <Attribute name="host_isroute" display-name="Host Is Route" visibility="public"/>
   <Attribute name="host_hostname" display-name="Host Name" visibility="public"/>
   <Attribute name="host_os" display-name="Host Operating System"
visibility="public"/>
</Class>
<Class class-name="unix" display-name="Unix" visibility="public">
   <Derived-From class-name="host_node"/>
</Class>
<Valid-Link ID="host_member_host" display-name="Member" visibility="public">
   <End1 class-name="host"/>
   <End2 class-name="host"/>
</Valid-Link>
<Valid-Link ID="host_container_f_hostresource" display-name="Container link"
visibility="public">
   <End1 class-name="host"/>
   <End2 class-name="hostresource"/>
</Valid-Link>
</Class-Model>
```

Part IV

Reference Information

16

Working with Tables

This chapter includes:

Reference

➤ Columns User Interface on page 540

Reference

🔍 Columns User Interface

This section includes (in alphabetical order):

➤ Select Columns Dialog Box on page 540

➤ Sort Column Content Dialog Box on page 541

🔍 Select Columns Dialog Box

This dialog box enables you to choose the information you are interested in displaying. You can hide a column or display a hidden column.

Description	Click the **Select Columns** ▦ button. This button appears above every table in a report.

The following elements are included:

GUI Element (A-Z)	Description
➡	Displays a column. Moves the selected column from the **Available Columns** pane to the **Visible Columns** pane.
⬅	Hides a selected column. Moves the selected column from the **Visible Columns** pane to the **Available Columns** pane.
➡	Displays all hidden columns. Moves all the columns from the **Available Columns** pane to the **Visible Columns** pane.
Available Columns	The columns in this pane do not appear in the table.
Default	Restores the report columns to their original display status.
Visible Columns	The columns in this pane are visible in the table.

✎ Sort Column Content Dialog Box

This dialog box enables you to set or change the sort order for the entries displayed in a table.

Description	Click the ≣↑ **Sort Column Content** button.
Important Information	**To sort a table by one column:** Move the column name from the **Available Columns** to the **Sorted Columns** list. Select the name and decide whether to sort in ascending (upward triangle) or descending (downward triangle) order by clicking the relevant button.
	To sort a table by more than one column: Move the column names from the **Available Columns** to the **Sorted Columns** list. For each column, decide whether to sort in ascending or descending order.
	To change the order in which columns are sorted: In the **Sorted Columns** list, select an entry, and click the Up or Down arrow to change the order. (Entries higher in the list are sorted before entries lower in the list.) A number is displayed in the table's column headers.
	Note: Only columns that are displayed can be sorted. For details on how to define which columns are displayed in the table and in which order, see "Select Columns Dialog Box" on page 540.

The following elements are included:

GUI Element (A–Z)	Description
→	Moves the selected column from the **Available Columns** pane to the **Sorted Columns** pane. You can double-click the selection to perform the same procedure.
←	Moves the selected column from the **Sorted Columns** pane to the **Available Columns** pane.
⇒	Moves all the columns from the **Available Columns** pane to the **Sorted Columns** pane.

GUI Element (A–Z)	Description
	Moves all the columns from the **Sorted Columns** pane to the **Available Columns** pane.
	Moves the selected column up or down in the list to increase or decrease its priority in establishing the sort order.
	Enables you to sort the column content in ascending or descending order. In the Sorted Columns pane, select a column name and click the ascending or descending button.
Available Columns	The columns whose content is not sorted. **Note:** You can select multiple columns.
Sorted Columns	The columns whose content is sorted in either ascending or descending order.

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Regular Expression Examples

This chapter includes:

Reference

Reference

🔍 Examples of Regular Expressions

➤ Enter a regular expression to define an IP address (aa.yy.zz.mm):

To:	In the First Field Enter:	In the Second Field Enter:
Create label by aa	(.*)([.].*[.].*[.].*)	1
Create label by yy	(.*[.])(.*)([.].*[.].*)	2
Create label by zz	(.*[.].*[.])(.*)([.].*)	2
Create label by mm	(.*[.].*[.].*[.])(.*)	2

➤ Enter a regular expression to create the label by the first or last letters of the selected attribute:

To:	In the First Field Enter:	In the Second Field Enter:
Create label by the first letter	(.)(.*)	1
Create label by the last letter	(.*)(.)	2
Create label by the first two letters	(..)(.*)	1
Create label by the last two letters	(.*)(..)	2

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