OMi Management Pack for Microsoft SQL Server

Software Version: 1.01

For the Operations Manager i for Linux and Windows® operating systems

User Guide

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Chapter 1: OMi Management Pack for Microsoft SQL Server

The OMi Management Pack for Microsoft SQL Server (OMi MP for Microsoft SQL Server) works with Operations Manager i (OMi) that enables you to monitor Microsoft SQL Server database in your environments and its underlying infrastructure. It includes Indicators - Health Indicators (HIs), Event Type Indicators (ETIs) and Correlation Rules that analyze the events that occur in the Microsoft SQL Server databases and report the health status. It provides out-of-the-box Management Templates for monitoring different types of Microsoft SQL Server environments (standalone and cluster) and also includes capabilities to monitor the health and performance of the systems. These Management Templates consist of a wide range of Aspects which enable the monitoring of Microsoft SQL Server components and the system components.

These Management Templates can be deployed by administrators for monitoring Microsoft SQL Server databases in an environment. Subject Matter Experts (SMEs) and developers can customize the Microsoft SQL Server Management Templates.

The OMi MP for Microsoft SQL Server works with OMi and provides the following additional functionality to support a unified monitoring solution:

- Microsoft SQL Server instance-based deployment and configuration.
- Supports agent and agentless monitoring of Microsoft SQL Server instances.

Chapter 2: Getting Started

The following section provides step-by-step instructions about monitoring Microsoft SQL Server databases using OMi MP for Microsoft SQL Server on BSM 9.2x and OMi 10.x systems.

Task 1: Adding Nodes to the BSM 9.2x or OMi 10.x Console

Before you begin monitoring, you need to add the nodes:

1. Open the **Monitored Nodes** pane:

   On BSM 9.2x, click **Admin > Operations Management > Setup > Monitored Nodes**.

   On OMi 10.x, click **Administration > Setup and Maintenance > Monitored Nodes**.

2. In the Node Views pane, click **Predefined Node Filters > Monitored Nodes** and then click  and then click **Computer > Windows**. The Create New Monitored Nodes dialog box appears.
3. Specify the Primary DNS Name, IP address, Operating System, and Processor Architecture of the node and click **OK**.

   The newly created node is saved as a CI instance in RTSM.

   > **Note:** You must active the node with the Operations Agent needs on BSM or OMi server and grant certificate.

Task 2: Deploying the Microsoft SQL Server Discovery Aspect

To discover the Microsoft SQL Server Database CI on the added managed nodes, you must deploy the Microsoft SQL Server Discovery Aspect.

1. Open the Management Templates & Aspects pane:

   On BSM 9.2x, click **Admin > Operations Management > Monitoring > Management Templates and Aspects**.

   On OMi 10.x, click **Administration > Monitoring > Management Templates & Aspects**.

2. In the Configuration Folders pane:

   Configuration Folders > Database Management > Microsoft SQL Server > Microsoft SQL Server Aspects.

3. In the **Microsoft SQL Server Aspects** folder, right-click the Microsoft SQL Server Discovery aspect, and then click  **Assign and Deploy Item** to open the Assign and Deploy Wizard.

4. In the **Configuration Item** tab, select the CI deploy the Discovery Aspect and then click **Next**.

5. *(Optional).* In the **Required Parameters** tab, click **Next**.

   > **Note:** Microsoft SQL Server Discovery Aspect does not have mandatory parameters. You will get a notification stating the following message:
   >
   > `There are no parameters that require editing for this Assignment.`

6. *(Optional).* In the **All Parameters** tab on BSM 9.2x or **Parameter Summary** tab on OMi 10.x, click **Next**.

7. *(Optional).* If you do not want to enable the assignment immediately:

   On BSM 9.2x, clear the **Enable Assigned Objects** check box.

   On OMi 10.x, clear the **Enable Assignment(s)** check box.

   You can enable the assignment later using the Assignments & Tuning pane.

8. Click **Finish**.

> **Note:** After the Microsoft SQL Server Discovery Aspect is deployed, a message stating the `Assignment and deployment jobs created` appears. To check the status of the deployment jobs, go to the following location:
>
> On BSM 9.2x, click **Admin > Operations Management > Monitoring > Deployment Jobs**.
>
> On OMi 10.x, click **Administration > Monitoring > Deployment Jobs**.

Task 3: Verifying Discovery

After you deploy the Microsoft SQL Server Discovery Aspect, you must verify if the CIs are populated in the View Explorer.

To view the CIs populated in the View Explorer, follow these steps:

1. Open the Events Perspective pane:

   On BSM 9.2x, click **Applications > Operations Management > Event Perspective**.

   On OMi 10.x, click **Workspaces > Operations Console > Event Perspective**.
2. From the **Browse Views** tab, select the following view from the drop-down list:
   a. If Microsoft SQL Server is configured in a cluster:
      i. **MSSQL_Cluster_Deployment**
   b. If Microsoft SQL Server is NOT configured in a cluster:
      i. **MSSQL_Database_Deployment**
      ii. **MSSQL_Deployment**

Task 4: Deploying the Microsoft SQL Server Management Templates or Microsoft SQL Server Aspects

This section is further divided into Task 4a: Microsoft SQL Server Management Templates and Task 4b: Deploying Microsoft SQL Server Aspects that provides information on identifying and deploying the Microsoft SQL Server Management Templates or Aspects based on your requirements.

If you have already deployed MTs or Aspects with 1.00 version, skip to the Task 5.

User Privileges

For the list of grants and privileges of Microsoft SQL Server user account for OMi MP for Microsoft SQL Server, see "Permissions and Grants" on page 114.

Task 4a: Deploying Microsoft SQL Server Management Template

You **must** deploy the Microsoft SQL Server Discovery Aspect even if the CIs are already populated by any other source such as SiteScope, DDM, and so on. For more information, see "Task 2: Deploying the Microsoft SQL Server Discovery Aspect".

Before deploying the Microsoft SQL Server Management Templates, you must identify the Microsoft SQL Server Management Template suitable for your environment by following these recommendations:

- If you want to monitor basic functionality of Microsoft SQL Server environment, you can deploy the Essential Microsoft SQL Server Management Template.
- If you want to monitor basic functionality of Microsoft SQL Server cluster environment, you can deploy Essential Microsoft SQL Server Cluster Management Template.
- If you want to monitor the standalone Microsoft SQL Server environment, you can deploy Extensive Microsoft SQL Server Management Template.
- For in-depth and detailed monitoring of Microsoft SQL Server cluster environment, you can deploy Extensive Microsoft SQL Server Cluster Management Template.
- For agent and agentless monitoring, you can deploy Hybrid Microsoft SQL Server Management Template.

To deploy the Microsoft SQL Server Management Templates to the Microsoft SQL Server CIs, follow these steps:

1. Open the Management Templates & Aspects pane:

   On BSM 9.2x, click **Admin > Operations Management > Monitoring > Management Templates & Aspects**.

   On OMi 10.x, click **Administration > Monitoring > Management Templates & Aspects**.

2. In the Configuration Folders pane:

Configuration Folders > Microsoft SQL Server Database > Microsoft SQL Server Management Templates.

3. In the Microsoft SQL Server Management Templates folder, select the Management Template that you want to deploy, and then click  . The Assign and Deploy wizard opens.
4. In the **Configuration Item** tab, select the CI to which you want to assign the Management Template, and then click **Next**.
5. *(Optional).* In the **Required Parameters** tab, you must specify the parameters based on the environment:

> **Note:** For **Microsoft SQL Server with Windows authentication**: You do not have to specify the Domain Name, User Name and Password.
>
> For **Mixed Mode authentication**: You must specify the user name and password of the SQL Server user.
>
> For **Microsoft SQL Server Domain Authentication**: You must specify the user name, domain name, and password of the system.
>
> For **Hybrid Microsoft SQL Server Management Template**: The assignment is supported with SQL Server Authentication.

> **Note:** The User Name that you enter during the deployment of a Management Template must have the required admin privileges to connect to the Microsoft SQL Server and collect the data for monitoring needs of OMi MP for Microsoft SQL Server. Following are the guidelines:
>
> - When you have the User Name with the admin privileges (created by the Microsoft SQL Server administrator), you can use the same while deploying the Management Template.
> - When you want to use the create user tools provided by Management Pack explicitly, you need to deploy Management Templates without entering the User Name and Password as these are not mandatory parameters.
>
> After you deploy the Management Template, all the files are deployed and you can run the create user tool to create users and update the User Name and Password parameters to begin the monitoring.
>
> For more information about the permissions and privileges for the Microsoft SQL Server user account, see Permissions and Grants.

   a. Select the **Microsoft SQL Server Instance User Name** parameter in the list, and then click  . The Microsoft SQL Server Instance User Name dialog box opens.

b. Click **Value**, specify the value, and then click **OK**.

c. Select the **Microsoft SQL Server Instance Password** parameter in the list, and then click  . The Microsoft SQL Server Password dialog box opens.

d. Click **Value**, specify the value, and then click **OK**.

e. Select the **MSSQL Server Instance Domain Name** parameter in the list, and then click  . The Microsoft SQL Server Domain Name dialog box opens.

f. Click **Value**, specify the value, and then click **OK**.

6. Click **Next**.

7. In the **All Parameters** tab on BSM 9.2x or **Parameter Summary** tab on OMi 10.x, you can change the default values of the parameters. To change the default values of the parameters, follow these steps:

   a. Select the **MSSQL Server Instance Name** parameter and then click  . The Edit Instance Parameter window appears.

   b. Select the parameter from the list and then click  . The Edit Parameter dialog box opens. Click **Value**, specify the value, and then click **OK**.

   > **Note:** In the **All Parameters** tab on BSM 9.2x or **Parameter Summary** tab on OMi 10.x, you can override the default values of any parameter. You can specify a value for each parameter at the Management Template level. By default, parameters defined as expert parameters are not shown. To show expert parameters, click  **Show Expert Parameters**.

8. Click **Next**.

9. *(Optional).* In the **Configure Options** tab, if you do not want to enable the assignment immediately:

   On BSM 9.2x, clear the **Enable Assigned Objects** check box.

   On OMi 10.x, clear the **Enable Assignment(s)** check box.

   You can then enable the assignment later using the Assignments & Tuning pane.

10. Click **Finish**.

Task 4b: Deploying Microsoft SQL Server Aspects

You **must** deploy the Microsoft SQL Server Discovery Aspect even if the CIs are already populated by any other source such as SiteScope, DDM, and so on. For more information, see "Task 2: Deploying

the Microsoft SQL Server Discovery Aspect"

To deploy Microsoft SQL Server Aspects to the Microsoft SQL Server CIs, follow these steps:

1. Open the Management Templates & Aspects pane:

   On BSM 9.2x, click **Admin > Operations Management > Monitoring > Management Templates & Aspects**.

   On OMi 10.x, click **Administration > Monitoring > Management Templates & Aspects**.

2. In the Configuration Folders pane:

   Configuration Folders > Database Management > Microsoft SQL Server > Microsoft SQL Server Aspects

3. In the Microsoft SQL Server Aspects folder, right-click the Microsoft SQL Server Aspect that you want to deploy, and then click **Assign and Deploy Item** to open the Assign and Deploy Wizard.

4. In the **Configuration Item** tab, click the configuration item to which you want to deploy the Aspect and then click **Next**.

5. *(Optional).* In the **Required Parameters** tab, click **Next**.

   > **Note:** Microsoft SQL Server Discovery Aspect do not have mandatory parameters. You will get a notification stating the following message:
   >
   > `There are no parameters that require editing for this Assignment.`

6. In the **All Parameters** tab on BSM 9.2x or **Parameter Summary** tab on OMi 10.x, you can change the default values of the parameters. To change the default values of the parameters, follow these steps:

   a. Select the **MSSQL Server Instance Name** parameter and then click . The Edit Instance Parameter window appears.

   b. Select the parameter from the list and then click . The Edit Parameter dialog box opens. Click **Value**, specify the value, and then click **OK**.

   > **Note:** In the **All Parameters** tab on BSM 9.2x or **Parameter Summary** tab on OMi 10.x you can override the default values of any parameter. You can specify a value for each parameter at the Management Template level. By default, parameters defined as expert parameters are not shown. To show expert parameters, click **Show Expert Parameters**.

7. *(Optional).* In the **Configure Options** tab, if you do not want to enable the assignment

immediately:

On BSM 9.2x,clear the **Enable Assigned Objects** check box.

On OMi 10.x, clear the **Enable Assignment(s)** check box.

You can then enable the assignment later using the Assignments & Tuning pane.

8. Click **Finish**.

Task 5: Updating the Management Templates and Aspects to a Newer Version

You can update the existing Management Templates and Aspects to the latest version.

If you have already deployed OMi MP for Microsoft SQL Server 1.00 Aspects or Management Templates to the managed nodes before installing OMi MP for Microsoft SQL 1.01, then use the latest version of Aspects or Management Templates on those nodes.

Perform the following steps for each Management Template and Aspect assignment on each of the managed nodes:

For BSM 9.2x:

1. To open the Management Templates & Aspects pane, click **Admin > Operations Management > Monitoring > Management Templates & Aspects**.
2. Select 1.00 MSSQL Server Aspects or Management Templates that has been deployed to nodes.
3. Redeploy with parameterization to each of the Microsoft SQL Server CIs.

For OMi 10.x:

1. To open the Assignments & Tuning pane, click **Administration > Monitoring > Assignments & Tuning**.
2. In the Browse Views pane, select the **MSSQL_Database_Deployment** view and select each SQL Server CI where version update is required.
3. Click  **Show Assignments That Require an Update**.

   All the Management Templates and Aspects that requires an update are listed.
4. Select each of the Management Templates and Aspects and click

 **Update Assigned Item**.

The Update Assigned Item dialog box appears.

5. In the **Update Options** tab, follow these steps:
   a. Select the latest version from the **Update to Version** drop-down list.

      If you select **Use parameter values from existing assignments**, only the new mandatory parameters that do not have a default value are listed.

      If you select **Use default parameter values from version selected above**, all mandatory parameters from the selected Management Template or Aspect version that do not have a default value are displayed. These parameters must be edited before proceeding to the next step of the wizard.

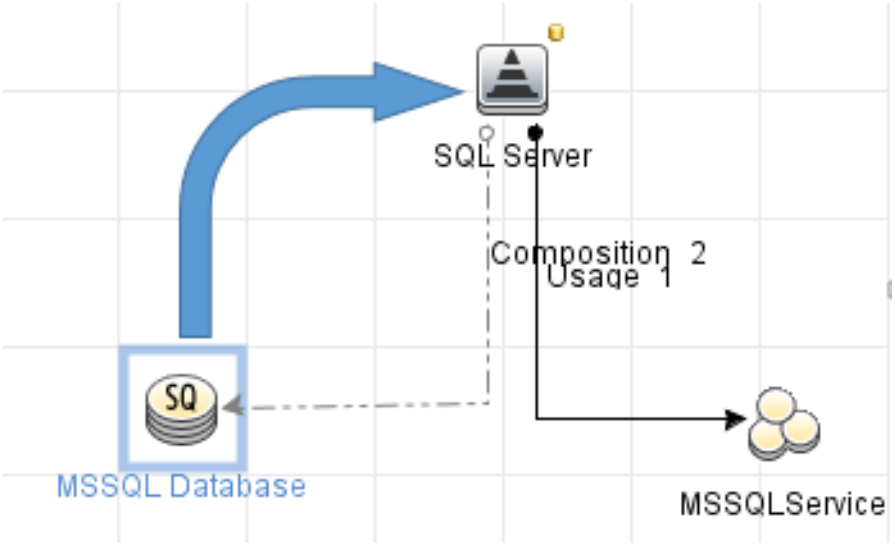
   b. Click **Next**.
6. In the **Required Parameters** tab, edit and provide values for each of the mandatory parameters. The **Microsoft SQL Server Instance User Name** and **Microsoft SQL Server Instance Password** are the mandatory parameters.
7. Click **Next** to go to **All Parameters** tab on BSM 9.2x or **Parameter Summary** tab on OMi 10.x, or click **Finish** to save the changes and close the wizard.

   The assigned item is updated to the specified Management Template or Aspect version.

> **Note:** To update the existing deployed Management Templates and Aspects of the OMi MP for Infrastructure (which are internally used by OMi MP for Microsoft SQL Server) to the latest version, see section *"Getting Started"* in the *OMi Management Pack for Infrastructure 1.12 Installation Guide*.

Enriching Microsoft SQL Server Database Events (Optional)

Events are automatically mapped to the CIs during out-of-the-box deployment. By default, database events (for example, metric 233 and 278) are mapped to the SQL Server CI, as shown in the following figure:



If you want to customize the Microsoft SQL Server database events that you want to enrich with the SQL Database CI instead of SQL Server CI, add the following enrichment rule:

```
<Enrichment>[sqldatabase].from:composition.[sqlserver].name</Enrichment>
```

Perform the following steps to add the enrichment rule:

1. Open the Infrastructure Settings pane:

   On BSM 9.2x, click **Admin > Platform > Setup and Maintenance > Infrastructure Settings**.

   On OMi 10.x, click **Administration > Setup and Maintenance > Infrastructure Settings**.
2. Under **Select Context**, select **Applications** and click **Operations Management** from the drop-down list.
3. Under **Operations Management - CI Resolver Settings**, search for the **Cache Modification Configuration** setting and click to add or edit the XML values.
4. In the **Edit Setting** dialog box, add the enrichment rule in the **Value** field, before the `</CiResolver>` tag.

   ```
   <Enrichment>[sqldatabase].from:composition.[sqlserver].name</Enrichment>
   ```

   ```
   </CiResolver>
   ```

Checking the Topology Synchronization Settings (Optional)

If there are HP Operations Manager (HPOM) servers in the environment and you want to synchronize the topology information discovered by the Smart Plug-in for Microsoft SQL Server (SPI for Microsoft SQL Server) to the OMi, then follow these steps:

1. Open the Infrastructure Settings:

   On BSM 9.2x, click **Admin > Platform > Setup and Maintenance > Infrastructure Settings**.

   On OMi 10.x, click **Administration > Setup and Maintenance > Infrastructure Settings**.
2. In the Infrastructure Settings pane, select **Applications > Operations Management**.
3. In the **Operations Management - HPOM Topology Synchronization Settings**, the packages for Topology Sync should contain the packages that are used for topology synchronization - **default;nodegroups;operations-agent;HPOprSys;HPOprMss**.
4. If the package is not available, add the toposync package by following these steps:
   a. In the Packages for Topology Sync, click  .
   b. In Value, add **HPOprMss** and click **Save**.

Monitoring Microsoft SQL Server Environment

After you deploy Management Template and Aspects, you can analyze the status of the events from the following perspectives:

- Event Perspective
- Health Perspective
- Performance Perspective

Event Perspective

After you deploy the Microsoft SQL Server Discovery Aspect and Microsoft SQL Server Management Template(s), you can view the events of the Microsoft SQL Server CIs that are monitored by OMi MP for Microsoft SQL Server.

To view the Event Perspective of the Microsoft SQL Server CIs, follow these steps:

1. Open the Event Perspective pane:

   On BSM 9.2x, click **Applications > Operations Management > Event Perspective**.

   On OMi 10.x, click **Workspaces > Operations Console > Event Perspective**.

   The View Explorer pane appears.

2. Click the **Browse Views** tab and select one of the following views from the drop-down menu:

   a. **MSSQL_Cluster_Deployment**

   b. **MSSQL_Database_Deployment**

   c. **MSSQL_Deployment**

   A list of monitored Microsoft SQL Server CIs appears.

3. Select the Microsoft SQL Server CI for which you want to view the Event Perspective. The Event Browser pane displays events from the selected Microsoft SQL Server CI.

   When you click an event from the Event Browser, the Event Details pane opens where you can view following details:

   - **General** - Displays the detailed information about the selected event such as Severity, Lifecycle State, Priority, Related CIs and so on.
   - **Additional Info** - Displays more detailed information about the attributes of the selected event.
   - **Source Info** - Displays an overview of the information available about the source of the selected event.
   - **Actions** - Displays the list of actions available for a selected event. There are two types of possible actions: User Action and Automatic Action.
   - **Annotations** - Displays a list of the annotations attached to the selected event.
   - **Custom Attributes** - Displays a list of the attributes that either an administrator or a responsible user manually configured and added to the selected event.

- **Related Events** - Displays an overview of all the events that are related to the event selected in the Event Browser.
- **History** - Displays the history of the selected event.
- **Resolver Hints** - Displays the information used to identify the node and CI associated with an event.
- **Instructions** - Displays instructions designed to help operators handle the associated event.
- **Forwarding** - Displays the transfer of ownership details if any, for the events.

Health Perspective

After you deploy the Microsoft SQL Server Discovery Aspect and Microsoft SQL Server Management Template(s), you can view the events related to the health of the Microsoft SQL Server CIs that are monitored by OMi MP for Microsoft SQL Server.

To view the Health Perspective of the Microsoft SQL Server CIs, follow these steps:

1. Open the Health Perspective pane:

   On BSM 9.2x, click **Applications > Operations Management > Health Perspective**.

   On OMi 10.x, click **Workspaces > Operations Console > Health Perspective**.

   The View Explorer pane appears.
2. Click the **Browse Views** tab and select one of the following views from the drop-down menu:
   a. **MSSQL_Cluster_Deployment**
   b. **MSSQL_Database_Deployment**
   c. **MSSQL_Deployment**

   A list of monitored Microsoft SQL Server CIs appears.
3. Select the Microsoft SQL Server CI for which you want to view the Health Perspective. The Event browser pane displays health related events from the selected Microsoft SQL Server CI.

   When you click an event from the Event Browser pane, the following panes appear:

   - **Health Top View** - Displays the health top view of the selected event.
   - **Health Indicators** - Displays the Key Performance Indicators (KPIs) and HIs related to the CI that you select from the Health Top View pane.
   - **Actions** - Displays the list of actions available for a selected event.

Performance Perspective

Performance Perspective enables you to populate graphs from existing graph templates. You can also plot customized graphs by selecting the required metrics for a selected CI.

To view the Performance Perspective of Microsoft SQL Server CIs using graphs, follow these steps:

1. Open the Performance Perspective pane:

   On BSM 9.2x, click **Applications > Operations Management > Performance Perspective**.

   On OMi 10.x, click **Workspaces > Operations Console > Performance Perspective**.

   The View Explorer pane appears.

2. Click the **Browse Views** tab and select one of the following views from the drop-down menu:

   a. **MSSQL_Cluster_Deployment**

   b. **MSSQL_Database_Deployment**

   c. **MSSQL_Deployment**

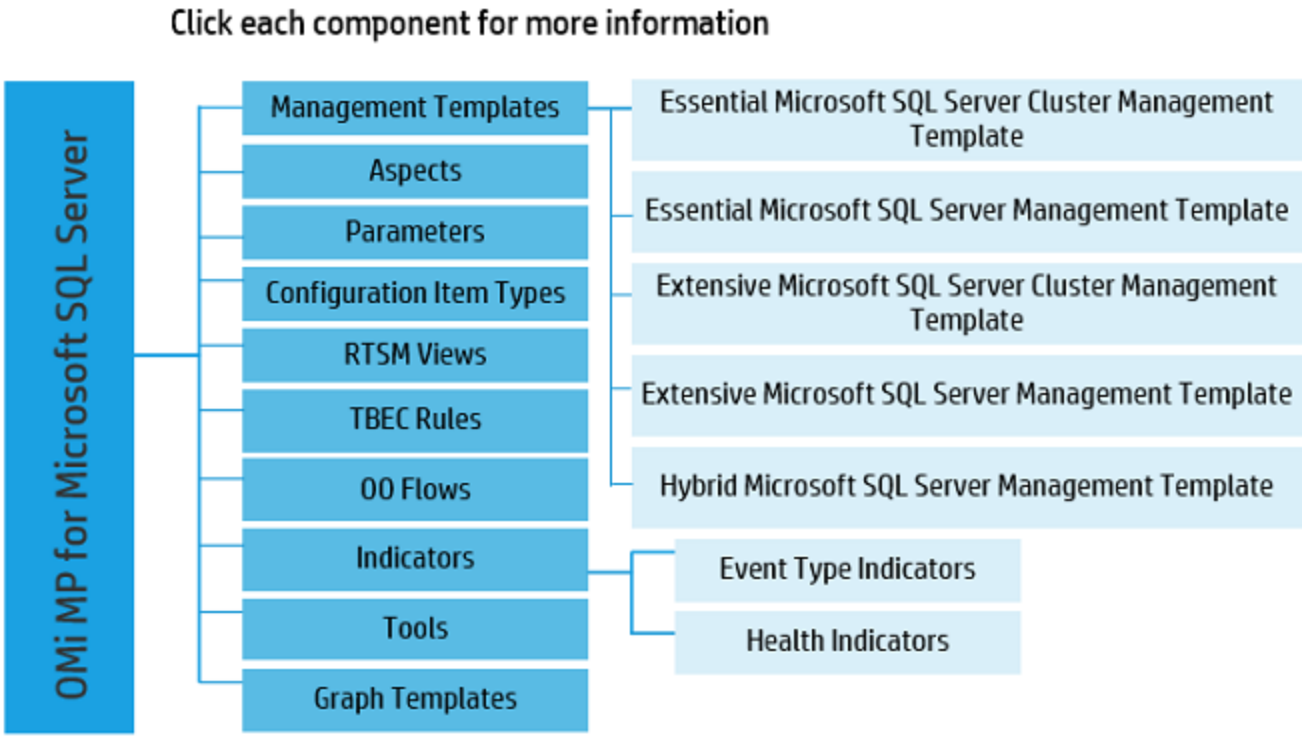
   A list of monitored Microsoft SQL Server CIs appears.

3. Click the graph you want to plot from the **Graphs** tab, and then click  **Draw Graphs**. The selected graph is plotted on the right pane.

> **Note:** For more information about managing events, health, and performance perspectives, see the *Operations Manager i Concepts Guide*.

Chapter 3: Components

The OMi MP for Microsoft SQL Server includes the following components for monitoring Microsoft SQL Server databases in an environment:



Microsoft SQL Server Management Templates

The Microsoft SQL Server Management Templates consist of several Microsoft SQL Server Aspects, which enable you to monitor Microsoft SQL Server, based on the criticality and type of your environment. By default, the OMi MP for Microsoft SQL Server consists of a set of Management Templates. You can deploy the out-of-the-box Management Templates with the default parameters or you can customize the Management Templates based on your requirements. For more information, see Tuning Microsoft SQL Server Management Templates. In addition, you can also create Microsoft SQL Server Management Templates based on the monitoring requirements using the Microsoft SQL Server Aspects. For more information, see Create Microsoft SQL Server Management Templates.

Overview

The OMi MP for Microsoft SQL Server comprises the following Management Templates:

- "Essential Microsoft SQL Server Cluster Management Template"
- Essential Microsoft SQL Server Management Template
- "Extensive Microsoft SQL Server Cluster Management Template"
- "Extensive Microsoft SQL Server Management Template"
- "Hybrid Microsoft SQL Server Management Template"

How to Access Microsoft SQL Server Management Templates

1. Open Management Templates & Aspects pane:

   On BSM 9.2x, click **Admin > Operations Management > Monitoring > Management Templates & Aspects**.

   On OMi 10.x, click **Administration > Monitoring > Management Templates & Aspects**.

2. In the Configuration Folder pane, click **Configuration Folders > Database Management > Microsoft SQL Server > Microsoft SQL Server Management Templates**.

Tasks

How to Deploy Microsoft SQL Server Management Templates

For more information about deploying Microsoft SQL Server Management Templates, see Task 4a: Deploying the Microsoft SQL Server Database Management Templates.

How to Automatically Assign Microsoft SQL Server Management Templates or Microsoft SQL Server Aspects

To automatically assign Microsoft SQL Server Management Templates or Microsoft SQL Server Aspects, you must specify the required privileges. To automatically assign, follow these steps:

1. Open Automatic Assignment Rules pane:

On BSM 9.2x, click **Admin > Operations Manager > Monitoring > Automatic Assignment Rules**.

On OMi 10.x, click **Administration > Monitoring > Automatic Assignment Rules**.

The pane consists of the Auto-Assignment Rules pane at the top, and a parameter list at the bottom.

2. Click  **New Assignment** in the toolbar of the **Auto-Assignment Rules** pane and select the appropriate option. The Create Auto-Assignment Rule wizard appears.
3. Select the Microsoft SQL Server View containing the CIs for which you want to create an automatic assignment, and click **Next**.
4. In **Select Item to Assign** window, click the **Microsoft SQL Server** Management Template or Aspect that you want to automatically assign to all CIs with a CIT.

   > **Note:** The list shows only the Management Templates that have a root CIT that appears in the View that you selected or, if an Aspect is auto-assigned, only the compatible Aspects appear.
   >
   > By default, the latest version of the Management Template or Aspect that you want to assign is selected. If required, select a different version in column **Version**.

5. Click **Next** to go to **Required Parameters**.
6. This step lists all mandatory parameters in the Management Template that do not yet have a value. As they are mandatory, however, all listed parameters *must* be given a value before the Management Template can be deployed.

   If all required values are specified, you can choose one of the following actions:

   - Click **Finish** to assign the configuration object to the selected CI and close the wizard or dialog.
   - Click **Next** to go to **All Parameters** tab on BSM 9.2x and **Parameter Summary** tab on OMi 10.x, where you can override the default value of any parameter, including those that are not required.

   > **Note:** To access step *Configure Options*, click **Next** in this step, and **Next** again in step All Parameters/Parameters Summary.

   To change a parameter, double-click it, or select it in the list and click  **Edit**.

- For standard parameters, the **Edit Parameter** dialog opens.

  Click **Value**, specify the value, and then click **OK**.

- For instance parameters, the **Edit Instance Parameter** dialog opens.

  Add instance values, and then for each instance value, specify dependent parameter values. After you specify the instances and dependent parameter values, click **OK**.

7. *(Optional).* In the **All Parameters** on BSM 9.2x and **Parameter Summary** on OMi 10.x, specify a value for each parameter to be monitored against a different value than the default value.

   To change a parameter, double-click it, or select it in the list and click  **Edit**.

   - For standard parameters, the Edit Parameter dialog opens.

     Click **Value**, specify the value, and then click **OK**.

   - For instance parameters, the Edit Instance Parameter dialog opens.

     Add instance values, and then for each instance value, specify dependent parameter values. After you specify the instances and dependent parameter values, click **OK**.

   Click **Next** to go to the **Configure Options** tab or **Finish** to save the assignment and close the wizard.

8. *(Optional).* In step **Configuration Options**, clear the **Activate Auto-Assignment Rule** check box if you do not want to activate the assignment rule immediately.

9. Click **Finish** to save the changes and close the wizard. The assignment rule is added to the list of auto-assignment rules.

An assignment may trigger an event to be sent to OMi if one of the following situations applies:

- A deployment job fails.
- An auto-assignment fails.
- An auto-assignment succeeds. This behavior can be configured in the Infrastructure Settings.

You can check if the automatic assignment rule successfully created the expected assignments as follows:

- Go the Assignments & Tuning pane:

  On BSM 9.2x, click **Admin > Operations Management > Monitoring > Assignments & Tuning**.

  On OMi 10.x, click **Administration > Monitoring > Assignments & Tuning**.

- In the Browse Views pane, select the view you identified when creating your automatic assignment rule.
- Expand the view, and select a node that corresponds to the root CI type of the assigned item. Assignments created as a result of Automatic Assignment Rules are shown in the list of assignments at the top of the right pane, and have the value Auto Assignment in the column Assigned By.

You can consider the following options for tuning the assignment:

- Use the Automatic Assignment Rules screen to tune the parameter values for all assignments triggered by the automatic assignment rule.
- Use the Assignments and Tuning screen to tune, redeploy, delete, and enable or disable individual assignments.

How to Display an Assignment Report for a Microsoft SQL Server Management Template

1. Select the Management Template for which you want to create a report.
2. Click  **Generate Assignment Report** in the **Management Templates & Aspects** pane.

   The preconfigured **Assignment Report** appears.

You can display additional types of reports from the Assignments & Tuning pane.

> **Note:** The list shows only the Management Templates that have a root CIT that appears in the View that you selected or, if an Aspect is auto-assigned, only the compatible Aspects appear.
>
> The latest version of the Management Template or Aspect that you want to assign is selected by default. If required, select a different version in column **Version**.

Essential Microsoft SQL Server Cluster Management Template

The Essential Microsoft SQL Server Cluster Management Template can be used to monitor primary monitoring areas of Microsoft SQL Server clusters in an environment. It comprises of essential Microsoft SQL Server Aspects and Infrastructure Aspects for monitoring the availability, health, and performance of Microsoft SQL Server databases.

> **Note:** To use and deploy Infrastructure Aspects, you must install OMi Management Pack for

> Infrastructure software.

How to Access the Essential Microsoft SQL Server Cluster Management Template

1. Open Management Templates & Aspects pane:

   On BSM 9.2x, click **Admin > Operations Management > Monitoring > Management Templates & Aspects**.

   On OMi 10.x, click **Administration > Monitoring > Management Templates & Aspects**.

2. In the Configuration Folders pane, click **Configuration Folders > Database Management > Microsoft SQL Server > Microsoft SQL Server Management Templates > Essential Microsoft SQL Server Cluster Management Template**.

User Interface Reference

Management Template - General

Provides an overview of the attributes of the Management Template.

UI Element	Description
Name	Essential Microsoft SQL Server Cluster Management Template
Description	Manages primary monitoring areas of Microsoft SQL Server Failover Cluster instance environments for availability, locks, Transaction, Space, Memort, Buffer Manager, and others along with critical infrastructure areas of CPU, Memory and Disk.
ID	A unique identifier for the Management Template.
Version ID	A unique identifier for this version of the Management Template.
Version	The current version of the Management Template. In this instance, the version of the Management Template is 1.100.
Change Log	Text that describes what is new or modified in this version of the Management Template.

Management Template - Topology View

UI Element	Description
Topology View	**MSSQL_Cluster_Deployment** is the Topology View for Essential Microsoft

UI Element	Description
	SQL Server Cluster Management Template.
CI Type	Is the type of configuration item that the Essential Microsoft SQL Server Cluster Management Template helps you to manage. **FailoverCluster** is the type of CI to which the Essential Microsoft SQL Server Cluster Management Template can be assigned.

Management Template - Aspects

The Essential Microsoft SQL Server Cluster Management Template contains the following Aspects:

- Microsoft SQL Server Availability
- Microsoft SQL Server Base
- Microsoft SQL Server Buffer Manager
- Microsoft SQL Server Data Access Methods
- Microsoft SQL Server Discovery
- Microsoft SQL Server Error
- Microsoft SQL Server Input Output Utilization
- Microsoft SQL Server Jobs
- Microsoft SQL Server Latches
- Microsoft SQL Server Locks
- Microsoft SQL Server Memory and Memory Manager
- Microsoft SQL Server Processes and Statistics
- Microsoft SQL Server Space
- Microsoft SQL Server Transactions

The Essential Microsoft SQL Server Management Template contains the following Infrastructure Aspects:

Cluster Infrastructure Discovery

The Cluster Infrastructure Discovery Aspect discovers the high availability components such as cluster nodes and resource pool availability in a clustered environment.

System Fault Analysis

The System Fault Analysis Aspect monitors the kernel log file, boot log file, and event log file for critical error conditions and instructions on what might have caused it.

Resource Bottleneck Diagnosis

The Resource Bottleneck Diagnosis Aspect identifies congestions and bottleneck conditions for system resources such as the CPU, memory, network and disk. CPU bottleneck monitoring is based on global CPU utilization and load average (Run Queue Length).

Essential Microsoft SQL Server Management Template

The Essential Microsoft SQL Server Management Template manages primary monitoring areas of Microsoft SQL Server standalone instance environments for availability, locks, Transaction, Space, Memory, Buffer Manager, and others along with critical infrastructure areas of CPU, Memory and Disk.

How to Access Essential Microsoft SQL Server Management Template

1. Open Management Templates & Aspects pane:

   On BSM 9.2x, click **Admin > Operations Management > Monitoring > Management Templates & Aspects**.

   On OMi 10.x, click **Administration > Monitoring > Management Templates & Aspects**.

2. In the Configuration Folders pane, click **Configuration Folders > Database Management > Microsoft SQL Server > Microsoft SQL Server Management Templates > Essential Microsoft SQL Server Management Template**.

User Interface Reference

Management Template - General

Provides an overview of the attributes of the Management Template.

UI Element	Description
Name	Essential Microsoft SQL Server Management Template
Description	Manages primary monitoring areas of Microsoft SQL Server standalone instance environments for availability, locks, Transaction, Space, Memory, Buffer Manager, and others along with critical infrastructure areas of CPU, Memory and Disk.
ID	A unique identifier for the Management Template.
Version ID	A unique identifier for this version of the Management Template.

UI Element	Description
Version	The current version of the Management Template. In this instance, the version of the Management Template is 1.0.
Change Log	Text that describes what is new or modified in this version of the Management Template.

Management Template - Topology View

UI Element	Description
Topology View	**MSSQL_Database_Deployment** is the Topology View for Essential Microsoft SQL Server Management Template.
CI Type	The type of CIs that the Essential Microsoft SQL Server Management Template enables you to manage.

Management Template - Aspects

The Essential Microsoft SQL Server Management Template contains the following Aspects:

- Microsoft SQL Server Availability
- Microsoft SQL Server Base
- Microsoft SQL Server Buffer Manager
- Microsoft SQL Server Data Access Methods
- Microsoft SQL Server Discovery
- Microsoft SQL Server Error
- Microsoft SQL Server Input Output Utilization
- Microsoft SQL Server Jobs
- Microsoft SQL Server Latches
- Microsoft SQL Server Locks
- Microsoft SQL Server Memory and Memory Manager
- Microsoft SQL Server Processes and Statistics
- Microsoft SQL Server Space
- Microsoft SQL Server Transactions

The Essential Microsoft SQL Server Management Template contains the following Infrastructure Aspects:

System Fault Analysis

This Aspect monitors the kernel log file, boot log file, and event log file for critical error conditions and instructions.

Resource Bottleneck Diagnosis

This Aspect identifies congestions and bottleneck conditions for system resources like the CPU, memory, network, and disk. CPU bottleneck monitoring is based on global CPU utilization and load average (Run Queue Length) Memory bottleneck monitoring is based on memory utilization, free memory available, and memory swap out rate. Filesystem monitoring is based on space utilization level for busiest filesystem on the node. Network monitoring is based on packet collision rate, packet error rate, and outbound queue length.

System Infrastructure Discovery

Discovers and gathers information regarding the system resources, operating system, and applications on a managed node.

Extensive Microsoft SQL Server Cluster Management Template

The Extensive Microsoft SQL Server Cluster Management Template is used to monitor primary and advanced monitoring areas of Microsoft SQL Server Failover clusters in your environment. It comprises of Microsoft SQL Server Aspects and Infrastructure Aspects for monitoring the availability, health, and performance of Microsoft SQL Server databases.

> **Note:** To use and deploy Infrastructure Aspects, you must install OMi Management Pack for Infrastructure software.

How to Access Extensive Microsoft SQL Server Cluster Management Template

1. Open Management Templates & Aspects pane:

   On BSM 9.2x, click **Admin > Operations Management > Monitoring > Management Templates & Aspects**.

   On OMi 10.x, click **Administration > Monitoring > Management Templates & Aspects**.

2. In the Configuration Folders pane, click **Configuration Folders > Database Management > Microsoft SQL Server > Microsoft SQL Server Management Templates > Extensive Microsoft SQL Server Cluster Management Template**.

User Interface Reference

Management Template - General

Provides an overview of the attributes of the Management Template.

UI Element	Description
Name	Extensive Microsoft SQL Server Cluster Management Template
Description	Manages primary and advanced areas of Microsoft SQL Server Failover Cluster instance environments for Availability, Locks, Transaction, Space, Memory, Buffer Manager, Backup, and so on along with deep infrastructure areas of CPU, Memory and Disk.
ID	A unique identifier for the Management Template.
Version ID	A unique identifier for this version of the Management Template.
Version	The current version of the Management Template. In this instance, the version of the Management Template is 1.100.
Change Log	Text that describes what is new or modified in this version of the Management Template.

Management Template - Topology View

UI Element	Description
Topology View	**MSSQL_Cluster_Deployment** is the Topology View for Extensive Microsoft SQL Server Cluster Management Template.
CI Type	Is the type of configuration items that the Extensive Microsoft SQL Server Cluster Management Template helps you to manage.

Management Template - Aspects

The Extensive Microsoft SQL Server Cluster Management Template contains the following Aspects:

- Microsoft SQL Server Availability
- Microsoft SQL Server Base
- Microsoft SQL Server Backup
- Microsoft SQL Server Buffer Manager

- Microsoft SQL Server Buffer Manager (Add-on)
- Microsoft SQL Server Data Access Methods
- Microsoft SQL Server Discovery
- Microsoft SQL Server Database Mirroring
- Microsoft SQL Server Jobs
- Microsoft SQL Server Jobs (Add-on)
- Microsoft SQL Server Latches
- Microsoft SQL Server Locks
- Microsoft SQL Server Memory and Memory Manager
- Microsoft SQL Server Memory and Memory Manager (Add-on)
- Microsoft SQL Server Processes and Statistics
- Microsoft SQL Server Space
- Microsoft SQL Server Transactions

The Extensive Microsoft SQL Server Cluster Management Template contains the following Infrastructure Aspects:

Cluster Infrastructure Discovery

Discovers the HA Cluster Components such as Cluster Nodes and Resource Pools.

Remote Disk Space Utilization

Monitors the space utilization of the remote disk.

Bandwidth Utilization and Network IOPS

Monitors I/O operations, and performance of the systems in the network. It monitors the network I/O operations and performance based on the bandwidth used, outbound queue length and average bytes transferred per second.

CPU Performance

Monitors I/O operations, and performance of the systems in the network. It monitors the network I/O operations and performance based on the bandwidth used, outbound queue length and average bytes transferred per second.

Memory and Swap Utilization

Monitors memory performance of the system. Memory performance monitoring is based on Memory utilization (in percentage), Swap space utilization (in percentage), Free memory available (in MBs) and Free swap space available (in MBs).

Space Availability and Disk IOPS

Monitors the disk I/O operations and space utilization of the system.

Extensive Microsoft SQL Server Management Template

The Extensive Microsoft SQL Server Management Template can be used to monitor primary and advanced monitoring areas of Microsoft SQL Server databases in an environment. It comprises of Microsoft SQL Server Aspects and Infrastructure Aspects for monitoring the availability, health, and performance of Microsoft SQL Server databases.

> **Note:** To use and deploy Infrastructure Aspects, you must install OMi Management Pack for Infrastructure software.

How to Access Extensive Microsoft SQL Server Management Template

1. Open Management Templates & Aspects pane:

   On BSM 9.2x, click **Admin > Operations Management > Monitoring > Management Templates & Aspects**.

   On OMi 10.x, click **Administration > Monitoring > Management Templates & Aspects**.

2. In the Configuration Folders pane, click **Configuration Folders > Database Management > Microsoft SQL Server > Microsoft SQL Server Management Templates > Extensive Microsoft SQL Server Management Template**.

User Interface Reference

Management Template - General

Provides an overview of the attributes of the Management Template.

UI Element	Description
Name	Extensive Microsoft SQL Server Management Template
Description	Manages primary and advanced areas of Microsoft SQL Server standalone database instance environments for Availability, Locks, Transaction, Space, Memory, Buffer Manager, Backup, and so on along with deep infrastructure areas of CPU, Memory and Disk.

UI Element	Description
ID	A unique identifier for the Management Template.
Version ID	A unique identifier for this version of the Management Template.
Version	The current version of the Management Template. In this instance, the version of the Management Template is 1.100.
Change Log	Text that describes what is new or modified in this version of the Management Template.

Management Template - Topology View

UI Element	Description
Topology View	**MSSQL_Database_Deployment** is the Topology View for Extensive Microsoft SQL Server Management Template.
CI Type	Is the type of CI that the Extensive Microsoft SQL Server Management Template helps you to manage.

Management Template - Aspects

The Extensive Microsoft SQL Server Management Template contains the following Aspects:

- Microsoft SQL Server Availability
- Microsoft SQL Server Base
- Microsoft SQL Server Backup
- Microsoft SQL Server Buffer Manager
- Microsoft SQL Server Buffer Manager (Add-on)
- Microsoft SQL Server Data Access Methods
- Microsoft SQL Server Discovery
- Microsoft SQL Server Error
- Microsoft SQL Server Input Output Utilization
- Microsoft SQL Server Jobs
- Microsoft SQL Server Jobs (Add-on)
- Microsoft SQL Server Locks
- Microsoft SQL Server Latches
- Microsoft SQL Server Memory and Memory Manager

- Microsoft SQL Server Memory and Memory Manager (Add-on)
- Microsoft SQL Server Space
- Microsoft SQL Server Transactions
- Microsoft SQL Server Processes and Statistics

The Extensive Microsoft SQL Server Management Template contains the following Infrastructure Aspects:

Space Availability and Disk IOPS

Monitors the disk I/O operations and space utilization of the system.

Bandwidth Utilization and Network IOPS

Monitors I/O operations, and performance of the systems in the network. It monitors the network I/O operations and performance based on the bandwidth used, outbound queue length and average bytes transferred per second.

CPU Performance

This Aspect monitors the overall CPU performance such as the CPU utilization percentage and spike in CPU usage. Individual CPU performance monitoring is based on total CPU utilization, CPU utilization in user mode, CPU utilization in system mode, and interrupt rate.

Memory and Swap Utilization

Monitors memory performance of the system. Memory performance monitoring is based on Memory utilization (in percentage), Swap space utilization (in percentage), Free memory available (in MBs) and Free swap space available (in MBs).

Remote Disk Space Utilization

Monitors the space utilization of the remote disk.

System Infrastructure Discovery

Discovers and gathers information regarding the system resources, operating system, and applications on a managed node.

Hybrid Microsoft SQL Server Management Template

The Hybrid Microsoft SQL Server Management Template can be used for monitoring Microsoft SQL Server databases in an environment using agent and agentless monitoring. It comprises agent based Microsoft SQL Server Aspects, agent based Infrastructure Aspects, and agentless Microsoft SQL Server Aspects.

> **Note:** To use and deploy Infrastructure Aspects, you must install OMi Management Pack for Infrastructure software.

How to Access Hybrid Microsoft SQL Server Management Template

1. Open Management Templates & Aspects pane:

   On BSM 9.2x, click **Admin > Operations Management > Monitoring > Management Templates & Aspects**.

   On OMi 10.x, click **Administration > Monitoring > Management Templates & Aspects**.

2. In the Configuration Folders pane, click **Configuration Folders > Database Management > Microsoft SQL Server > Microsoft SQL Server Management Templates > Hybrid Microsoft SQL Server Management Template**.

User Interface Reference

Management Template - General

Provides an overview of the attributes of the Management Template.

UI Element	Description
Name	Hybrid Microsoft SQL Server Management Template
Description	Manages primary and advanced areas of Microsoft SQL Server standalone database instance environments using Agent for Availability, Locks, Transaction, Space, Memory, Buffer Manager, and so on along with critical infrastructure areas of CPU and System. This also includes Agentless Microsoft SQL Server Aspects to monitor Microsoft SQL Server standalone database instance environments for availability.
ID	A unique identifier for the Management Template.

UI Element	Description
Version ID	A unique identifier for this version of the Management Template.
Version	The current version of the Management Template. In this instance, the version of the Management Template is 1.100.
Change Log	Text that describes what is new or modified in this version of the Management Template.

Management Template - Topology View

UI Element	Description
Topology View	**MSSQL_Database_Deployment** is the Topology View for Hybrid Microsoft SQL Server Management Template.
CI Type	Is the type of configuration items that the Microsoft SQL Server Management Template helps you to manage. **SQL Server** is the CI type.

> **Note:** The Hybrid Microsoft SQL Server Management Template can be deployed only on SQL instance configured as **SQL authentication**.

Management Template - Aspects

The Hybrid Microsoft SQL Server Management Template contains the following Aspects:

- Microsoft SQL Server Availability
- Microsoft SQL Server Availability (Agentless)
- Microsoft SQL Server Base
- Microsoft SQL Server Buffer Manager
- Microsoft SQL Server Data Access Methods
- Microsoft SQL Server Discovery
- Microsoft SQL Server Error
- Microsoft SQL Server Input Output Utilization
- Microsoft SQL Server Jobs
- Microsoft SQL Server Latches
- Microsoft SQL Server Locks
- Microsoft SQL Server Memory and Memory Manager

- Microsoft SQL Server Processes and Statistics
- Microsoft SQL Server Response Time (Agentless)
- Microsoft SQL Server Space
- Microsoft SQL Server Transactions

The Hybrid Microsoft SQL Server Management Template contains the following Infrastructure Aspects:

Resource Bottleneck Diagnosis

The Resource Bottleneck Diagnosis Aspect identifies congestions and bottleneck conditions for system resources such as the CPU, memory, network and disk. CPU bottleneck monitoring is based on global CPU utilization and load average (Run Queue Length).

System Fault Analysis

The System Fault Analysis Aspect monitors the kernel log file, boot log file, and event log file for critical error conditions and instructions on what might have caused it.

System Infrastructure Discovery

Discovers and gathers information regarding the system resources, operating system, and applications on a managed node.

Microsoft SQL Server Aspects

Microsoft SQL Server Aspects can be used to monitor the building blocks or units of Microsoft SQL Server. A Microsoft SQL Server Aspect comprises of policy templates, instrumentation, and parameters for monitoring the health and performance of Microsoft SQL Servers.

How to Access Microsoft SQL Server Aspects

1. Open Management Templates & Aspects pane:

   On BSM 9.2x, click **Admin > Operations Management > Monitoring > Management Templates & Aspects**.

   On OMi 10.x, click **Administration > Monitoring > Management Templates & Aspects**.

2. In the Configuration Folder pane, click **Configuration Folders > Database Management > Microsoft SQL Server > Microsoft SQL Server Aspects**.

Tasks

How to Deploy Microsoft SQL Server Aspects

For more information about deploying Microsoft SQL Server Aspects, see Task 4b: Deploying the Microsoft SQL Server Aspects.

How to Create Microsoft SQL Server Aspects

For more information about creating a new aspect, see "Creating New Microsoft SQL Server Aspects".

List of Microsoft SQL Server Aspects

Microsoft SQL Server Aspects comprises policy templates, instrumentation, and parameters for monitoring the health and performance of Microsoft SQL Server databases. Each Microsoft SQL Server Aspect can be used to monitor individual units of Microsoft SQL Server databases.

User Interface Reference

General	Provides an overview of the general attributes of the Microsoft SQL Server Aspects.
CI Type	The type of CIs that the Aspect can be assigned to.
Instrumentation	Provides a single package which contains the binaries for discovery, collection, and data logging.
Aspects	Provides an overview of any Aspects that the Microsoft SQL Server Aspect contains. You can expand each item in the list to see more details about the nested aspect. The Microsoft SQL Server Base Aspect is part of all the other Aspects.
Policy Templates	Provides an overview of the policy templates that the Microsoft SQL Server Aspect contains. You can expand each item in the list to see more details about the policy template.

The OMi MP for Microsoft SQL Server comprises the following Microsoft SQL Server Aspects:

Microsoft SQL Server Availability

This Aspect monitors the Microsoft SQL Server database connection status and services.

CI Type	Policy Template	Indicator	Description	Policy Type
SQL Server	MSSQLServer_3028	NA	Monitors the number of databases marked as suspect (M028_SuspectDBCnt).	Measurement Threshold
SQL Server	MSSQLServer_3057	SQLServerServiceStatus:Down, SQLServerServiceStatus:Up	Monitors the SQL Server Service (M057_ServiceMon).	Measurement Threshold
SQL Server	MSSQLServer_3058	NA	Monitors SQL Agent Service (M058_ServiceMon).	Measurement Threshold
SQL Server	MSSQLServer_3097	NA	Enables connection to a server (M097_ServerConnect)	ConfigFile
SQL Server	MSSQLServer_3243	NA	Monitors the uptime information.	ConfigFile

Microsoft SQL Server Availability (Agentless)

CI Type	Policy Template	Policy Description	Policy Type
SQL Server	MSSQLServer_Availability (:MSSQLServer_Availability)	This policy monitors Microsoft SQL Server Connection status remotely.	SiteScope Template

Note: This aspect must be deployed on SQL Server Authentication instance.

Microsoft SQL Server Backup

This Aspect monitors the database and transaction log backups.

CI Type	Policy Template	Indicator	Description	Policy Type
SQL Server	MSSQLServer_3033	NA	Monitors the number of databases missing backup since the last backup for a defined number of hours (M033_DBBackupCnt).	Measurement Threshold
SQL Server	MSSQLServer_3234	NA	Monitors the number of hours since the last database transaction log backup (M3234_TransLogBackup).	Measurement Threshold

Microsoft SQL Server Base

This is the base Aspect for monitoring Microsoft SQL Server database.

CI Type	Policy Template	Indicator	Description	Policy Type
SQL Server	MSSQLServer_ Configuration	NA	This policy is used to update user configuration.	ConfigFile
SQL Server	MSSQLServer_ High	NA	Runs the MSSQLServer MP collector/analyzer every HIGH schedule.	Scheduled Task
SQL Server	MSSQLServer_ Logger	NA	Monitors the MSSQLServer logger data feed every 5 minutes.	Scheduled Task
SQL Server	MSSQLServer_ Low	NA	Runs the MSSQLServer MP collector/analyzer every LOW schedule.	Scheduled Task
SQL Server	MSSQLServer_ Medium	NA	Runs the MSSQLServer MP collector/analyzer every MEDIUM schedule.	Scheduled Task
SQL Server	MSSQLServer_ Messages	NA	Monitors the MSSQLServer Message Interceptor policy.	Open Message Interface
SQL Server	MSSQLServer_ VeryHigh	NA	Runs the MSSQLServer MP collector/analyzer every VERYHIGH schedule.	Scheduled Task

Microsoft SQL Server Buffer Manager

This Aspect monitors the physical page reads and write requests sent, number of buffers sent, check points issued, and pending memory grants.

CI Type	Policy Template	Indicator	Description	Policy Type
SQL Server	MSSQLServer_ 3413	NA	Monitors the number of physical database page read requests sent.	ConfigFile
SQL Server	MSSQLServer_ 3414	NA	Monitors the number of physical database page write requests sent.	ConfigFile
SQL Server	MSSQLServer_ 3415	NA	Monitors the number of pages flushed using the checkpoint or other operations that require all dirty pages to be flushed.	ConfigFile

CI Type	Policy Template	Indicator	Description	Policy Type
SQL Server	MSSQLServer_3416	NA	Monitors the number of buffers written by the buffer manager's Lazy Writer.	ConfigFile
SQL Server	MSSQLServer_3422	NA	Measures the total memory the server has committed to the SQL objects.	ConfigFile

Microsoft SQL Server Buffer Manager (Add-on)

This Aspect monitors the buffer manager pending memory grants.

CI Type	Policy Template	Indicator	Description	Policy Type
SQL Server	MSSQLServer_3417	NA	The number of processes waiting for a workspace memory grant.	ConfigFile

Microsoft SQL Server Data Access Methods

This Aspect monitors the amount of data, indexes, and free space in a database.

CI Type	Policy Template	Indicator	Description	Policy Type
SQL Server	MSSQLServer_3051	MSSQLServerSQLQueryTuning:Low, MSSQLServerSQLQueryTuning:Normal	Monitors the full scans rate (M051_FullScansRate).	Measurement Threshold
SQL Server	MSSQLServer_3052	MSSQLServerSQLQueryTuning:Low, MSSQLServerSQLQueryTuning:Normal	Monitors the index searches rate (M052_IndxSearchsRate).	Measurement Threshold
SQL Server	MSSQLServer_3053	MSSQLServerSQLQueryTuning:Low, MSSQLServerSQLQueryTuning:Normal	Monitors the pages allocated rate (M053_PgesAlloctdRate).	Measurement Threshold
SQL Server	MSSQLServer_3054	MSSQLServerSQLQueryTuning:Low, MSSQLServerSQLQueryTuning:Normal	Monitors the extents allocated rate (M054_	Measurement Threshold

CI Type	Policy Template	Indicator	Description	Policy Type
			ExtntsAllocRate).	
SQL Server	MSSQLServer_3055	MSSQLServerSQLQueryTuning:Low, MSSQLServerSQLQueryTuning:Normal	Monitors the page splits rate (M055_PageSplitsRates).	Measurement Threshold
SQL Server	MSSQLServer_3056	NA	Monitors the table lock escalation rate (M056_TblLckEscalRate).	Measurement Threshold

Microsoft SQL Server Discovery

This Aspect discovers Microsoft SQL Server standalone instances and failover cluster instances, databases, services, and so on.

CI Type	Policy Template	Policy Description	Policy Type
SQL Server Computer	MSSQLServer_Discovery	Runs the MSSQLServer_Discovery policy.	Service Auto-Discovery Template
	MSSQLServer_DeepDiscovery	Runs the MSSQLServer_DeepDiscovery policy (default 5 mins).	Schedule Task Template

Microsoft SQL Server Error

This Aspect monitors the activity of Microsoft SQL Servers such as Read/Write errors, packet errors, and logfiles.

CI Type	Policy Template	Indicator	Description	Policy Type
SQL Server	MSSQLServer_3023	SQLServerDiskReadWriteErrors:High, SQLServerDiskReadWriteErrors:Normal	Monitors the number of SQL Server read/write errors since the last probing. (M023_ReadWriteErrCnt)	Measurement Threshold

CI Type	Policy Template	Indicator	Description	Policy Type
SQL Server	MSSQLServer_3024	SQLServerDiskReadWriteErrors:High, SQLServerDiskReadWriteErrors:Normal	Monitors the number of packet errors while reading or writing packets. (M024_PacketErrorCnt)	Measurement Threshold
SQL Server	MSSQLServer_AlertLog	NA	Monitors the MSSQL Server log file.	LogFile Entry
SQL Server	MSSQLServer_EventLog_Errors	NA	Forwards application log entries with severity "Error".	Windows Event Log
SQL Server	MSSQLServer_EventLog_Warnings	NA	Forwards the application log entries with severity "Warning".	Windows Event Log

Microsoft SQL Server Input Output Utilization

This Aspect monitors the Input Output statistics such as outstanding reads and write rate.

CI Type	Policy Template	Indicator	Description	Policy Type
SQL Server	MSSQLServer_3007	DatabaseReadsOutstanding:High, DatabaseReadsOutstanding:Normal	Monitors the number of read request issues to the operating system that are not complete. (M007_ReadsOutstdRate)	Measurement Threshold
SQL Server	MSSQLServer_3008	DatabaseWritesOutstanding:High, DatabaseWritesOutstanding:Normal	Monitors the number of write request issues to the operating system that are	Measurement Threshold

CI Type	Policy Template	Indicator	Description	Policy Type
			not complete. (M008_ WritsOutstdRate)	
SQL Server	MSSQLServer_3227	NA	Monitors the percentage of physical I/O used by process ID. (M227_ PhysIOByUsrPct)	Measurement Threshold
SQL Server	MSSQLServer_3244	NA	Monitors the number of physical reads and writes to the disk since the last collection for each tablespace.	ConfigFile
SQL Server	MSSQLServer_3412	NA	Monitors the number of seconds a page stays in the buffer pool without references.	ConfigFile

Microsoft SQL Server Jobs

This Aspect monitors the jobs running on an SQL Server instance by using SQL Server Agent.

CI Type	Policy Template	Indicator	Description	Policy Type
SQL Server	MSSQLServer_ 3277	NA	Reports the failed and canceled jobs (M3277_CompletedJobs).	Measurement Threshold

Microsoft SQL Server Jobs (Add-on)

This Aspect monitors long running jobs.

CI Type	Policy Template	Indicator	Description	Policy Type
SQL	MSSQLServer_	LongRunningJobs:	Monitors jobs that run beyond the	Measurement

CI Type	Policy Template	Indicator	Description	Policy Type
Server	3089	High LongRunningJobs: Normal	defined threshold and provides a long running job count (M3089_ LongRunningJobs).	Threshold

Microsoft SQL Server Latches

This Aspect monitors the latches to determine the activity and usage of resources that help you to identify the bottlenecks in performance.

CI Type	Policy Template	Indicator	Description	Policy Type
SQL Server	MSSQLServer_ 3068	DatabaseLatchWaitRate:High, DatabaseLatchWaitRate:Normal	Monitors the latch wait rate (M068_ LatchWaitsRate).	Measurement Threshold
SQL Server	MSSQLServer_ 3069	NA	Monitors the average latch wait time (M069_ AvgLatchWaitTim).	Measurement Threshold
SQL Server	MSSQLServer_ 3076	NA	Monitors the current average latch wait time (M076_ CurAvgLatchWait).	Measurement Threshold

Microsoft SQL Server Locks

This Aspect monitors the SQL Server lock resources accessed by concurrent transactions.

CI Type	Policy Template	Indicator	Description	Policy Type
SQL Server	MSSQLServe r_3013	LocksInUsePercentage:High, LocksInUsePercentage:Normal	Monitors the percentage of locks in use. (M013_ LocksInUsePct)	Measuremen t Threshold
SQL Server	MSSQLServe r_3070	DatabaseLockTimeoutRate:High, DatabaseLockTimeoutRate:Norma l	Monitors the lock timeout rate. (M070_ LockTimeoutRate)	Measuremen t Threshold

CI Type	Policy Template	Indicator	Description	Policy Type
SQL Server	MSSQLServer_3071	DatabaseDeadlockRate:High, DatabaseDeadlockRate:Normal	Monitors the deadlocks rate. (M071_ DeadlocksRate)	Measurement Threshold
SQL Server	MSSQLServer_3072	LockWaitRate:High, LockWaitRate:Normal	Monitors the locks wait rate. (M072_ LocksWaitRate)	Measurement Threshold
SQL Server	MSSQLServer_3073	NA	Monitors the average lock wait time. (M073_ LockAvgWaitTime)	Measurement Threshold
SQL Server	MSSQLServer_3075	LockMemoryUsedPct:High, LockMemoryUsedPct:normal	Monitors the percentage of lock memory in use. (M075_ LockMemoryPct)	Measurement Threshold

Microsoft SQL Server Memory and Memory Manager

This Aspect monitors low-memory condition using available bytes, pages per second, and the amount of memory that SQL Server uses by monitoring memory manager.

CI Type	Policy Template	Indicator	Description	Policy Type
SQL Server	MSSQLServer_3420	NA	Amount of physical memory, in MB immediately available for allocation to a process or for system use.	ConfigFile
SQL Server	MSSQLServer_3424	NA	Number of pages that are read from or written to disk is collected.	ConfigFile
SQL Server	MSSQLServer_3421	NA	Number of the database pages (buffer manager) which are currently being occupied in the data cache.	ConfigFile

Microsoft SQL Server Memory and Memory Manager (Add-on)

This Aspect monitors the amount of memory that SQL Server uses by monitoring memory manager's stolen and target server memory.

CI Type	Policy Template	Indicator	Description	Policy Type
SQL Server	MSSQLServer_3425	NA	Monitors the ideal amount of memory the server is willing to consume.	ConfigFile
SQL Server	MSSQLServer_3094	MemryCnsmptn:High, MemryCnsmptn:Normal	Checks for the amount of memory used by the resource pool.	Measurement Threshold
SQL Server	MSSQLServer_3423	NA	Monitors the amount of memory used by the server for purposes other than monitoring the database pages.	ConfigFile

Microsoft SQL Server Processes and Statistics

This Aspect monitors the Microsoft SQL Server database processes and statistics such as the CPU used, LRU Stats, SQL statistics, Runnable connections, blocked processes, and so on.

CI Type	Policy Template	Indicator	Description	Policy Type
SQL Server	MSSQLServer_3001	CachePerformance:Low, CachePerformance:Normal	Percentage of times a data page was found in the cache (M001_CacheHitPct).	Measurement Threshold
SQL Server	MSSQLServer_3011	UsersConnectedPct:High, UsersConnectedPct:Normal, UsersConnectedPct:Medium	Percentage of current users connected (M011_UserConnectPct).	Measurement Threshold
SQL Server	MSSQLServer_3014	BlockedProcesses:High, BlockedProcesses:Normal	Number of blocked processes (M014_BlckdProcessCnt)	Measurement Threshold
SQL Server	MSSQLServer_3017	NA	Percentage of command queue length used	Measurement Threshold

CI Type	Policy Template	Indicator	Description	Policy Type
			(M017_ CmdQueueLenPct)	
SQL Server	MSSQLServer_3032	NA	Percentage of total connections that are runnable (M032_ RunableContnPct)	Measurement Threshold
SQL Server	MSSQLServer_3025	MSSQLServerCPUUsagebySQL:High, MSSQLServerCPUUsagebySQL:Normal	Percentage of CPU time used by SQL Server (M025_ CPUUsedPct)	Measurement Threshold
SQL Server	MSSQLServer_3026	InactiveDatabaseConnections:High, InactiveDatabaseConnections:Normal	Percentage of total connections that are active vs sleeping (M026_ ActiveConntnPct)	Measurement Threshold
SQL Server	MSSQLServer_3074	NA	Batch requests rate (M074_ BatchReqstsRate)	Measurement Threshold
SQL Server	MSSQLServer_3031	NA	User connections count (M031_ NumUsersCnt)	ConfigFile

Microsoft SQL Server Response Time (Agentless)

This Aspect monitors the Microsoft SQL Server Response Time remotely.

CI Type	Policy Template	Policy Description	Policy Type
SQL Server	MSSQLServer_ ResponseTime (:MSSQLServer_ ResponseTime)	Monitors Microsoft SQL Server Response Time remotely.	SiteScope Template

Note: This aspect must be deployed on SQL Server Authentication instance.

Microsoft SQL Server Space

This Aspect monitors the SQL Server space utilization such as virtual device space, database space, and filegroup free space.

CI Type	Policy Template	Indicator	Description	Policy Type
SQL Server	MSSQLServer_3215	VirtualDeviceSpaceUsageLevel:High, VirtualDeviceSpaceUsageLevel:Normal, VirtualDeviceSpaceUsageLevel:Medium	Monitors the percentage of space used on a specific virtual device (M215_VirtDevSpUsdPct).	Measurement Threshold
SQL Server	MSSQLServer_3216	MSSQL_Database_Transaction_Log_Usage_Level:High, MSSQL_Database_Transaction_Log_Usage_Level:Normal	Monitors the percentage of transaction log space used for each database (M216_TransLogUsedPct).	Measurement Threshold
SQL Server	MSSQLServer_3218	MSSQL_Database_Space_Usage_Level:High, MSSQL_Database_Space_Usage_Level:Normal	Monitors the percentage of database space used (M218_DBSpaceUsedPct).	Measurement Threshold
SQL Server	MSSQLServer_3240	NA	Monitors the free and allocated database size in MB.	ConfigFile
SQL Server	MSSQLServer_3241	NA	Monitors the free and allocated table size in MB.	ConfigFile
SQL Server	MSSQLServer_3242	NA	Monitors the virtual device size that is allocated in MB.	ConfigFile
SQL Server	MSSQLServer_3278	MSSQL_Database_FileGroup_Space_Usage_Level:High, MSSQL_Database_FileGroup_Space_Usage_Level:Normal, MSSQL_Database_FileGroup_Space_Usage_Level:Medium	Monitors the percentage of space used per filegroup and database (M278_FileGrpUsedSpacePct).	Measurement Threshold

Microsoft SQL Server Transactions

This Aspect monitors the Microsoft SQL Server transactions rate, log shrink, and log growths.

CI Type	Policy Template	Indicator	Description	Policy Type
SQL Server	MSSQLServer_3009	MSSQLServerTransactionRate:High, MSSQLServerTransactionRate:Normal	Monitors the server transaction rate (M009_ TransactionRate).	Measurement Threshold
SQL Server	MSSQLServer_3035	MSSQLSQLQueryPerformance:Low, MSSQLSQLQueryPerformance:Normal	Monitors the long running transaction (M035_ LongTransaction).	Measurement Threshold
SQL Server	MSSQLServer_3064	SQLServerDatabaseActiveTransactions: High, SQLServerDatabaseActiveTransactions: Normal	Monitors the number of active transactions for the entire server (M064_ DBActivTransCnt).	Measurement Threshold
SQL Server	MSSQLServer_3066	NA	Monitors the transactions log expansions for the server (M066_ DBLogGrowthsCnt).	Measurement Threshold
SQL Server	MSSQLServer_3067	NA	Monitors the number of transactions log shrinks for the server (M067_ DBLogShrinksCnt).	Measurement Threshold

List of Additional OOTB Aspects

Following is a list of Aspects that are not part of any of the Management Templates. These Aspects are used to monitor specific areas such as full text search, disaster recovery, and so on. You can add one or more of these Aspects to Management Templates based on your monitoring requirements.

Microsoft SQL Server Database Mirroring

This Aspect monitors the data flow in a database mirroring session.

CI Type	Policy Template	Indicator	Description	Policy Type
SQL Server	MSSQLServer_3084	DatabaseMirroringStatus:Suspended, DatabaseMirroringStatus:Normal	Monitors the mirroring state of the Microsoft SQL Server instance. (M084_DBMirroring_State)	Measurement Threshold
SQL Server	MSSQLServer_3085	MSSQL_Database_Mirroring_Status:Unsent_Log, MSSQL_Database_Mirroring_Status:Normal	Monitors the unsent log on the principal. (M085_DBMirroring_UnsentLog)	Measurement Threshold
SQL Server	MSSQLServer_3086	MSSQL_Database_Mirroring_Status:Unrestored_Log, MSSQL_Database_Mirroring_Status:Normal	Monitors the unrestored log on the mirror. (M086_DBMirroring_UnrestoredLog)	Measurement Threshold
SQL Server	MSSQLServer_3087	NA	Monitors the log generation rate on the principal. (M087_DBMirroring_LogGenRate)	Measurement Threshold
SQL Server	MSSQLServer_3088	NA	Monitors the current send	Measurement Threshold

CI Type	Policy Template	Indicator	Description	Policy Type
			rate on the principal. (M088_ DBMirroring_ CurrSndRate)	

Microsoft SQL Server Audit

This Aspect monitors the principals, backup size, schema modification, ad hoc queries and so on.

CI Type	Policy Template	Indicator	Description	Policy Type
SQL Server	MSSQLServer_ 3092	LastBkSize:High, LastBkSize:Normal	Monitors the size of last full database backup of each database (M3092_LastBkSize).	Measurement Threshold
SQL Server	MSSQLServer_ 3090	Principal_ sysadmin:High, Principal_ sysadmin:Normal	Monitors the count of principals who are members of the sysadmin fixed server role (M3090_PrincipalSysadminCnt).	Measurement Threshold
SQL Server	MSSQLServer_ 3091	AdHocQuery:High, AdHocQuery:Normal	Monitors the number of ad hoc queries in the plan cache (M3091_AdHocQuery).	Measurement Threshold
SQL Server	MSSQLServer_ 3093	SchemaMod:High, SchemaMod:Normal	Monitors the modification of database schema (M3093_ SchemaMod).	Measurement Threshold

Microsoft SQL Server Configuration Settings

This Aspect monitors the database settings of the Microsoft SQL Server such as the Auto Close, Auto Create Statistic, Auto Shrink, Auto Update Statistics, Auto Update Statistics Asynchronously, and so on.

CI Type	Policy Template	Indicator	Description	Policy Type
SQL Server	MSSQLServer_ 3501	AutoCloseOn:High, AutoCloseOn:Normal	Monitors the **Auto Close** setting for the databases. If the	Measurement Threshold

CI Type	Policy Template	Indicator	Description	Policy Type
			settings do not meet the specified standard, an alert is generated to avoid performance issues caused by recompilation of all subsequent execution plans from plan cache which has got cleared.	
SQL Server	MSSQLServer_3502	AutoCreateStatistic:High, AutoCreateStatistic:Normal	Monitors the **Auto Create Statistic** setting for the databases. If settings do not meet the specified standard, an alert needs to be generated to avoid poor query performance.	Measurement Threshold
SQL Server	MSSQLServer_3503	AutoShrinkOn:High, AutoShrinkOn:Normal	Monitors the **Auto Shrink** setting for the databases. This monitor is a part of overall standard requirement. If settings do not meet the specified standard, an alert needs to be generated to avoid performance issues in database.	Measurement Threshold
SQL Server	MSSQLServer_3504	AutoUpdateStatistics:High, AutoUpdateStatistics:Normal	Monitors the **Auto Update Statistics Asynchronously** setting for the database. If the settings do not meet the specified	Measurement Threshold

CI Type	Policy Template	Indicator	Description	Policy Type
			standard, an alert needs to be generated to avoid query performance issues.	
SQL Server	MSSQLServer_3505	AutoUpdateStatsOn:High, AutoUpdateStatsOn:Normal	Monitors the **Auto Update Statistics** setting for the database. If settings do not meet the specified standard, an alert needs to be generated to avoid query performance issues.	Measurement Threshold
SQL Server	MSSQLServer_3506	NA	Monitors the **DB Chaining** setting for the database.	ConfigFile
SQL Server	MSSQLServer_3507	NA	Monitors the number of **Page Verify** setting for the database.	ConfigFile
SQL Server	MSSQLServer_3508	NA	Monitors the number of **Recovery Model** setting for the database.	ConfigFile
SQL Server	MSSQLServer_3509	NA	Monitors the number of **Trustworthy** setting for the database.	ConfigFile

Microsoft SQL Server User Defined Aspect

This Aspect monitors the user defined aspect for Microsoft SQL Server.

CI Type	Policy Template	Indicator	Description	Policy Type
SQL	MSSQLServer_	NA	UDM monitor metric 37XX	Measurement

CI Type	Policy Template	Indicator	Description	Policy Type
Server	37XX			Threshold
SQL Server	MSSQLServer_UDM	NA	Syntax to create MSSQL Server User Defined Metrics.	ConfigFile

Microsoft SQL Server Replication

This Aspect monitors copying and distributing data and database objects from one database to another and then synchronizing between databases.

CI Type	Policy Template	Indicator	Description	Policy Type
SQL Server	MSSQLServer_3081	MSSQLServerReplicationStatus:Broken, MSSQLServerReplicationStatus:Up	Monitors the status of the Replication Agents (M081_RepnAgentsStatus).	Measurement Threshold
SQL Server	MSSQLServer_3082	NA	Monitors the replication latency (M082_RepnLatency).	Measurement Threshold
SQL Server	MSSQLServer_3083	NA	Monitors the delivery latency (M083_DelLatency).	Measurement Threshold
SQL Server	MSSQLServer_3401	NA	Monitors the number of commands delivered to the Subscriber per second.	ConfigFile
SQL Server	MSSQLServer_3402	NA	Monitors the number of transactions delivered to the Subscriber per second.	ConfigFile

CI Type	Policy Template	Indicator	Description	Policy Type
SQL Server	MSSQLServer_3403	NA	Time (in milliseconds) elapsed from when transactions are delivered to the Distributor to when they are applied at the Subscriber.	Measurement Threshold
SQL Server	MSSQLServer_3404	MergeConflicts:High, MergeConflicts:Normal, MergeConflicts:Medium	Number of conflicts per second during Publisher or Subscriber upload and download applied at the Subscriber.	Measurement Threshold
SQL Server	MSSQLServer_3405	NA	Monitors the number of rows replicated from the Publisher to the Subscriber per second.	ConfigFile
SQL Server	MSSQLServer_3406	NA	Monitors the number of rows replicated from the Subscriber to the Publisher per second.	ConfigFile
SQL Server	MSSQLServer_3407	NA	Monitors the number of snapshot commands delivered to the Distributor per second.	ConfigFile
SQL Server	MSSQLServer_3408	NA	Monitors the number of snapshot transactions delivered to the Distributor per	ConfigFile

CI Type	Policy Template	Indicator	Description	Policy Type
			second.	
SQL Server	MSSQLServer_3409	NA	Monitors the number of LogReader commands delivered to the Distributor per second.	ConfigFile
SQL Server	MSSQLServer_3410	NA	Monitors the number of LogReader transactions delivered to the Distributor per second.	ConfigFile
SQL Server	MSSQLServer_3411	NA	Time (in milliseconds) elapsed from when transactions are applied at the Publisher to when they are delivered to the Distributor.	Measurement Threshold

Microsoft SQL Server Reports

This Aspect monitors the SQL Server failed reports.

CI Type	Policy Template	Indicator	Description	Policy Type
SQL Server	MSSQLServer_3080	NA	Monitors the number of failed reports (Reporting Services) (M080_ReportsFailed).	Measurement Threshold

Microsoft SQL Server Logshipping

This Aspect monitors backing up the transaction logs from a primary database and then copying and restoring them to a secondary database.

CI Type	Policy Template	Indicator	Description	Policy Type
SQL Server	MSSQLServer_3291	NA	Monitoring backup job in primary instance of logshipping configuration	Measurement Threshold
SQL Server	MSSQLServer_3292	NA	Monitors copy backup job in secondary instance of logshipping configuration.	Measurement Threshold
SQL Server	MSSQLServer_3293	NA	Monitors restore job in secondary instance of logshipping configuration.	Measurement Threshold

Microsoft SQL Server High Availability (AOAG)

This Aspect monitors Always On Availability Group (AOAG) such as availability replica and availability database.

CI Type	Policy Template	Indicator	Description	Policy Type
SQL Server	MSSQLServer_3429	NA	Monitors the number of messages sent over the network to the replica.	ConfigFile
SQL Server	MSSQLServer_3430	NA	Monitors the number of messages en-queued to be sent over the network to the replica.	ConfigFile
SQL Server	MSSQLServer_3431	NA	Monitors the number of messages received from the replica.	ConfigFile
SQL Server	MSSQLServer_3432	NA	Monitors the number of database message bytes en-queued to be sent over the network to the replica.	ConfigFile
SQL Server	MSSQLServer_3433	NA	Monitors the number of bytes sent over the network to the replica.	ConfigFile
SQL Server	MSSQLServer_3434	NA	Monitors the number of bytes received from the replica over the network.	ConfigFile
SQL Server	MSSQLServer_3435	NA	Monitors the amount of filestream data received by the availability replica for the database.	ConfigFile
SQL Server	MSSQLServer_3436	NA	Monitors the amount of log bytes remaining to be redone to finish the reverting phase received by the availability.	ConfigFile
SQL Server	MSSQLServer_3437	NA	Monitors the amount of log records redone in the last second to catch up with the database replica.	ConfigFile

CI Type	Policy Template	Indicator	Description	Policy Type
SQL Server	MSSQLServer_3438	NA	Monitors the number of milliseconds transaction termination waited for acknowledgment per second.	ConfigFile
SQL Server	MSSQLServer_3439	NA	Monitors the number of times redo got blocked in the last second.	ConfigFile
SQL Server	MSSQLServer_3440	NA	Monitors the number of hardened log (in KB) waiting to be redone on the secondary.	ConfigFile
SQL Server	MSSQLServer_3441	NA	Monitors the amount of logs (in KB) waiting to be sent to the database replica.	ConfigFile
SQL Server	MSSQLServer_3442	NA	Monitors the amount of logs received by the availability replica for the database.	ConfigFile

Microsoft SQL Server High Availability (DR)

This Aspect monitors the state of availability and database replica.

CI Type	Policy Template	Indicator	Description	Policy Type
SQL Server	MSSQLServer_3510	ReplicaRole:Valid ReplicaRole:InValid	Monitors the state of role of availability replica.	Measurement Threshold Policy
SQL Server	MSSQLServer_3511	SyncStateOfDB:Synchronised SyncStateOfDB:Asynchronised	Monitors the data synchronization state of database replica	Measurement Threshold Policy
SQL Server	MSSQLServer_3512	JoinStateOfDB:Joined JoinStateOfDB:UnJoined	Monitors the join state of database replica.	Measurement Threshold Policy
SQL Server	MSSQLServer_3513	DataMovement:Suspended DataMovement: Unsuspended	Monitors the state of data movement of the database replica	Measurement Threshold Policy
SQL Server	MSSQLServer_3514	FailoverReady:Available FailoverReady:Unavailable	Monitors whether the availability group has at least one secondary replica which is	Measurement Threshold Policy

CI Type	Policy Template	Indicator	Description	Policy Type
			failover ready.	
SQL Server	MSSQLServer_3515	ReplicaConnState:Connected ReplicaConnState:DisConnected	Monitors the connection state between availability replicas.	Measurement Threshold Policy

Microsoft SQL Server Full-Text Search

This Aspect monitors the Full-Text Search service status, insufficient disk space, and outstanding population batches.

CI Type	Policy Template	Indicator	Description	Policy Type
SQL Server	MSSQLServer_3516	FullTxtSpace:High FullTxtSpace:Normal	Number of databases with insufficient disk space for Full Text Search operation (M3516_FullTxtSpace).	Measurement Threshold
SQL Server	MSSQLServer_3517	FullTxtSrchStatus:Down FullTxtSrchStatus:Up	Status of Full Text Search service (M3517_FullTxtSrchStatus).	Measurement Threshold
SQL Server	MSSQLServer_3518	FullTxtBatches:High FullTxtBatches:Normal	Number of outstanding population batches for the Full Text Search service (M3518_FullTxtBatches).	Measurement Threshold

Microsoft SQL Server Processes and Statistics (Add-on)

This Aspect monitors blocking sessions, free threads, SQL server re-compilation, and batch requests.

CI Type	Policy Template	Indicator	Description	Policy Type
SQL Server	MSSQLServer_3095	BlockingSessions:High BlockingSessions:Normal	Monitors the existence of blocking situations caused by multiple sessions trying to access the same resource with lock-based	Measurement Threshold

CI Type	Policy Template	Indicator	Description	Policy Type
			concurrency. (M3095_ BlockingSessions)	
SQL Server	MSSQLServer_ 3096	FreeThreadCount:Low FreeThreadCount:Normal	Monitors the number of free threads for DB Engine process.	Measurement Threshold
SQL Server	MSSQLServer_ 3426	SQLReCompilatn:High SQLReCompilatn:Normal	SQL ReCompilation is required to create a new query execution plan that will be optimal for the new database state and ensure better procedure performance.	Measurement Threshold
SQL Server	MSSQLServer_ 3427	NA	Tracks the number of compilations per second. Indicates the number of times the compile code path is entered. Includes compiles caused by statement-level recompilations in SQL Server.	ConfigFile
SQL Server	MSSQLServer_ 3428	NA	SQL Server's Batch Requests represents the number of SQL Statements that are being executed per second.	ConfigFile

Parameters

Parameters are variables that are an integral component of Microsoft SQL Server Management Templates, Microsoft SQL Server Aspects, and Policy Templates. Each parameter corresponds to a variable. Parameters contain default values that are used for monitoring the different components of Microsoft SQL Server databases. You can also modify the values of the variables to suit your monitoring requirements.

Grouping of Parameters

The parameters are grouped as follows:

- **Instance Parameters** - These parameters are essential for monitoring Microsoft SQL Server CIs. For example, Microsoft SQL Server instance name is an Instance Parameter.
- **Mandatory Parameters** - These parameters contain the essential information required by policy templates. For example, Microsoft SQL Server instance name is a mandatory parameter.
- **Dependent Parameters** - There are some parameters which are a subset of the mandatory parameters. Such parameters are referred to as dependent parameters. For example, Microsoft SQL Server User Name is a dependent parameter of Microsoft SQL Server instance name.
- **Expert Parameters** - These parameters can be used by SMEs and Administrators.

Microsoft SQL Server Parameters

OMi MP for Microsoft SQL Server contains the following parameters:

Parameter	Parameter Type	Description	Default Values
MSSQL Server Instance Name	Mandatory	Microsoft SQL Server Instance Name that must be monitored.	CI Name
MSSQL Server Instance User Name	Dependent	Microsoft SQL Server User Name with the required privileges to collect data.	
MSSQL Server Instance Password	Dependent	Password for Microsoft SQL Server User Name.	
Filter	Expert	Filter the monitored components. For example, Microsoft SQL Server Segment Filter parameter filters the segments for monitoring.	
MSSQL Server Instance Collection	Expert	Turn on or off collection for Microsoft SQL Server Instance.	ON
MSSQL Server Instance Tracing	Expert	Enable Tracing on or off for trace to be captured on node at `%ovdatadir%/dbspi/log/trace`.	OFF

Parameter	Parameter Type	Description	Default Values
Frequency of High Scheduler	Expert	Frequency for the scheduler which is expected to run for high intervals (in minutes).	15
Frequency of Low Scheduler	Expert	Frequency for the scheduler which is expected to run for short intervals (in hours).	24
Frequency of Medium Scheduler	Expert	Frequency for the scheduler which is expected to run for medium intervals (in hours).	1
Frequency of Very High Scheduler	Expert	Frequency for the scheduler which is expected to run for very high intervals (in minutes).	5
Frequency	Mandatory	Frequency of monitoring by a policy template. For example, the frequency of monitoring MSSQL Server Database availability.	
Threshold	Mandatory	Threshold of a policy template. For example, the threshold of monitoring available database nodes.	
Severity	Mandatory	Severity level of a policy template. For example, the severity of monitoring critical database nodes count.	

Tuning Parameters

You can edit the parameters of the Microsoft SQL Server Management Templates that are already deployed to the CIs. To edit the parameters, follow these steps:

1. Open the Assignments & Tuning pane:

   On BSM 9.2x, click **Admin > Operations Management > Monitoring > Assignments & Tuning**.

   On OMi 10.x, click **Administration > Monitoring > Assignments & Tuning**.

2. In the **Browse Views** tab, select the **MSSQL_Database_Deployment** view that contains the CI for which you want to tune parameters. Alternatively, you can use the **Search** tab to find a CI.

3. In the list of Microsoft SQL Server CIs, click a CI. The Assignments pane shows details of any existing assignments for the Microsoft SQL Server CI.

4. Click the assignment for which you want to tune parameters. The Assignment Details pane shows the current parameter values.

5. In the Assignment Details pane, change the parameters:
   a. *(Optional).* By default, the list shows only mandatory parameters. To see all parameters, click  .
   b. Select a parameter in the list, and then click  .
      - For standard parameters, the Edit Parameter dialog box opens.

        Click **Value**, specify the value, and then click **OK**.
      - For instance parameters, the Edit Instance Parameter dialog box opens.

        Change the instance values if necessary, and then for each instance value, change dependent parameter values. After you change the instances and dependent parameter values, click **OK**.
6. In the Details of Assignment pane, click **Save Changes**. Operations Management deploys the new parameter values to the relevant Operation Agents.

Policy Template Groups

The policy templates are grouped under the Microsoft SQL Server MP policy group. A Policy Template comprises instrumentation and parameters for monitoring the health and performance of the Microsoft SQL Server.

1. To access policy groups:

   On the BSM 9.2x, click **Admin > Management Templates & Aspect > Monitoring > Policy template**.

   On the OMi 10.x, click **Administration > Monitoring > Policy Templates**.
2. In the Policy Template Groups pane, click **Policy Management > Template Groups > Microsoft SQL Server MP**.

The Microsoft SQL Server MP policy group contains the following policy templates:

Policy Template Category	Policy Template
Measurement Threshold	MSSQLServer_3001
	MSSQLServer_3007
	MSSQLServer_3008

Policy Template Category	Policy Template
	MSSQLServer_3009
	MSSQLServer_3011
	MSSQLServer_3013
	MSSQLServer_3014
	MSSQLServer_3017
	MSSQLServer_3023
	MSSQLServer_3024
	MSSQLServer_3025
	MSSQLServer_3026
	MSSQLServer_3028
	MSSQLServer_3030
	MSSQLServer_3032
	MSSQLServer_3033
	MSSQLServer_3035
	MSSQLServer_3051
	MSSQLServer_3052
	MSSQLServer_3053
	MSSQLServer_3054
	MSSQLServer_3055
	MSSQLServer_3056
	MSSQLServer_3057
	MSSQLServer_3058
	MSSQLServer_3064
	MSSQLServer_3066
	MSSQLServer_3067
	MSSQLServer_3068
	MSSQLServer_3069

Policy Template Category	Policy Template
	MSSQLServer_3070
	MSSQLServer_3071
	MSSQLServer_3072
	MSSQLServer_3073
	MSSQLServer_3074
	MSSQLServer_3075
	MSSQLServer_3076
	MSSQLServer_3080
	MSSQLServer_3081
	MSSQLServer_3082
	MSSQLServer_3083
	MSSQLServer_3084
	MSSQLServer_3085
	MSSQLServer_3086
	MSSQLServer_3087
	MSSQLServer_3088
	MSSQLServer_3089
	MSSQLServer_3090
	MSSQLServer_3091
	MSSQLServer_3092
	MSSQLServer_3093
	MSSQLServer_3094
	MSSQLServer_3095
	MSSQLServer_3096
	MSSQLServer_3209
	MSSQLServer_3215
	MSSQLServer_3216

Policy Template Category	Policy Template
	MSSQLServer_3218
	MSSQLServer_3227
	MSSQLServer_3230
	MSSQLServer_3233
	MSSQLServer_3234
	MSSQLServer_3264
	MSSQLServer_3266
	MSSQLServer_3267
	MSSQLServer_3270
	MSSQLServer_3271
	MSSQLServer_3272
	MSSQLServer_3273
	MSSQLServer_3277
	MSSQLServer_3278
	MSSQLServer_3279
	MSSQLServer_3280
	MSSQLServer_3291
	MSSQLServer_3292
	MSSQLServer_3293
	MSSQLServer_3403
	MSSQLServer_3404
	MSSQLServer_3411
	MSSQLServer_3426
	MSSQLServer_3501
	MSSQLServer_3502
	MSSQLServer_3503
	MSSQLServer_3504

Policy Template Category	Policy Template
	MSSQLServer_3505
	MSSQLServer_3510
	MSSQLServer_3511
	MSSQLServer_3512
	MSSQLServer_3513
	MSSQLServer_3514
	MSSQLServer_3515
	MSSQLServer_3516
	MSSQLServer_3517
	MSSQLServer_3518
	MSSQLServer_37XX
Scheduled Task	MSSQLServer_DeepDiscovery
	MSSQLServer_High
	MSSQLServer_Logger
	MSSQLServer_Low
	MSSQLServer_Medium
	MSSQLServer_VeryHigh
Service Auto-Discovery	MSSQLServer_Discovery
Windows Event Log	MSSQLServer_EventLog_Errors
	MSSQLServer_EventLog_Warnings
ConfigFile	MSSQLServer_3031
	MSSQLServer_3097
	MSSQLServer_3240
	MSSQLServer_3241
	MSSQLServer_3242
	MSSQLServer_3243
	MSSQLServer_3244

Policy Template Category	Policy Template
	MSSQLServer_3401
	MSSQLServer_3402
	MSSQLServer_3405
	MSSQLServer_3406
	MSSQLServer_3407
	MSSQLServer_3408
	MSSQLServer_3409
	MSSQLServer_3410
	MSSQLServer_3412
	MSSQLServer_3413
	MSSQLServer_3414
	MSSQLServer_3415
	MSSQLServer_3416
	MSSQLServer_3417
	MSSQLServer_3420
	MSSQLServer_3421
	MSSQLServer_3422
	MSSQLServer_3423
	MSSQLServer_3424
	MSSQLServer_3425
	MSSQLServer_3427
	MSSQLServer_3428
	MSSQLServer_3429
	MSSQLServer_3430
	MSSQLServer_3431
	MSSQLServer_3432
	MSSQLServer_3433

Policy Template Category	Policy Template
	MSSQLServer_3434
	MSSQLServer_3435
	MSSQLServer_3436
	MSSQLServer_3437
	MSSQLServer_3438
	MSSQLServer_3439
	MSSQLServer_3440
	MSSQLServer_3441
	MSSQLServer_3442
	MSSQLServer_3506
	MSSQLServer_3507
	MSSQLServer_3508
	MSSQLServer_3509
	MSSQLServer_Configuration
	MSSQLServer_UDM
SiteScope	MSSQLServer_Availability (:MSSQLServer_Availability)
	MSSQLServer_ResponseTime (:MSSQLServer_ResponseTime)
Logfile Entry	MSSQLServer_AlertLog
Open Message Interface	MSSQLServer_Messages

Configuration Item (CI) and Configuration Item Types (CITs)

Configuration Items (CIs) are components that need to be managed to deliver an IT Service. For example, IT Services, hardware and software are CIs.

Configuration Item Type (CIT) describes the type of a CI and its attributes. The Microsoft SQL Server CIs that are discovered in an environment are grouped under the corresponding CITs. OMi MP for Microsoft SQL Server comprises the following CITs:

- MSSQL Database
- Microsoft SQL Server
- FailoverCluster
- Filesystem

Run-time Service Model Views

The Run-time Service Model (RTSM) View enables you to build and visualize a subset of the overall CI model that comprises Microsoft SQL Server CITs related to a specific area of interest.

How to Access RTSM Views

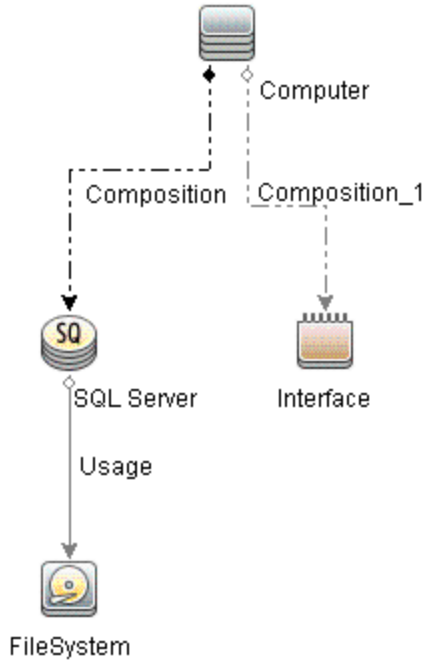
1. Open the Modeling Studio pane:

   On BSM 9.2x, click **Admin > RTSM Administration > Modeling > Modeling Studio**.

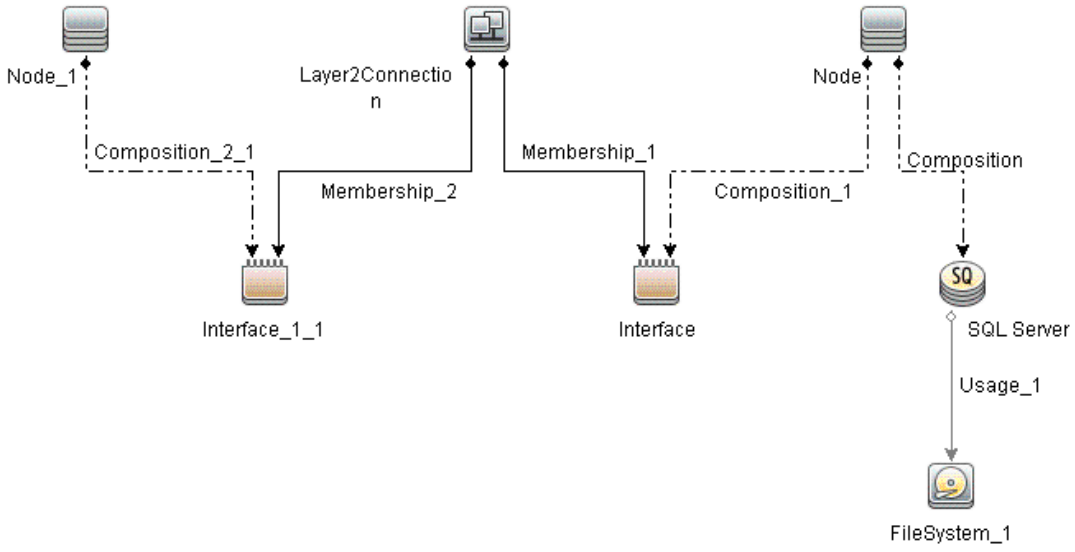
   On OMi 10.x, click **Administration > RTSM Administration > Modeling > Modeling Studio**.
2. Click **Resource Type** as Views.
3. Click **Operations Management > Databases** from the list.

By default, OMi MP for Microsoft SQL Server includes the following Views:

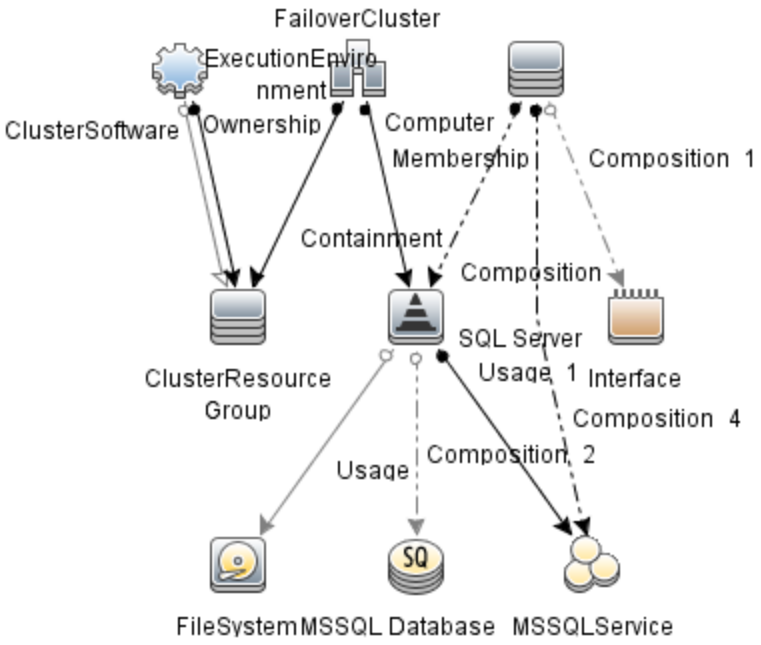
- **MSSQL_Deployment:** This view shows the SQL Server, File System, and Computer CI type. The following image shows the relationship among the CI types.



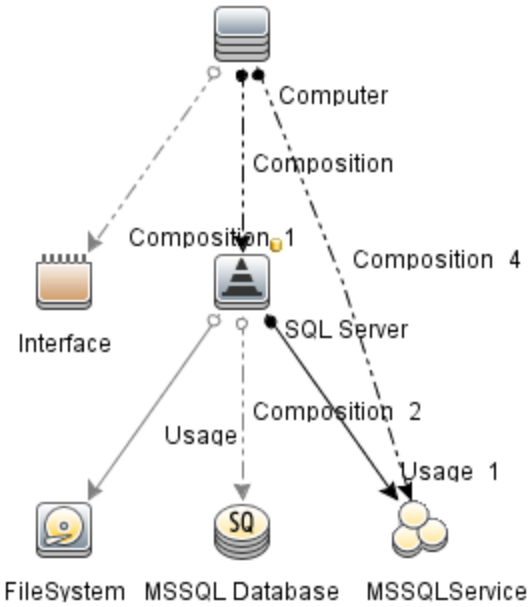
- **MSSQL_Network_Deployment:** This view shows the SQL Server, File System, Node, and Interface CI type. The following image shows the relationship among the CI types.



  - **MSSQL_Cluster_Deployment:** This view shows the cluster deployment and shows the FailoverCluster CIT.



- **MSSQL_Database_Deployment**: This view shows the database deployment and shows the SQL Server CIT.



Health Indicators

Health Indicators (HIs) analyze the events that occur in Microsoft SQL Server CIs and report the health of the Microsoft SQL Server CIs. The OMi MP for Microsoft SQL Server includes the following HIs to monitor Microsoft SQL Server-related events:

How to Access Health Indicators

1. Open the Indicators pane:

   On BSM 9.2x, click **Admin > Operations Management > Monitoring > Indicators**.

   On OMi 10.x, click **Administration > Service Health > CI Status Calculation > Health- and Event Type Indicators**.

2. In the CI Type pane:
   - For SQL Server, click **ConfigurationItem > InfrastructureElement > RunningSoftware > Database > SQL Server**.
   - For MSSQL Database, click **ConfigurationItem > InfrastructureElement > Application Resource > Database Resource > Database Schema > MSSQL Database**.

CI Type	HI	Description	Value/Severity
SQL Server	SQL Server Databases Data File Size	Indicates the cumulative size of all the data files in the database including any automatic growth	Normal/NORMAL, High/MAJOR
	SQL Server Cursor Memory Usage	Indicates amount of memory consumed by cursors.	Normal/NORMAL, High/MAJOR
	SQL Server Database Active Transactions	Indicates the number of active transactions with the database.	Normal/NORMAL, High/WARNING
	SQL Server Service Status	Indicates the availability of a SQL Server Service that corresponds to a given SQL Server Instance.	Up/NORMAL, Down/CRITICAL
	Database Mirroring	Indicates the delay in waiting for unterminated commit acknowledgment.	Normal/NORMAL, High/MAJOR

CI Type	HI	Description	Value/Severity
	Transaction Delay		
	Database FileGroup Space Usage Level	Indicates availability of a database in the SQL Server Instance as the percentage of space used per filegroup per database and the percentage of space available per filegroup per database.	Normal/NORMAL, Medium/MAJOR, High/CRITICAL
	Lock Memory Used Pct	Indicates percentage of used lock memory.	normal/NORMAL, Full_ Capacity/WARNING, High/CRITICAL
	Runnable Workers Ratio	Indicates the ratio between SQL Server worker threads currently running and worker threads potentially runnable. A ratio above 100.00 means more worker threads are currently running than runnable threads.	Normal/NORMAL, FullCapacity/WARNING, High/CRITICAL
	Database Status	Indicates the availability of a database in an SQL Server Instance	Up/NORMAL, Down/CRITICAL
	MSSQL Server Transaction Rate	Indicates the rate of transactions for the MSSQL database server.	Normal/NORMAL, High/MINOR
	Cache Performance	Indicates cache hit percentage.	Normal/NORMAL, Low/WARNING
SQL Server	MSSQL Server CPU Usage by SQL	Indicates the MSSQL SQL statements with high CPU time for each execution.	Normal/NORMAL, High/WARNING
	Database Space Usage Level	Indicates availability of Database in the SQL Server Instance as the percentage of database space used	Normal/NORMAL, High/CRITICAL
	Locks in Use Percentage	Indicates percentage total locks currently held to the total number of locks configured for SQL Server.	Normal/NORMAL, High/CRITICAL
	Users Connected Percentage	Indicates percentage of the current user connections to the total number of user connections configured for SQL Server.	Normal/NORMAL, High/CRITICAL, Medium/MAJOR
	Database Latch Wait	Indicates the performance of a SQL Server instance based on number of latch waits	Normal/NORMAL, High/MINOR

CI Type	HI	Description	Value/Severity
	Rate		
	MSSQL Server Status	Indicates the availability of the MSSQL server.	Up/NORMAL, Down/CRITICAL
	Virtual Device Space Usage Level	Indicates percentage of space used on a virtual device.	High/CRITICAL, Normal/NORMAL, Medium/MAJOR
	MSSQL Server Replication Status	Indicates the server replication status of the MSSQL server.	Up/NORMAL, Broken/MAJOR, Failed/CRITICAL
	Database Lock Timeout Rate	Indicates the performance of a SQL Server instance based on the rate of deadlocks in the database.	Normal/NORMAL, High/MINOR
	Database Reads Outstanding	Indicates the performance of a SQL Server that is instance based on the number of outstanding read requests sent to the host operating system.	Normal/NORMAL, High/WARNING
SQL Server	SQL Server Databases Transaction Rate	Indicates the number transactions started for the database per second.	Normal/NORMAL, High/MINOR
	Transaction Log Usage Level	Indicates the availability of an SQL Server instance as affected by the percentage of transaction log space used	Normal/NORMAL, High/MAJOR
	Database Deadlock Rate	Indicates the performance of a SQL Server instance based on the rate of deadlocks in the database.	Normal/NORMAL, High/MAJOR
	SQL Server Active Cursor	Indicates the active cursors of the Microsoft SQL Server.	Normal/NORMAL, High/MAJOR
	MSSQL Server SQL Query Performance	Indicates MSSQL SQL statements with high elapsed time per execution	Normal/NORMAL, Low/MAJOR
	Database Writes	Indicates the performance of a SQL Server instance based on the number of	Normal/NORMAL, High/WARNING

CI Type	HI	Description	Value/Severity
	Outstanding	outstanding write requests to the host operating system.	
	Lock Wait Rate	Indicates number of lock requests per second that could not be satisfied immediately and required the caller to wait, for all object types combined: Extent, Key, Page, Table, RID, Database.	Normal/NORMAL, High/WARNING
	Full Text Status	Indicates the status of the Full Text Search.	Up/NORMAL, Down/MAJOR
MSSQL Database	MSSQL Database Status	Indicates the availability of a MSSQL database in an SQL Server Instance.	Up/NORMAL, Down/CRITICAL
	MSSQL Database Space Usage Level	Indicates availability of a database in the SQL Server Instance based on the percentage of used database space.	Normal/NORMAL, High/CRITICAL
	MSSQL Database FileGroup Space Usage Level	Indicates availability of a database in the SQL Server Instance as the percentage of space used per filegroup per database and the percentage of space available per filegroup per database.	Normal/NORMAL, Medium/MAJOR, High/CRITICAL
	MSSQL Database Transaction Rate	Indicates the rate of transactions for the MSSQL database.	Normal/NORMAL, High/MINOR
	MSSQL Database Transaction Log Usage Level	Indicates the availability of an SQL Server instance as affected by the percentage of transaction log space used in MSSQL database.	Normal/NORMAL, High/MAJOR

Event Type Indicators

Event Type Indicators (ETIs) are categorization of events based on the type of occurrence. The OMi Management Pack for Microsoft SQL Server includes the following ETIs to monitor Microsoft SQL Server-related events:

How to Access Event Type Indicators

1. Open the Indicators pane:

   On BSM 9.2x, click **Admin > Operations Management > Monitoring > Indicators**.

   On OMi 10.x, click **Administration > Service Health > CI Status Calculation > Health- and Event Type Indicators**.

2. In the CI Type pane:
   - For SQL Server, click **ConfigurationItem > InfrastructureElement > RunningSoftware > Database > SQL Server**.
   - For MSSQL Database, click **Configuration Item > Infrastructure Element > Application Resource > Database Resource > Database Schema > MSSQL Database**.

CI Type	ETI	Description	Value/Severity
SQL Server	Database Mirroring Status	Indicates mirroring state of the SQL Server	Normal/NORMAL, UnrestoredLog/MAJOR, Suspended/WARNING, UnsentLog/MAJOR
	Inactive Database Connections	Indicates the number of total connections that are active versus sleeping in a SQL Server instance	Normal/NORMAL, High/WARNING
	MSSQL Server SQL Query Tuning	Indicates the MSSQL Server SQL statements with low query tuning.	Low/MAJOR, Normal/NORMAL
	SQL Server Disk ReadWrite Errors	Indicates SQL Server disk read/write errors	Normal/NORMAL, High/WARNING
SQL Server	Merge Conflicts	Indicates the number of conflicts per second during Publisher or Subscriber upload and download in a SQL Server instance	Normal/NORMAL, Medium/WARNING, High/MAJOR
	Synchronize State Of DB	Indicates the synchronised state of the SQL Server database.	Synchronised/NORMAL, Asynchronised/WARNING
	SQL ReCompilation	Indicates the SQL recompilation.	Normal/NORMAL, High/WARNING
	Auto Update Statistics Asynchronously Setting	Indicates the Auto Update Statistics Asynchronously setting.	Normal/NORMAL, High/WARNING
	Blocked Processes	Indicates the Blocked Processes setting.	Normal/NORMAL, High/WARNING

CI Type	ETI	Description	Value/Severity
	Replica Connection State	Indicates the connection state of Replica.	Connected/NORMAL, Disconnected/WARNING
	Data Movement	Indicates the Data Movement.	Unsuspended/NORMAL, Suspended/WARNING
	Database Schema	Modification of database schema event type indicator.	Normal/NORMAL, High/MAJOR
	Auto Create Statistic Setting	Indicates the Auto Create Statistic Setting.	Normal/NORMAL, High/WARNING
	Number of Ad Hoc Queries	Indicates the Ad hoc queries.	Normal/NORMAL, High/MAJOR
	Long Running Jobs	Indicates the Long Running Jobs.	Normal/NORMAL, High/WARNING
SQL Server	Blocking Sessions	Indicates the Blocking Sessions.	Normal/NORMAL, High/CRITICAL
	Join State Of DB	Join State of DB	Joined/NORMAL, UnJoined/WARNING
	Database Backup	Indicates the database backup.	Normal/NORMAL, High/MAJOR
	Full Text Batches	Indicates the full text search population batches.	Normal/NORMAL, High/WARNING
	Principal System Admin Roles	Indicates the main System Admin roles.	Normal/NORMAL, High/MAJOR
	Free Thread Count	Indicates the Free Thread Count.	Normal/NORMAL, Low/CRITICAL
	Replica Role	Role of Replica	Valid/NORMAL, Invalid/WARNING
	Full Text Space	Indicates the Full Text Space.	Normal/NORMAL, High/MAJOR
	Auto Close Setting	Indicates the Auto Close setting.	Normal/NORMAL, High/WARNING
	Memory Consumption	Memory Consumption ETI	Normal/NORMAL, High/MAJOR
	Failover Ready	Replica available for failover ready	Available/NORMAL, Unavailable/WARNING
	Auto Update	Auto Update Statistics Setting	Normal/NORMAL,

CI Type	ETI	Description	Value/Severity
	Statistics Setting		High/WARNING
	Auto Shrink Setting	Auto Shrink Setting	Normal/NORMAL, High/WARNING
MSSQL Database	MSSQL Database Mirroring Status	Indicates mirroring state of the SQL Server database	Normal/NORMAL, Suspended/WARNING, Unrestored_Log/MAJOR, Unsent_Log/MAJOR

Note: The CITs from HP Operations Manager (HPOM) are mapped to Run-time Service Model (RTSM) in OMi using the OMi MP for Microsoft SQL Server.

Topology Based Event Correlation (TBEC) Rules

The OMi MP for Microsoft SQL Server includes the following rules to correlate Microsoft SQL Server-related events.

For more information on how the correlation rules work, see the *Operations Manager i Concepts Guide*.

How to Access TBEC Rules

On BSM 9.2x, click **Admin > Operations Management > Event Correlation > Topology-Based Event Correlation**.

On OMi 10.x, click **Administration > Event Processing > Correlation > Topology-Based Event Correlation**.

Database::FileSystem:SQLServer Space Usage Level HIs > Disk Usage Level

Description: Correlates the high usage of Virtual Device Space by Microsoft SQL Server to near capacity disk usage level of FileSystem		
Cause		
CIT: SQL server	ETI: Database Space Usage Level	Value: High
Symptom		
CIT: File System	ETI: Disk Usage Level	Value: Near Capacity

Database::FileSystem:SQLServer Transaction Log Usage Level Hls >> Disk Usage Level

Description: Correlates the high usage of Virtual Device Space by Microsoft SQL Server to near capacity disk usage level of FileSystem		
Cause		
CIT: SQL server	ETI: Transaction Log Usage Level	Value: High
Symptom		
CIT: File System	ETI: Disk Usage Level	Value: Near Capacity

Database::FileSystem:SQLServer Virtual Device Space Usage Level Hls >> Disk Usage Level

Description: Correlates the high usage of Virtual Device Space by Microsoft SQL Server to near capacity disk usage level of FileSystem		
Cause		
CIT: SQL server	ETI: Virtual Device Space Usage Level	Value: High
Symptom		
CIT: File System	ETI: Disk Usage Level	Value: Near Capacity

Database::FileSystem:SQLServer FileGroup Space Usage Level Hls >> Disk Usage Level

Description: Correlates the high usage of Virtual Device Space by Microsoft SQL Server to near capacity disk usage level of FileSystem		
Cause		
CIT: SQL server	ETI: Database FileGroup Space Usage Level	Value: High
Symptom		
CIT: File System	ETI: Disk Usage Level	Value: Near Capacity

Database::Interface: InterfaceCommunicationStatus >> SQLServer Database Packet Error

Description: Correlates Interface Communication Status of node to Microsoft SQL Server Database Packet Error		
Cause 1		
CIT: Interface	ETI: Interface Communication Status	Value: Unavailable
Cause 2		

Description: Correlates Interface Communication Status of node to Microsoft SQL Server Database Packet Error		
CIT: Interface	ETI: Interface Discard Rate	Value: High
Cause 3		
CIT: Interface	ETI: Interface Error Rate	Value: High
Symptom		
CIT: SQL Server	ETI: SQL Server Disk Read Write Errors	Value: High

Operations Orchestration Flows

Operations Orchestration (OO) provides OO flows that enable IT process automation and run book automation. For more information, see the *HPE Operations Orchestration* documentation.

When creating the mapping for the OO flows, you can set default values for the attributes listed in the following table. You need not specify these values each time you run the OO flows.

How to upload OO flows

To upload OO Flows from OMi MP for Microsoft SQL Server, follow these steps:

1. In BSM 9.2x, go to the directory:

   `<HPBSM_Root_Directory>/conf/opr/oo`

2. Copy the required OO JAR file to a temporary location on a system where OO Studio (version 07.51.02 or greater) is installed.

   The file names can be one of the following:

   `HPOprOO<content_name>.jar`

   For HP OO Studio version 09.00:

   `HPOprOOMss90.jar` for Microsoft SQL Server

   To install and upload the OO flows run the command:

   ```
   java -jar -Xmx1024m "<temp>/HPOprOO<content_name>" -centralPassword
   <centralpassword>
   ```

   For example:

```
java -jar -Xmx1024m "<temp>/HPOprOOMss90" -centralPassword <centralpassword>
```

> **Note:** If the admin user in OO is not the default user, another parameter is required. For further details about installing content and the options available, see the OO Software Development Kit Guide.

Using OO Studio, the uploaded OO flows can be accessed under:

../Library/Operations Management/..

3. From OMi 10.x, complete the mapping of OO flows to CIs and map the OO flow input variables to CI attributes using:

   On BSM 9.2x, click **Admin > Integration > Operations Orchestration**.

   On OMi 10.x, click **Administration > Operations Console > Run Books Mapping**.

Attribute	Description
omServerPort	Port number of the OM Tool WS.
omServerUser	User name for the OM Server that will be used in the OM Tool WS.
omServerPassword	Password for the OM Server that will be used in the OM Tool WS.

The following section lists the Microsoft SQL Server OO flows:

SQL Server Health Check

You can use this flow to check the health of a Microsoft SQL Server. The flow checks if the value of **% of Current Users Connected** for Microsoft SQL Server is above the specified threshold.

> **Note:** You can run this flow only on the Microsoft SQL Server, which is monitored by OM Smart Plug-in for Microsoft SQL Server.

You must map this flow to the CIT **sqlserver**.

The following table lists the user input items when executing this OO flow.

Flow input	Description
omNode	FQDN of the node. This must be a managed node for the OM Server and must be specified each time you run the OO flow.
sqlServerName	Name of the Microsoft SQL Server.
SqlConnectionPCT_Threshold	The threshold value of **% of Current Users Connected** for the Microsoft SQL Server. This is an optional attribute and the default value is 98.

Flow input	Description
timeout	Timeout value to be used when running the remote command on the node. This is an optional attribute and the default value is 100000.
omServer	FQDN of the OM Server. You can map this input to the Event attribute **Originating Server**.

SQL Server Performance Check

You can use this flow to check the performance of a Microsoft SQL Server. This flow checks for the following:

- If the Microsoft SQL Server CPU Utilization is above the specified threshold.
- If the Microsoft SQL Server Cache Hit Percentage is below the specified threshold.
- If the Microsoft SQL Server Lock Wait Rate is above the specified threshold.
- If the Microsoft SQL Server Writes Outstanding Rate is above the specified threshold.
- If the Microsoft SQL Server Reads Outstanding Rate is above the specified threshold.

> **Note:** You can run this flow only on the Microsoft SQL Server, which is monitored by OM Smart Plug-in for Microsoft SQL Server.

You must map this flow to the CIT **sqlserver**.

The following table lists the user input items when executing this OO flow.

Flow input	Description
omNode	FQDN of the node. This must be a managed node for the OM Server and must be specified each time you run the OO flow.
ServerWriteOutstanding_ Threshold	Threshold value of **Writes Outstanding Rate** for Microsoft SQL Server. This is an optional attribute.
ServerReadOutstanding_ Threshold	Threshold value of **Reads Outstanding Rate** for Microsoft SQL Server. This is an optional attribute.
ServerCPU_PCT_ Threshold	Threshold value of **% CPU Time Used** by Microsoft SQL Server. This is an optional attribute.
ServerCacheHitPCT_ Threshold	Threshold value (minimum) of **Cache Hit Percentage** for Microsoft SQL Server. This is an optional attribute.
ServerLockWaitRate_ Threshold	Threshold value of **Locks Wait Rate** for Microsoft SQL Server. This is an optional attribute.

Flow input	Description
timeout	Timeout value to be used when running the remote command on the node. This is an optional attribute and the default value is 100000.
sqlServerName	Name of the Microsoft SQL Server.
omServer	FQDN of the OM Server. You can map this input to the Event attribute **Originating Server**.

Graph Templates

Graphs represent pictorial representation of metrics. The graphs are generated from the **DBSPI_MSS_GRAPH**, **DBSPI_MSS_REPORT, DBMP_MSS_GRAPH,** and **MSSQLSERVER_DATA** data sources. For information about creating and viewing graphs, see the Performance Graphing section available in the *HPE Operations Manager i* documentation. The OMi MP for Microsoft SQL Server includes the Microsoft SQL Server graph family, which is mapped to the SQL Server CIT.

The following table lists the graph templates present in the OMi MP for Microsoft SQL Server graph family and the mapped policies.

Graph Templates	Class Name/ Metric Name	Policy Description
Buffer Manager Performance Counters	BFRMGR_PGRDP_SEC	Shows the number of physical database page reads issued.
	BFRMGR_PGWRTP_SEC	Shows the number of physical database page writes issued.
	BFRMGR_CHKPNTPGP_SEC	Shows the number of pages flushed by checkpoint or other operations that require all dirty pages to be flushed.
	BFRMGR_LZYWRTP_SEC	Shows the number of buffers written by buffer manager's lazy writer.
Data Access	DBSPI_MSS_GRAPH / M051_FULLSCANSRATE	Shows the Full Scans rate.
	DBSPI_MSS_GRAPH / M052_INDXSEARCHSRATE	Shows the Index searches rate.
	DBSPI_MSS_GRAPH / M053_PGESALLOCTDRATE	Shows the Pages allocated rate.

Graph Templates	Class Name/ Metric Name	Policy Description
	DBSPI_MSS_GRAPH / M054_EXTNTSALLOCRATE	Shows the Extents allocated rate.
	DBSPI_MSS_GRAPH / M055_PAGESPLITSRATES	Shows the Page splits rates.
	DBSPI_MSS_GRAPH / M056_TBLLCKESCALRATE	Shows the Table lock escalation rate.
Errors	DBSPI_MSS_GRAPH / M023_READWRITEERRCNT	Shows the number of SQL Server read or write errors since the last probing.
	DBSPI_MSS_GRAPH / M024_PACKERERRORCNT	Shows the number of packet errors while reading or writing packets.
	DBSPI_MSS_GRAPH / M028_SUSPECTDBCNT	Shows the number of databases marked as suspect.
IO Utilization	DBSPI_MSS_GRAPH / M007_READSOUTSTDRATE	Shows the number of read requests issued to OS that are not completed.
	DBSPI_MSS_GRAPH / M008_WRITSOUTSTDRATE	Shows the number of write requests issued to the OS not completed.
Latches	DBSPI_MSS_GRAPH / M068_LATCHWAITSRATE	Shows the number of latch requests that was not immediately granted and had to wait before being granted.
	DBSPI_MSS_GRAPH / M069_AVGLATCHWAITTIM	Shows the average latch wait time for latch requests that had to wait from the time server started.
	DBSPI_MSS_GRAPH / M076_CURAVGWAITLATCH	Shows the average latch wait time for latch requests that had to wait during the current collection interval.
Least Recently Used	DBSPI_MSS_GRAPH / M001_CACHEHITPCT	Shows the percentage of times a data page is found in the cache.
	DBSPI_MSS_GRAPH / M002_CACHEFREEBUFPCT	Shows the percentage of free buffer in cache.
Lock Requests	DBSPI_MSS_GRAPH / M070_LOCKTIMEOUTRATE	Shows the Lock timeout rate.
	DBSPI_MSS_GRAPH / M071_DEADLOCKSRATE	Shows the Deadlocks rate.
	DBSPI_MSS_GRAPH / M072_LOCKSWAITRATE	Shows the Locks wait rate.

Graph Templates	Class Name/ Metric Name	Policy Description
	DBSPI_MSS_GRAPH / M073_LOCKAVGWAITTIME	Shows the Average lock wait time.
Locks and its Memory Utilization	DBSPI_MSS_GRAPH / M013_LOCKSINUSEPCT	Shows the Percentage of locks in use.
	DBSPI_MSS_GRAPH / M075_LOCKMEMORYPCT	Shows the Percentage of lock memory in use.
Memory Database Pages	BFRMGR_DB_PAGES	Shows the total memory the server has saved for the SQL objects.
Memory Pages	MEM_PGSPRSEC	Shows the number of pages read from or written to disk.
Memory Performance	MEMMGR_TTLSVRMMRY	Shows the number of database pages (buffer manager) currently occupied in the data cache.
	MEMMGR_STLNSRVRMEM	Shows the amount of memory the server is currently using for purposes other than the database pages.
Processes and Transactions Status	M014_BLCKDPROCESSCNT	Shows the number of blocked processes.
	M064_DBACTIVTRANSCNT	Shows the number of active transactions for the entire server.
Server Status	DBSPI_MSS_GRAPH / M017_CMDQUEUELENPCT	Shows the percentage of the command queue length used.
	DBSPI_MSS_GRAPH / M025_CPUUSEDPCT	Shows the percentage of the CPU time used by SQL server.
	DBSPI_MSS_GRAPH / M074_BATCHREQSTSRATE	Shows the Batch requests rate.
Transactions	DBSPI_MSS_GRAPH / M009_TRANSACTIONRATE	Shows the Server transaction rate
	DBSPI_MSS_GRAPH / M066_ DBLOGGROWTHSCNT	Shows the number of the log expansions for the server.
Users	DBSPI_MSS_GRAPH / M011_USERCONNECTPCT	Shows the percentage of the current users connected.
	DBSPI_MSS_GRAPH / M026_ACTIVECONNTNPCT	Shows the percentage of the total connections that are active and sleeping.

Graph Templates	Class Name/ Metric Name	Policy Description
	DBSPI_MSS_GRAPH / M031_NUMUSERSCNT	Shows number of users.

Tools

The OMi MP for Microsoft SQL Server contains the following tools mapped to the SQL Server CIT and the Database Operational Tools category. It comprises the following tools:

How to Access Tools

1. Open the Tools pane:

   On BSM 9.2x, click **Admin > Operations Management > Operations Console > Tools**.

   On OMi 10.x, click **Administration > Operations Console > Tools**.

2. In the CI Types pane:
   - For SQL Server CIs, click **ConfigurationItem > InfrastructureElement > RunningSoftware > Database > SQL Server**.
   - For Computer CIs, click **ConfigurationItem > InfrastructureElement > Node > Computer**.

CI Type	Category	Tool	Description
SQL Server	Microsoft SQL Server Operational Tools	Active Connections	Checks the percentage of total connections that are active versus sleeping for Microsoft SQL Server that are configured to OMi MP for Microsoft SQL Server.
		Buffer Cache Size	Shows the size (MB) of buffer cache (RAM) dedicated to each database.
		Connection	Checks the

CI Type	Category	Tool	Description
		Check	connection of all the Microsoft SQL Servers configured and monitored using OMi MP for Microsoft SQL Server.
SQL Server	Microsoft SQL Server Management Pack Operational Tools	Create User Using Domain Login	Helps in creating users for the Microsoft SQL Server using the domain login to connect to the Microsoft SQL Server.
		Create User Using Microsoft SQL Server Authentication	Helps in creating users for the Microsoft SQL Server using the Microsoft SQL Server Authentication to connect to the Microsoft SQL Server.
		Create User Using Windows Authentication	Helps in creating users for the Microsoft SQL Server using the Microsoft SQL Server Windows Authentication to connect to the Microsoft SQL Server.
SQL Server	Microsoft SQL Server Operational Tools	Database Integrity	Shows the Database Integrity errors.
		Databases Status	Checks the database status for Microsoft SQL Server that is

CI Type	Category	Tool	Description
			monitored using OMi MP for Microsoft SQL Server.
		Failed SQL Logins	Shows the number of failed SQL Logins
		Filegroup Space Usage	Checks the space used per filegroup per database of Microsoft SQL Server that are configured and monitored using OMi MP for Microsoft SQL Server.
		Identity Columns Near Limit	Shows the number of Identity Columns Near Limit for each database to avoid system database integrity.
		Last Restore Time	Shows the last restore time of the database to avoid risk of losing valuable data.
		Locks Wait Rate	Checks the locks wait rate for Microsoft SQL Server that are configured and monitored using OMi MP for Microsoft SQL Server.
		Microsoft SQL Server Documents	Starts a web browser and connects to the Microsoft SQL

CI Type	Category	Tool	Description
			Server product manuals web site.
		Mirroring Status	Checks the mirroring state of Microsoft SQL Server that are configured and monitored using OMi MP for Microsoft SQL Server.
		Network Statistics	Checks the network statistics of Microsoft SQL Server that is monitored using OMi MP for Microsoft SQL Server.
		Out of Memory Errors	Shows the number of out of memory errors
		Outstanding Population Batches	Shows all outstanding population batches for the fullest catalog.
		Processes Blocked	Checks the blocked processes of Microsoft SQL Server that are configured and monitored using OMi MP for Microsoft SQL Server.
SQL Server	Microsoft SQL Server Operational Tools	Replication Agents Status	Checks the replication agent status of Microsoft SQL Servers that are configured and monitored using

CI Type	Category	Tool	Description
			OMi MP for Microsoft SQL Server.
		Replication Latency	Checks the replication latency status of Microsoft SQL Server that is configured for OMi MP for Microsoft SQL Server.
		Server Statistics	Displays statistics of Microsoft SQL Servers that are configured using OMi MP for Microsoft SQL Server.
		Server Status	Displays status of Microsoft SQL Servers that are configured using OMi MP for Microsoft SQL Server.
		Transaction Log Space Usage	Checks the percentage of transaction log space used for each of the Microsoft SQL Server database that is configured using OMi MP for Microsoft SQL Server.
		Transactions Active	Checks the active transactions for the Microsoft SQL Servers.
		Untrusted Check Constraints	Shows the number of untrusted check constraints. These

CI Type	Category	Tool	Description
			constraints can affect efficiency of query plan and database integrity.
		Users Connected	Checks the current users connected to Microsoft SQL Server that are configured using OMi MP for Microsoft SQL Server.
SQL Server		Virtual Device Space Usage	Checks the space utilization of a specific virtual device for Microsoft SQL Server configured using OMi MP for Microsoft SQL Server.
		Replica Role	Shows role of availability replica.
		Connection State between Availability Replica	Shows the connection state between availability replica.
		FailOver Mode of Secondary Replica	Shows whether the availability group has at least one secondary replica which is failover ready.
		Join State of Database	Shows join state of database replica.
		State of Data Movement	Shows state of data movement of the database replica.

CI Type	Category	Tool	Description
		Synchronization State of Database	Shows data synchronization state of database replica.
Computer	Microsoft SQL Server Operational Tools	Active Jobs (Microsoft SQL Server)	Shows all jobs that are active for Microsoft SQL Server.
		All Jobs (Microsoft SQL Server)	Shows all jobs with status such as the *active*, *idle*, *suspended*, and *completed* for Microsoft SQL Server.
Computer	Microsoft SQL Server Management Pack Operational Tools	Disable MP Monitoring (Microsoft SQL Server)	Disables OMi MP for Microsoft SQL Server collection and alert notification.
		Disable MP Trace (Microsoft SQL Server)	Turns OMi MP for Microsoft SQL Server tracing off.
		Enable MP Monitoring (Microsoft SQL Server)	Enables OMi MP for Microsoft SQL Server collection and alert notification.
		Enable MP Trace (Microsoft SQL Server)	Turns OMi MP for Microsoft SQL Server tracing on.
Computer	Microsoft SQL Server Operational Tools	List instances (Microsoft SQL Server)	List of installed Microsoft SQL Server instances.
Computer	Microsoft SQL Server Management Pack Operational Tools	MP Data Capture Tool (Microsoft SQL Server)	Collects error and log information that can be sent to HPE Support for troubleshooting.

CI Type	Category	Tool	Description
Computer	Microsoft SQL Server Operational Tools	NT Services (Microsoft SQL Server)	Shows NT Services that are running.
Computer	Microsoft SQL Server Management Pack Operational Tools	Verify MP Deployment (Microsoft SQL Server)	Shows OMi MP for Microsoft SQL Server deployed files, versions, number of policies, default files, and performs a connection check.
		View MP Error File (Microsoft SQL Server)	Displays the contents of OMi MP for Microsoft SQL Server error file.

The following HA-DR Tools are supported from MSSQL Server 2012 onwards:

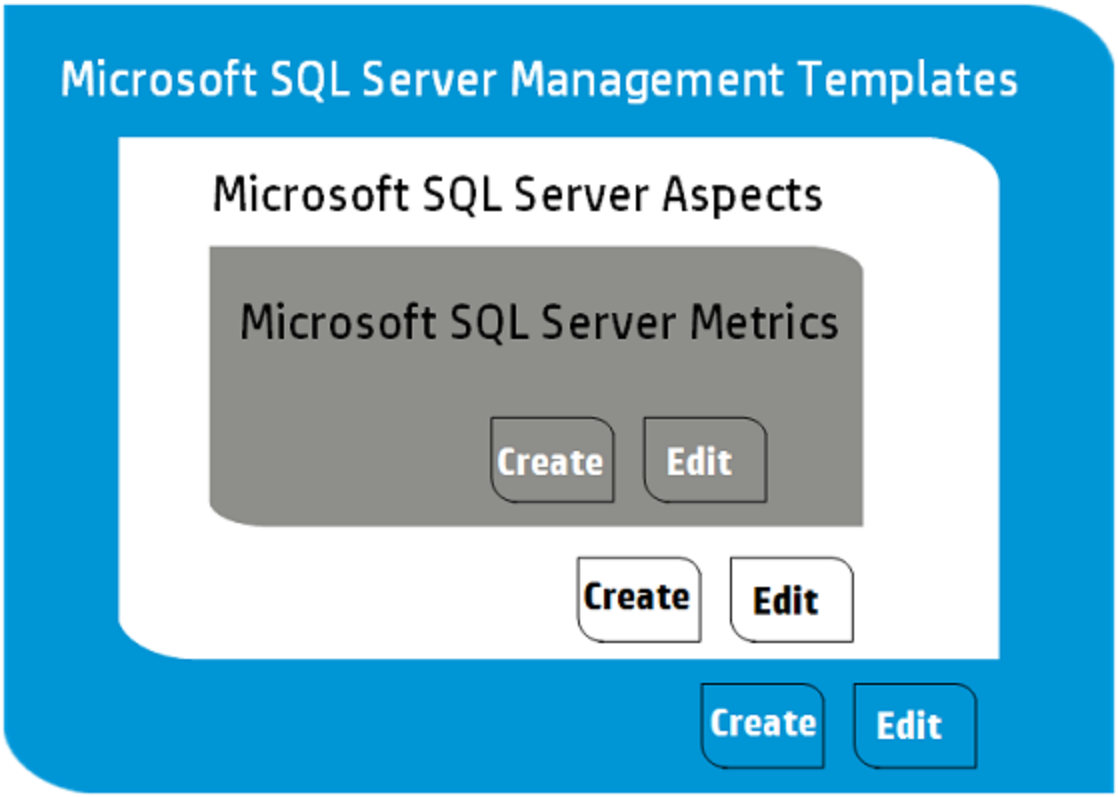
- Connection State Between Availability Relica
- FailOver Mode of Secondary Replica
- Join State of Database
- Replica Role
- State of DataMovement
- Synchronization State of Database

Chapter 4: Customizing OMi MP for Microsoft SQL Server

The OMi MP for Microsoft SQL Server can be customized to suit your monitoring requirements. You can edit the existing Microsoft SQL Server Management Templates or create new Microsoft SQL Server Management Templates to monitor any database environment.

This section provides information about the following:

- Tuning Components of OMi MP for Microsoft SQL Server
- Creating a new Management Template with SQL Server Aspects
- Creating a new aspect with SQL Server policies
- Creating New User Defined Metrics (UDM)



Tuning Components of OMi MP for Microsoft SQL Server

You can tune the following components:

- Parameters
- Aspects
- Management Templates

Tuning Parameters

You can edit the following list of parameters:

Parameters	Default Values
Frequency of Very High Scheduler	5 mins
Frequency of High Scheduler	15 mins
Frequency of Medium Scheduler	1 hour
Frequency of Low Scheduler	24 hours
Frequency	NA **Note:** When the value of Frequency parameter is set to NORUN, that specific Policy Template, Management Template, or Aspect will not be monitored for the duration the Frequency value is NORUN.
Threshold	NA
Frequency	NA

For modifying the frequency of collection, corresponding Schedule Task policy must be modified. For modifying the individual policy schedule, corresponding frequency parameters must be modified.

Advanced Data Collection Filters

Filters are typically used to prevent unnecessary alerts or messages. For example, you have “database” which you would not want to monitor and generate alerts or messages. In such cases, you can use filters to exclude some data from being collected and, as a result, prevent the unwanted messages. You can set up filters for Microsoft SQL Server using the SQL WHERE clause fragments during the Management Template or Aspect deployment.

Following is the list of filter parameters that you can edit:

Policy	Filter Parameter Label	Parameter Description and Example
MSSQLServer_3033	Database Filter to Ignore Backup	Filter Database object for which backup is not considered. Mention Database name to skip. Ex: name not in ('master','model')
MSSQLServer_3234 Filter Database object.	Transaction Log Backup Filter	Mention Database name to skip. Ex: name not in ('master','model')
MSSQLServer_3233	Database Backup Filter	Filter Database object. Mention Database name to skip. Ex: name not in ('master','model')
MSSQLServer_3227	Physical Input or Output Used Filter	Filter Login name. Mention login name to skip. Ex: loginame not in ('sa', 'sys')
MSSQLServer_3277	Completed Jobs Filter	Filter System job name. Mention job name to skip. Ex: name != 'Test'
MSSQLServer_3272	Lock Timeout Rate Filter (DrillDown)	Filter Database object type: (Extent, Key, Page, Table, RID, Database). Mention Instance name to skip. Ex: instance_name != 'RID'
MSSQLServer_3271	Deadlock Rate per Object Type Filter (DrillDown)	Filter Database object type: (Extent, Key, Page, Table, RID, Database). Mention Instance name to skip. Ex: instance_name != 'RID'
MSSQLServer_3270	Lock Timeout Rate Filter (DrillDown)	Filter Database object type: (Extent, Key, Page, Table, RID, Database). Mention Instance name to skip. Ex: instance_name not in ('master')
MSSQLServer_3273	Average Lock Wait Time Filter (DrillDown)	Filter Database object type: (Extent, Key, Page, Table, RID, Database). Mention Instance name to skip. Ex: instance_name != 'RID'

Policy	Filter Parameter Label	Parameter Description and Example
MSSQLServer_3215	Virtual Device Space Used Filter	Filter Virtual Device name. Mention virtual device name to skip. Ex: name not like 'MSDB%'
MSSQLServer_3216	Transaction Log Space Used Filter	Filter database object. Mention instance name to skip. Ex: instance_name not in ('master', 'pubs')
MSSQLServer_3218	Database Space Used Filter	Filter database object. Mention database name to skip. Ex: name not in ('master', 'model')
MSSQLServer_3278	Space Used per Filegroup and Database Filter	Filter database object. Mention database name to skip. Ex: name not in ('master', 'model')
MSSQLServer_3279	Filegroup Free Space Filter	Filter database object. Mention database name to skip. Ex: name not in ('master', 'model')
MSSQLServer_3209	Database Transaction Rate Filter (DrillDown)	Filter database object. Mention instance name to skip. Ex: instance_name not in ('master','pubs')
MSSQLServer_3264	Database Active Transactions Count Filter (DrillDown)	Filter Database object. Mention Instance name to skip. Ex: instance_name not in ('master')
MSSQLServer_3266	Transaction Log Growth Count Filter (DrillDown)	Filter Database object. Mention Instance name to skip. Ex: instance_name not in ('master')
MSSQLServer_3267	Transaction Log Shrinks per Database Filter (DrillDown)	Filter Database object. Mention Instance name to skip. Ex: instance_name not in ('master')
MSSQLServer_3230	Database Connection Filter (DrillDown)	Filter Database object. Mention Database name to skip. Ex: name not in ('master', 'model', 'pubs')

After Deploying the Microsoft SQL Server Management Templates or Aspects

1. Open the Assignments & Tuning pane:

   On BSM 9.2x, click **Admin > Operations Management > Monitoring > Assignments & Tuning**.

   On OMi 10.x, click **Administration > Monitoring > Assignments & Tuning**.

2. In the **Browse Views** tab, select the **MSSQL_Deployment** that contains the CI for which you want to edit the value.

3. In the list of CIs, select **MSSQL Database** CI for which you want to change the threshold. The Assignment Details pane shows the current parameter values.

You can change the value of the default parameter values by following these steps:

1. Double-click the **Suspect Database count Threshold** parameter. The Edit Parameter dialog box opens.
2. Change the value and click **OK**. The updated parameter is assigned to the selected CIs.

Tuning Microsoft SQL Server Aspects

Based on the monitoring requirements, you can include or exclude policy template to the existing MSSQL Server Aspect. For more information about each policy, see *HPE OMi Management Pack for Microsoft SQL Server Metric Reference Guide*.

SQL Server Roll-Up and Drill-Down Metrics

MSSQL Server *roll-up* policies monitor multiple instances of MSSQL Server databases. MSSQL Server drill-down monitors each instance of the MSSQL Server database. Roll-up policies send one message that could be relevant to multiple MSSQL Server databases.

For example, when the *MSSQLServer_3009* policy, generates a message (alert), that indicates transaction rate for MSSQL Server instance. The MSSQL Server instance name and transaction rate details are provided in the message text as following:

```
Server transactions rate (110/sec) too high (100/sec) for dbserv.
```

Corresponding drill-down policy is *MSSQLServer_3209*, which generates alert for each MSSQL Server database.

The out-of-the-box Aspects contains the roll up policies. Every roll-up metric does not have a corresponding drill-down metric. If you want to understand a specific occurrence of the roll-up, then replace it with the corresponding drill-down policy in the respective Aspect.

Microsoft SQL Server metrics that are relevant to multiple Server objects are called roll-up metrics, while those relevant to each server object are called drill-down metrics. Roll-up metrics send one message that could be relevant to multiple objects. For example, when a message (alert) is sent for roll-up metric 3080, it indicates that a SQL Server instance on the system has one or more failed reports. The message text which is the annotation text is also included with information about failed report.

For example: Number of reports failed 3 too high for <Server1>. For corresponding drill down metric 3080, when a message (alert) is sent it is sent for each failed report.

The following is the list of drill down metrics (corresponding rollup policy name is MSSQLServer_ 30XX):

OMi MP for Microsoft SQL Server provided the following drill down policies.

Aspect	Roll-up policy	Drill-down policy
Microsoft SQL Server Backup	MSSQLServer_3033	MSSQLServer_3233
Microsoft SQL Server Transactions	MSSQLServer_3009	MSSQLServer_3209
	MSSQLServer_3064	MSSQLServer_3264
	MSSQLServer_3066	MSSQLServer_3266
	MSSQLServer_3067	MSSQLServer_3267
Microsoft SQL Server Locks	MSSQLServer_3070	MSSQLServer_3270
	MSSQLServer_3071	MSSQLServer_3271
	MSSQLServer_3072	MSSQLServer_3272
	MSSQLServer_3073	MSSQLServer_3273
Microsoft SQL Server Reports	MSSQLServer_3080	MSSQLServer_3280

> **Note:** It is recommended in a particular instance to monitor using either roll-up or drill-down policy. Do not include both roll-up and drill-down metrics to monitor single instance of the database.

If you want to generate alert for each tablespace as described in the example, then perform the following:

1. Open the Management Templates & Aspects pane:

   On BSM 9.2x, click **Admin > Operations Management > Monitoring > Management Templates & Aspects**.

   On OMi 10.x, click **Administration > Monitoring > Management Templates & Aspects**.

2. In the Configuration Folders pane:

   Configuration Folders > Database Management > Microsoft SQL Server > Microsoft SQL Server Aspects

3. Select the **Microsoft SQL Server Transactions** from the list, and then click  . The Edit Aspect dialog box opens.

4. Click the **Policy Templates** tab.
5. Select the **MSSQLServer_3009** from the policies list and click  .
6. Click  and select **Add Policy Templates From List**.
7. In the list of policies, select **MSSQLServer_3209** policy and click **OK**.
8. In the Edit Aspect dialog box, click **OK**.

The version of the Microsoft SQL Server Management Template is incremented. Deploy the new version of the Aspect.

Tuning Microsoft SQL Server Management Templates

You can edit the Microsoft SQL Server Management Templates and modify the following components:

- Parameters
- SQL Server Aspects

Editing Parameters

Use Case: You are using Essential Microsoft SQL Server Management Template to monitor single instance databases in your environment. You are monitoring the table spaces with low free space in the environment and want to modify the parameters corresponding to tablespaces to closely monitor the free space available.

To closely monitor tablespaces in your environment, you must modify the tablespace parameters - tablespaces with low free space frequency, tablespaces with low free space threshold and tablespaces with low free space severity.

To edit the parameters, follow these steps:

1. Open the Management Templates & Aspects pane:

   On BSM 9.2x, click **Admin > Operations Management > Monitoring > Management Templates & Aspects**.

   On OMi 10.x, click **Administration > Monitoring > Management Templates & Aspects**.
2. In the Configuration Folder pane:

Configuration Folders > Database Management > Microsoft SQL Server > Microsoft SQL Server Management Templates > Essential Microsoft SQL Server Management Template

3. Select the **Essential Microsoft SQL Server Management Template** from the list, and then click  . The Edit Management Template dialog box opens.
4. Click the **Parameters** tab. The list of parameters appear.
5. Double-click the **tablespace** parameter. The Edit/Combine Parameters window appears.

   In this instance, tablespace parameter is tablespaces with low free space frequency, tablespaces with low free space threshold or tablespaces with low free space severity.
6. You can change the default value by using the drop down text. For example, you can change the value of the parameter tablespace with low free space frequency to High from Medium.
7. Click **OK**. The Edit Management Template dialog box opens.
8. Click **OK**. The version of the Microsoft SQL Server Management Template is incremented.

> **Note:** The version number of the Microsoft SQL Server Management Template is incremented when any customizations are made to the Microsoft SQL Server Management Template.

Including Additional Aspects

The Essential and Extensive Microsoft SQL Server Management Template help you to monitor basic areas of Lock Latches, Memory Performance, query performance, object faults, tablespace, and transactions. Based on your monitoring need, you can include or exclude aspect as required to or from the existing Management Template. There are additional aspects not part of the out-of-the-box Management templates. For a list of the complete Microsoft SQL Server Aspects, see List of Microsoft SQL Server Aspects.

- Microsoft SQL Server Processes and Statistics (Add-on)
- Microsoft SQL Server Buffer Manager (Add-on)
- Microsoft SQL Server Jobs (Add-on)
- Microsoft SQL Server Memory and Memory Manager (Add-on)

Use Case: 1 You are monitoring using Extensive SQL Server Management Template and require in-depth monitoring of memory used by the Memory Manager.

1. Open the Management Templates & Aspects pane:

   On BSM 9.2x, click **Admin > Operations Management > Monitoring > Management Templates & Aspects**.

   On OMi 10.x, click **Administration > Monitoring > Management Templates & Aspects**.

2. In the Configuration Folders pane:

   Configuration Folders > Database Management > Microsoft SQL Server > Microsoft SQL Server Management Templates > Extensive Microsoft SQL Server Management Template

3. Select the **Extensive Microsoft SQL Server Management Template** from the list, and then click . The Edit Management Template dialog box opens.

4. Click the **Aspects** tab. The list of Aspects matching the SQL Server CI type appears. You can deploy the Management Template only to this CI type.

5. In the Available Aspects list, select the **Microsoft SQL Server Memory and Memory Manager (Add-on)** Aspect and click .

6. Click **OK**. The version of the Microsoft SQL Server Management Template is incremented.

Creating New Microsoft SQL Server Management Template

1. Open the Management Templates & Aspects pane:

   On BSM 9.2x, click **Admin > Operations Management > Monitoring > Management Templates & Aspects**.

   On OMi 10.x, click **Administration > Monitoring > Management Templates & Aspects**.

2. In the Configuration Folders pane:

   Configuration Folders > Database Management > Microsoft SQL Server

3. In the **General** tab, type a **Name** for the new Microsoft SQL Server Management Template.

   Click **Next**.

4. A Microsoft SQL Server Management Template enables you to manage Microsoft SQL Server configuration items and all the related dependent CIs. Select **MSSQL_Deployment** from the list as the Topology View. The MSSQL_Deployment shows the Microsoft SQL Server CIs and all the

related CI types.

5. Click an item in the topology map to select the **CI Type** of the configuration items that this Management Template enables you to manage. This is the type of CI to which the Management Template can be assigned. For example, you can select Microsoft SQL Server to monitor Microsoft SQL Server databases. Click **Next**.
6. In the **Aspects** tab, add existing aspect **Microsoft SQL Server Base** and then click **OK**. Click **Next**.
7. For each Aspect that you add, you must specify at least one **Target CI**.

   Click an Aspect in the list, and then in the topology map click the CI types you want the Aspect to monitor when this Management Template is assigned. (Press **CTRL** to select several CI types.) Each CI type that you select here must correspond to one of the CI types assigned within the Aspect itself (or a child of one of those CITs). For example, you can select Microsoft SQL Server CI from the topology map.
8. In the **Parameters** tab, you see a list of all the parameters from the Aspects that you added to this Management Template.
   a. Press **CTRL** and click the SQL Server Instance Name parameter.
   b. Click the . The Edit/Combine Parameters dialog box opens.
   c. Type a MSSQL Server Instance Name for the combined parameters.
   d. Optional. Specify a **Description, Default Value,** and whether the combined parameter is **Read Only**, an **Expert Setting**, or **Hidden**.
   e. Click **OK**.

   Similarly combine all the MSSQL Server User Names and MSSQL Server Passwords.

   You can also edit the parameters without combining them, to override the defaults in the Aspects or policy templates. Click one parameter and then click . The Edit/Combine Parameters dialog box opens.
9. In the Create Management Template wizard, click **Finish** to save the Management Template and close the wizard. The new Management Template appears in the Management Templates & Aspects pane.

Creating New Microsoft SQL Server Aspects

1. Open the Management Templates & Aspects pane:

   On BSM 9.2x, click **Admin > Operations Management > Monitoring > Management Templates & Aspects**.

   On OMi 10.x, click **Administration > Monitoring > Management Templates & Aspects**.

2. Click **Configuration Folders > Database Management > Microsoft SQL Server > Microsoft SQL Server Aspects**.

3. In the Management Templates & Aspects pane, click , and then click **Create Aspect**. The Add New Aspect dialog box opens.

4. In the **General** tab, specify a unique name for the new aspect, and then click **Next**.

5. In the **CI Types** tab, select **SQL Server** CI to which this Aspect can be assigned, and then click to add them to the list of assigned CI types. (Press **CTRL** to select several CI types.)

   Click **Next**.

6. In the **Instrumentation** tab, click and select the **MSSQLServer_Discovery** and **MSSQLServer_Monitoring**. Click **Next**.

7. In the **Aspects** tab, select the Microsoft SQL Server Base Aspect and then click **OK**. Click **Next**.

8. *(Optional)*. In the **Policy Templates** tab, click Add Policy Template on BSM 9.2x or **Add Policy Template From List** on OMi 10.x. The Add Policy Template to Aspect or Add Policy Template From List dialog box opens. Select the Policy Templates that you want to add and click **OK**.

   You can add policies from the **Microsoft SQL Server MP** policy template group. For more information about each policy, see the *OMi Management Pack for Microsoft SQL Server Metric Reference Guide*.

   If suitable Policy Templates do not exist, click , and then click **Add New Policy Template**.

9. In the **Policy Templates** tab, select the Version of the policy templates that you want to add.

10. Each modification to a policy template is stored in the database as a separate version. Aspects contain specific versions of policy templates. If a new version of a policy template becomes

available later, you have to update the aspect to include the latest version, if that is what you want.

11. In the **Parameters** tab, you see a list of parameters from the Policy Templates that you added to this Aspect.

    To combine parameters:

    a. Press **CTRL** and click the parameters that you want to combine.

    b. Click . The Edit/Combine Parameters dialog box opens.

    c. Type a Name for the combined parameters.

    d. (Optional). Specify a Description, Default Value, and whether the combined parameter is Read Only, an Expert Setting, or Hidden.

    Read Only prevents changes to the parameter value when the aspect is assigned to a CI. Hidden also prevents changes, but additionally makes the parameter invisible. Users can choose whether to show expert settings when they make an assignment.

    e. You can set either a specific default value, or you can click **From CI Attribute** and then browse for a CI attribute. For the SQL Server Instance Name parameter, select default value as *name*.

    f. Click **OK**.

    You can also edit the parameters without combining them, to override the defaults in the policy template. Click one parameter, and then click . The Edit/Combine Parameters dialog box opens.

12. In the Add New Aspect window, click **Finish** to save the Aspect.

    The new Aspect appears in the Management Template & Aspects pane.

Creating New User Defined Metrics (UDM)

You can collect additional data from Microsoft SQL Server databases by creating User Defined Metrics (UDMs). By default, the UDMs are part of the User Defined Aspects (UDA). The User Defined Aspect includes the following policies:

- **MSSQLServer_UDM** - ConfigFile policy for monitoring UDM
- **MSSQLServer_37XX** - Measurement Threshold policy

Understanding UDM

The OMi Management Pack for Microsoft SQL Server provides you with a UDM configuration file. You can add SQL codes to the template to define new metrics and the mechanism to collect the metric data.

The template uses the following syntax to define metric name and metric data collection mechanism:

```
MSSQL

METRIC 37XX

COLLECT <OPTIONS> "{sqlcode}"

METRIC 27YY
```

The following snippet of code defines the mechanism to collect the metric MSSQLServer_37XX:

```
MSSQL

METRIC 37XX

COLLECT <OPTIONS> "<sqlcode>"

REPORT 1 "<sqlcode>"
```

Where:

`METRIC 37XX` is the newly defined metric (you can type a metric name of your choice).

`COLLECT <OPTIONS> "<sqlcode>"` is the syntax to define metric data collection mechanism from managed server nodes.

`<OPTIONS>` specifies the mechanism to log and represent the collected data.

"`<sqlcode>`" is the programming code written in SQL to collect metric data from database nodes. It can be a direct stand-alone SQL statement.

`REPORT 1 "<sqlcode>"` is the syntax to define the mechanism to generate reports from the collected metric data.

How to Create User Defined Aspects

To create user defined metrics, follow these steps:

1. To define a new metric, you must create a copy of the ConfigFile template **MSSQLServer_UDM**.
2. Open the Policy Template pane:

   On BSM 9.2x, click **Admin > Operations Management > Monitoring > Policy Templates**.

   On OMi 10.x, click **Administration > Monitoring > Policy Templates**.
3. In the Policy Templates Groups pane:

   Click **Templates grouped by type > ConfigFile**.
4. In the Policy Templates pane, click **MSSQLServer_UDM**.
5. To create a copy of the **MSSQLServer_UDM** policy, right-click and then click **Copy Item**. Then click **Paste Item**. Alternately, you can select **MSSQLServer_UDM**, click **Copy Item** and then click **Paste Item**.
6. Rename the policy as **MSSQLServer_0700** and click **OK**.

   You can rename the **MSSQLServer_UDM** policy in the range from 0700 to 0797.
7. To modify parameter names, description, and values, follow these steps:
   a. In the Policy Template pane, select the MSSQLServer_0700 policy template and then click  .

      You must edit the policy in raw mode.
   b. Click **Policy Data > Policy Parameters**.
   c. In the **Policy Parameter** tab, select the parameter from the list and then click  . The Edit Parameter dialog box opens.
   d. Edit the parameter name (Example, modify UDM Monitor Metric 37XX Severity to UDM Monitor Metric 3700 Severity), description, and the values.

   5. Click **OK**. The version of the policy template MSSQLServer_0700 increments by 0.1.

Tasks

How to Create UDM

To create user defined metrics, follow these steps:

1. Open the Management Templates & Aspects pane:

   On BSM 9.2x, click **Admin > Operations Management > Monitoring > Management Templates & Aspects**.

   On OMi 10.x, click **Administration > Monitoring > Management Templates & Aspects**.

2. In the Configuration Folders pane:

   Configuration Folders > Database Management > Microsoft SQL Server > Microsoft SQL Server Aspects > Microsoft SQL Server User Defined Aspect.

3. In the Microsoft SQL Server UDA folder, select 1.0 and then click  . The Edit Aspect dialog box opens.

4. Click the **Policy Templates** tab and select the **MSSQLServer_UDM** policy template (Config File policy) and then click  .

5. Click the **Policy Data** tab. It contains details about defining a user defined metric and a sample example of a user defined metric. You can edit the data and save the file. The version number of the Sample UDM policy is incremented by 1.

6. To define the parameters for the metric, you must create a copy of the measurement threshold template MSSQLServer_37XX.

7. Open the Policy Templates pane:

   On BSM 9.2x, click **Admin > Operation Management > Monitoring > Policy Templates**.

   On OMi 10.x, click **Administration > Monitoring > Policy Templates**.

8. In the Policy Templates groups pane:

   Templates grouped by Type > Measurement Threshold Templates > MSSQLServer_37XX

9. To copy MSSQLServer_37XX, right-click and select copy item and paste the item.

10. Rename the file as **MSSQLServer_3701**.

11. Select the policy template **MSSQLServer_3701** and then click  .

    > You must edit the policy in raw mode.

12. In the **Policy Parameters** tab, you can select and edit the parameters. For example, to modify the UDM frequency, you can select the parameters UDM frequency and then click  . The Edit Parameter dialog box opens. You can modify the default values and then click **OK**. The version of the policy template **MSSQLServer_3701** increments by 1.

How to Deploy UDM

You must deploy the policy templates - MSSQLServer_3701 and MSSQLServer_UDM for monitoring UDM.

1. Open the Policy Templates pane:

   On BSM 9.2x, click **Admin > Operations Management > Monitoring > Policy Templates**.

   On OMi 10.x, click **Administration > Monitoring > Policy Templates**.

2. In the Policy Template Folder pane, expand the tree, click the policy template that you want to deploy, and then click  . The Assign and Deploy wizard opens.

3. In the **Configuration Item** tab, click the CI to which you want to assign the policy template, and then click **Next**.

4. In the **Required Parameters** tab, specify a value for each parameter:

   a. Select a parameter in the list, and then click  .

      - For standard parameters, the Edit Parameter dialog box opens.

        Click **Value**, specify the value, and then click **OK**.

      - For instance parameters, the Edit Instance Parameter dialog box opens.

        Change the instance values if necessary, and then for each instance value, change dependent parameter values. After you change the instances and dependent parameter values, click **OK**.

   b. Click **Next**.

5. *(Optional).* If you do not want to enable the assignment immediately, on BSM 9.2x clear the **Enable Assigned Objects** check box and on OMi 10.x clear the Enable Assignment(s) check box. You can then enable the assignment later using the Assignments & Tuning pane.

6. Click **Finish**.

Appendix A: Permissions and Grants

Following is the list of grants and privileges for the Microsoft SQL Server user account for OMi MP for Microsoft SQL Server.

Database master:	Database msdb:
GRANT create table GRANT select ON sys.objects GRANT select ON sys.sysperfinfo GRANT select ON sys.dm_os_performance_counters GRANT select ON sys.sysprocesses GRANT select ON sys.dm_exec_sessions GRANT select ON sys.dm_exec_requests GRANT select ON sys.dm_tran_locks GRANT select ON sys.sysconfigures GRANT select ON sys.configurations GRANT select ON sys.databases GRANT select ON sys.sysdatabases GRANT select ON sys.sysfiles GRANT select ON sys.database_files GRANT select ON sys.sysindexes GRANT select ON sys.partitions GRANT select ON sys.allocation_units GRANT select ON sys.sysobjects GRANT select ON sys.sysdevices GRANT select ON sys.backup_devices GRANT execute ON sys.sp_monitor GRANT execute ON sys.xp_sqlagent_enum_jobs EXEC sp_configure 'show advanced	GRANT select ON msdb.dbo.agent_datetime GRANT select ON msdb..sysjobs GRANT select ON msdb..sysjobhistory GRANT select ON msdb..sysjobsteps GRANT select ON msdb..sysjobschedules GRANT select ON msdb..sysjobs_view GRANT select ON msdb..MSdistributiondbs GRANT select ON msdb..log_shipping_monitor_primary GRANT select ON msdb..log_shipping_primary_databases GRANT select ON msdb..log_shipping_monitor_error_detail GRANT select ON msdb..log_shipping_monitor_secondary GRANT select ON msdb..log_shipping_secondary GRANT select ON msdb..sysjobservers GRANT select ON msdb..sysjobactivity GRANT execute ON msdb..sp_help_job EXEC sp_dbmmonitorupdate EXEC sp_addrolemember 'dbm_monitor', '<user>' EXEC sp_addrolemember 'SQLAgentReaderRole', '<db mp user>'

Database master:	Database msdb:
option','1' GRANT VIEW SERVER STATE to '<user>'	

Perform on all databases:

GRANT select on executionlog

exec sp_addrolemember 'db_datareader', '<user>'

Grant the following to all databases listed in the msdb..MSdistributiondbs:

GRANT select ON `MSmerge_agents`

GRANT select ON `MSmerge_history`

GRANT select ON `MSmerge_sessions`

GRANT select ON `MSsnapshot_agents`

GRANT select ON `MSlogreader_agents`

GRANT select ON `MSdistribution_history`

GRANT select ON `MSsnapshot_history`

GRANT select ON `MSlogreader_history`

GRANT select ON `MSdistribution_agents`

Additionally, on all the databases, run the stored procedure `sp_grantdbaccess` by typing the following command:

```
EXEC sp_grantdbaccess '<user>','<passwd>'
```

> **Note:** Microsoft SQL Server metric 3035 needs DBCC opentran privilege to run.

Appendix B: Data Sources for Logging

The metric data is logged into specific data sources for generating reports and graphs. Following are the datasources for Microsoft SQL Server:

- DBSPI_MSS_GRAPH
- DBSPI_MSS_REPORT
- DBMP_MSS_GRAPH
- MSSQLSERVER_DATA

For more information about the metric data logged, see the *HPE OMi Management Pack for Microsoft SQL Server Reference Guide*.

Generic Data Source

The generic data source reserves a column for the database instance name, labeled instance name. This column also contains the information that differentiates the data collected for each instance. Other column represents the graphing metrics. The complete list of all the graphing metrics is stored in the **dbspimssg.fm** file located at:

Windows: `<ovagentdir>\bin\instrumentation`

Format of Generic Data Source

The following table provides information about the format of generic data source.

INSTANCE NAME	M001_CacheHitPct	...
<value>	<value>	<value>
<value>	<value>	<value>

Datasources for *Operations Bridge Reporter* Reports

You can view web based reports that enable you to check the health and efficiency of specific Microsoft SQLServer databases using *Operations Bridge Reporter*. The reports are generated from the **DBSPI_MSS_REPORT** data source. For information about viewing and accessing reports, see the *Operations Bridge Reporter* documentation.

The **DBSPI_MSS_REPORT** contains information about the following columns:

- Instance Name
- Metric ID
- Value ID
- System ID
- Object ID

01/09/14 05:25:03 PM	INSTANCENAME	onehp
01/09/14 05:25:03 PM	METRICID	201.00
01/09/14 05:25:03 PM	VALUEID	1.00
01/09/14 05:25:03 PM	VALUE	5.00
01/09/14 05:25:03 PM	SYSTEMID	Machine Name
01/09/14 05:25:03 PM	OBJECTID	onehp

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