



OMi Management Pack for JBoss Application Server

Software Version: 1.00

For Operations Manager i for Linux and Windows® operating systems

User Guide

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Chapter 1: OMi Management Pack for JBoss Application Server

The HPE OMi Management Pack for JBoss Application Server (OMi MP for JBoss Application Server) works with the Operations Manager i (OMi) and enables you to monitor JBoss Application Servers and the underlying infrastructure running in your environment.

The OMi MP for JBoss Application Server includes Health Indicators (HIs), Event Type Indicators (ETIs), and Correlation Rules that analyze the events that occur in the JBoss Application Servers and report the health status. It also provides out-of-the-box Management Templates and Aspects to monitor the availability, health, and performance of the JBoss Application Servers. The Management Templates consists of various Aspects that help you monitor the server status, servlets, EJB (Enterprise JavaBeans) performance, and so on.

The Management Templates or Aspects can be seamlessly deployed by administrators for monitoring the JBoss Application Servers in an enterprise environment.

The OMi MP for JBoss Application Server helps you to monitor the following network deployments:

- Standalone
- Domain
- Secure configuration with SSL authentication

The OMi MP for JBoss Application Server supports the following:

- Instance based deployment and configuration
- Ready to deploy out-of-the-box management solutions
- Composite Applications - Includes JBoss Application Server, Oracle Database, and its infrastructure

Chapter 2: Getting Started

This section provides a quick overview of the tasks involved in monitoring the JBoss Application Servers using OMi MP for JBoss Application Server:

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

Note: If the JBoss Application Servers (JBoss EAP version 5, 5.1, and 6.1) that you want to monitor are already being monitored by Smart Plug-in for JBoss Application Server (JBoss AS SPI) then remove the SPI artifacts and datasources from the node hosting the JBoss Application Servers before proceeding further. For more information, see the *HP Operations Smart Plug-in for JBoss Application Server Installation and Configuration Guide*.

Note: If the node already exists under monitored nodes, you can skip this step and proceed to [Task 2](#).

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

1. Open the Monitored Nodes pane from Administration.
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 click **Computer > <select the OS Type>**. 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 the RTSM.

Note: The node with HPE Operations Agent must be connected to the OMi server and certificate must be granted.

Task 2: Enabling Enrichment Rule

The Enrichment Rule must be enabled to reconcile more than one J2EE Domain CI with the same name as a single CI entity.

To enable the enrichment rule, perform the following steps:

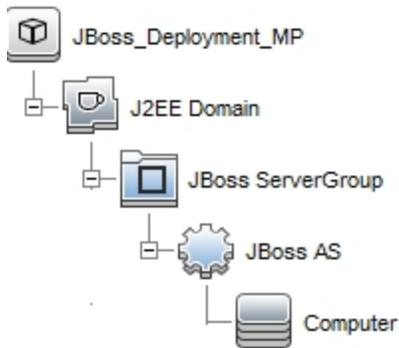
1. Open the Infrastructure Settings pane:
On BSM 9.2x, click **Admin > RTSM Administration > Modeling > Enrichment Manager**.
On OMi 10.x, click **Administration > RTSM Administration > Enrichment manager**.
2. Under **Root**, click **Operations Management > J2EE Application Servers**.
3. Select **JBossJ2EEDomainReconciliation**.
4. Right-click and select **Properties**.
The Enrichment Rule Properties window appears.
5. Click **Next**.
6. Select **Rule is Active**.
7. Click **Finish**.
8. In the Enrichment Rules pane, click  to save the changes.

Task 3: Deploying the JBoss Discovery Aspect

The JBoss Discovery Aspect enables you to discover JBoss Application Server instances in the environment. To discover the JBoss AS CIs on the added managed nodes, you must deploy the JBoss Discovery Aspect to a node.

The JBoss Discovery Aspect deployment discovers the Configuration Item (CIs) of the following CI types (CITs):

- Computer
- JBoss AS
- CICollection (JBoss Server Group)
- J2EE Domain



Note: The default domain name for J2EE Domain for EAP 5.x is `jboss_hostname`.

To deploy the JBoss Discovery Aspect, 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 > Application Server Management > JBoss Management > Aspects

3. In the Aspects folder, click **JBoss Discovery Aspect**, and then click  **Assign and Deploy** wizard to open the Assign and Deploy Wizard.

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

The **Required Parameters** tab opens and a message appears stating that there are no parameters that require editing for this Assignment.

5. In the **Required Parameters** tab, click **Next** to go to the **All Parameters** tab on BSM 9.2x or **Parameter Summary** tab on OMi 10.x.

6. *(Optional)*. 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 displayed. To display expert parameters, click

 **Show Expert Parameters**. The Frequency of JBoss MP Log (Common Setting) parameter is displayed.

You can select the Frequency of JBoss MP Log (Common Setting) parameter and then click  **Edit**. The Edit Parameter dialog box opens. Click **Value**, specify the value, and then click **OK**.

7. In the **All Parameters** tab on BSM 9.2x or **Parameter Summary** tab on OMi 10.x, click **Next** to go to the **Configure Options** tab.
8. *(Optional)*. In the **Configure Options** tab, if you do not want to enable the assignment immediately, clear the **Enable Assigned Objects** check box on BSM 9.2x or **Enable Assignment(s)** check box on OMi 10.x. You can then enable the assignment later using the Assignments & Tuning pane.
9. Click **Finish**.

Note: After the JBoss Discovery Aspect is deployed, the following message appears:
Assignment and deployment jobs created. To check the status of the deployment job, 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 4: Verifying Discovery

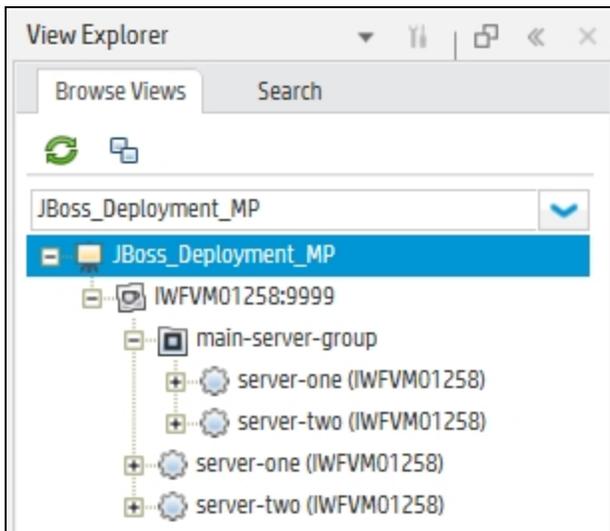
After you deploy the JBoss Discovery Aspect, you must verify if the CIs are populated in the View Explorer. The following CIs are discovered:

- Computer
- JBoss AS
- CICollection (JBoss Server Group)
- J2EE Domain

To view the CIs discovered, 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**.

2. In the **Browse Views** tab, select the **JBoss_Deployment_MP**.



Task 5: Deploying the JBoss Management Templates or Aspects

This section is further divided into [Task 5a: Identifying and Deploying JBoss Management Templates](#) and [Task 5b: Identifying and Deploying JBoss Aspects](#) provides information on identifying and deploying the JBoss Management Templates or Aspects based on your specific requirements.

For more information about the list of Management Templates and Aspects, see [Components](#).

Data Collection

Frequency (polling interval) at which each Aspect must be monitored is predefined with a default value in a specific frequency parameter. Frequency parameter is an expert parameter that is defined for each of the metrics regardless of whether they are for generating events or not.

Following are the four predefined frequency parameters:

Parameter	Frequency
Very High	5 mins

Parameter	Frequency
High	15 mins
Medium	1 hour
Low	24 hours

After Management Templates and Aspects are deployed, collector is triggered based on the predefined frequency parameter in a specific Aspect. You can modify the default value of the parameter at the following levels:

- During deployment of the Management Template or Aspects using the Management Templates & Aspects pane.
- After deployment using the Assignments & Tuning pane.

For more information about how to modify the parameter values, see [Types of Parameters](#).

Task 5a: Identifying and Deploying JBoss Management Templates

Before deploying the JBoss Management Templates, you must deploy the JBoss Discovery Aspect. For more information, see [Task 3: Deploying the JBoss Discovery Aspect](#).

You can identify the JBoss Management Template suitable for your environment.

- If you want to monitor the areas of the JBoss Application Server such as the server status, JVM, JDBC, Servlets, and server logs, you can deploy the Essential JBoss Management Template.
- If you want to monitor JBoss Application Server environment key areas of JBoss Application Server such as Availability, JVM, JDBC, EJB, Servlets, Transactions, Server logs along with infrastructure areas of CPU, Memory and Disk and Oracle database areas such as Availability, Locks, and Memory, you can use the Essential JBoss and Oracle Database Management Template. Deploy any aspect other than base aspect to discover Oracle CIs which are related to JBoss JDBC datasource CIs.

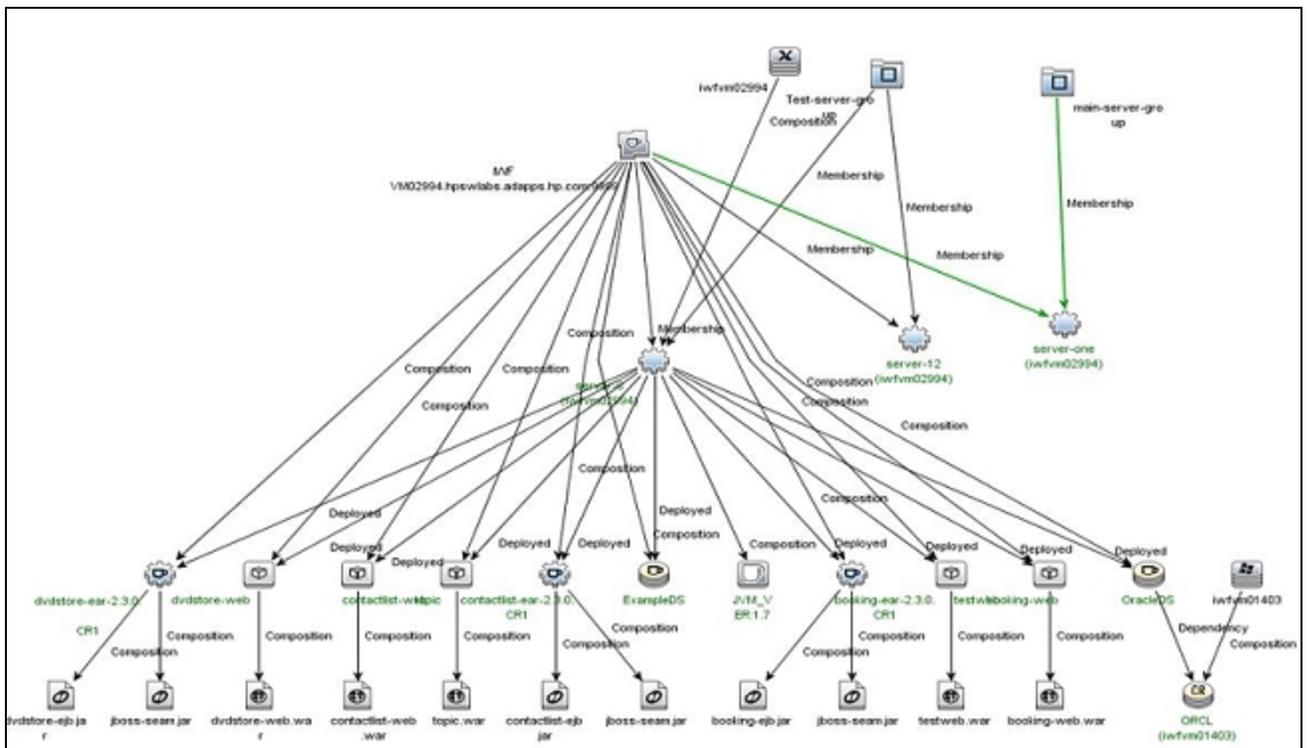
For more information on deploying the Essential JBoss and Oracle Database Management Template, see the [Monitoring Composite Applications](#) section in the *OMi MP for JBoss Application Server User Guide or Online Help*.

The JBoss Management Template discovers the JBoss Domain CI, JBoss Server, and other related CIs and completes the topology.

The following CIs are discovered:

- JVM
- Web Application
- Oracle
- J2EE Application
- JDBC Data Source
- CICollection (JBoss Server Group)
- EJB Module
- Entity Bean
- Message Driven Bean
- Stateless Session Bean
- Stateful Session Bean
- Web Module
- Servlet

An example of this is shown in the following figure:



To deploy the Essential JBoss Management Template to the JBoss Domain CI, 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:

Click **Configuration Folders > Application Server Management > JBoss Management > Management Templates**.

3. In the Management Templates folder, click the Management Template that you want to deploy, and then click  **Assign and Deploy**. The Assign and Deploy wizard opens.
4. In the **Configuration Item** tab, click the **JBoss Domain** CI to which you want to assign the Management Template, and then click **Next**. You can select multiple items by holding down the **CTRL** or **SHIFT** key while selecting them. Click **Next** to accept the CIs and go to **Required Parameters**.
5. In the **Required Parameters** tab, all the mandatory parameters that do not yet have a value are listed. Since the parameters are mandatory, you must assign a value before you deploy the Management Template. Do the following steps to assign values:

- a. Select the **JMX JBoss Username** parameter in the list and click  **Edit**.

The Edit Parameter: JBoss JMX Username dialog box opens.

- b. Click **Value**, specify the user name, and then click **OK**.

- c. Select the **JMX JBoss Password** parameter in the list and click  **Edit**.

The Edit Parameter: JMX JBoss Password dialog box opens.

- d. Enter the password for the user name and then click **OK**.

(Optional). For JBoss Application Servers using SSL authentication:

- a. Select the **JBoss Application Server SSL KeyStore File Path** parameter in the list, and then click  **Edit**.

You can also double-click on the **JBoss Application Server SSL KeyStore File Path** parameter to edit it.

The Edit Parameter: JBoss Application Server SSL KeyStore File Path dialog box opens.

- b. Click **Value**, specify the path to JBoss Application Server SSL KeyStore File Path, and then click **OK**.
- c. Select the **JBoss Application Server SSL KeyStore File Password** parameter in the list, and then click  **Edit**. The Edit Parameter: JBoss Application Server SSL KeyStore File Password dialog box opens.

You can also double-click on the **JBoss Application Server SSL KeyStore File Password** parameter to edit it.

- d. Click **Value**, specify the **JBoss Application Server SSL KeyStore File Password** password, and then click **OK**.
 - e. Click **OK**.
6. Click **Next** to go to the **All Parameters** tab on BSM 9.2x or **Parameter Summary** tab on OMi 10.x.
 7. In the **All Parameters** tab on BSM 9.2x or **Parameter Summary** tab on OMi 10.x, to change the default values of the parameters, you can select the parameter and then click  **Edit**.

The Edit Parameter dialog box appears.

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 displayed. To display expert parameters, click  **Show Expert Parameters**.

8. In the **All Parameters** tab on BSM 9.2x or **Parameter Summary** tab on OMi 10.x, click **Next**.
9. *(Optional)*. In the **Configure Options** tab, if you do not want to enable the assignment immediately, clear the **Enable Assigned Objects** check box on BSM 9.2x or **Enable Assignment(s)** check box on OMi 10.x. You can then enable the assignments later using the Assignments & Tuning pane.
10. Click **Finish**.

Task 5b: Identifying and Deploying JBoss Aspects

To deploy the JBoss Application Server Aspects, 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:
Click **Configuration Folders > Application Server Management > JBoss Management > Management Templates**.
3. In the Management Templates & Aspects pane, click the **Aspects** folder, and select an Aspect and then click  **Assign and Deploy** 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.
5. Click **Next** to go to **All Parameters** tab on BSM 9.2x or **Parameter Summary** tab on OMi 10.x. To change the default values of the parameters, you can select the parameter and then click  **Edit**.
The Edit Parameter dialog box opens.
Click **Value**, specify the value, and then click **OK**.
6. In the **All Parameters** tab on BSM 9.2x or **Parameter Summary** tab on OMi 10.x, click **Next**.
7. (*Optional*). In the **Configure Options** tab, if you do not want to enable the assignment immediately, clear the **Enable Assigned Objects** check box on BSM 9.2x or **Enable Assignment(s)** check box on OMi 10.x. You can then enable the assignment later using the Assignments & Tuning pane.
8. Click **Finish**.

Verifying Discovery for Extended Topology

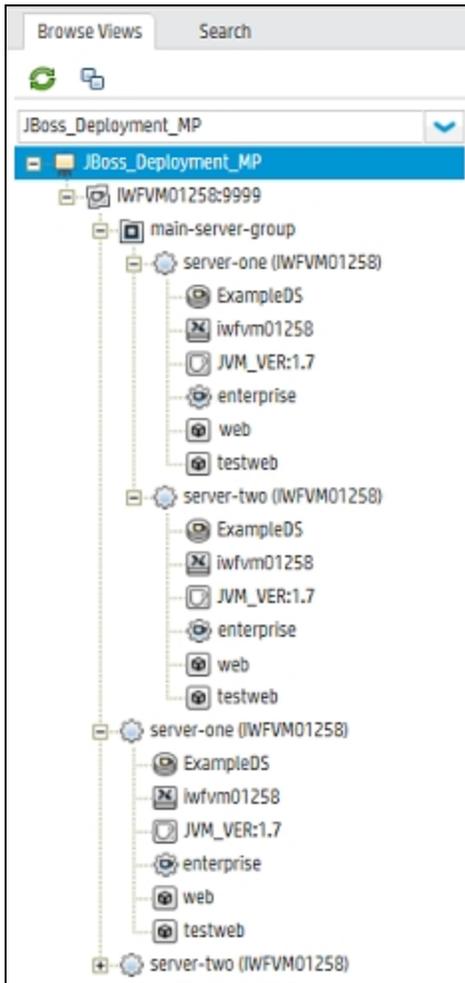
After you deploy the JBoss Application Server Management Templates or JBoss Discovery Aspect, you can verify if the CIs are populated in the View Explorer.

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

1. Open the Event Perspective:
On BSM 9.2x, click **Applications > Operations Management > Event Perspective**.

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

2. In the View Explorer, select **JBoss_Deployment_MP** from the drop-down list. You can see the extended topology comprising CIs associated with the **JBoss_Deployment_MP** as shown in the following figure:



Monitoring OMi MP for JBoss Application Server

After you deploy Management Templates and Aspects, you can view the deployment using each of the following perspectives:

- [Event Perspective](#)
- [Health Perspective](#)
- [Performance Perspective](#)

Event Perspective

Event Perspective provides a consolidated view of active events. In the Event Perspective pane, you can view the active events that need resolution and event information of JBoss Application Server CIs and Node CIs that are monitored by OMi MP for JBoss Application Server.

To view Event Perspective of the JBoss Application Server CIs, follow these steps:

1. Open the Operations Management 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. In the **Browse Views** tab, select **JBoss_Deployment_MP** that contains the JBoss Application Server organization and user specific roles. You can also use the **Search** tab to find a JBoss Application Server CI.
3. Click the JBoss Application Server CI for which you want to view the Event Perspective. The list of events for the selected JBoss Application Server CI appears in the Event Browser pane.
4. When you click on an event in the Event Browser, the Event Details pane opens where you can view the following details:
 - **General** - Displays the detailed information about the selected event such as Severity, Lifecycle State, Priority, Related CI, 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 instruction information designed to help operators handle the associated event.
- Forwarding - Displays the transfer of ownership details if any, for the events.

For more information about Managing Events, see the *Operations Manager i Concepts Guide*.

For more information about Event Type Indicators, see [Event Type Indicators \(ETIs\)](#).

Health Perspective

The Health Perspective provides a high-level view of the overall health information of the related CIs in the context of events. In the Health Perspective, you can view the health information of the JBoss Application Server CIs that are monitored by OMi MP for JBoss Application Server.

To view the Health Perspective of the JBoss Application Server CIs, follow these steps:

1. Open the Operations Management pane:
 - On BSM 9.2x, click **Applications > Operations Management > Health Perspective**.
 - On OMi 10.x, click **Workspaces > Operations Console > Health Perspective**.
2. In the Operations Management pane, click the **Health Perspective** tab. The View Explorer pane appears.
3. In the **Browse Views** tab, select **JBoss_Deployment_MP** that contains the JBoss Application Server CIs. You can also use the **Search** tab to find a JBoss Application Server CI.
4. Click the JBoss Application Server CI for which you want to view the Health Perspective. The list of events for the selected JBoss Application Server CI appears in the Event Browser pane.
 - Health Top View - Displays a topological view of the CIs that are affected by 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 a list of available actions for a selected event.

For more information about Health Indicators, see [Health Indicators](#).

Performance Perspective

Performance Perspective enables you to draw graphs from existing [graph templates](#). You can also plot customized graphs by selecting the required metrics for a selected CI.

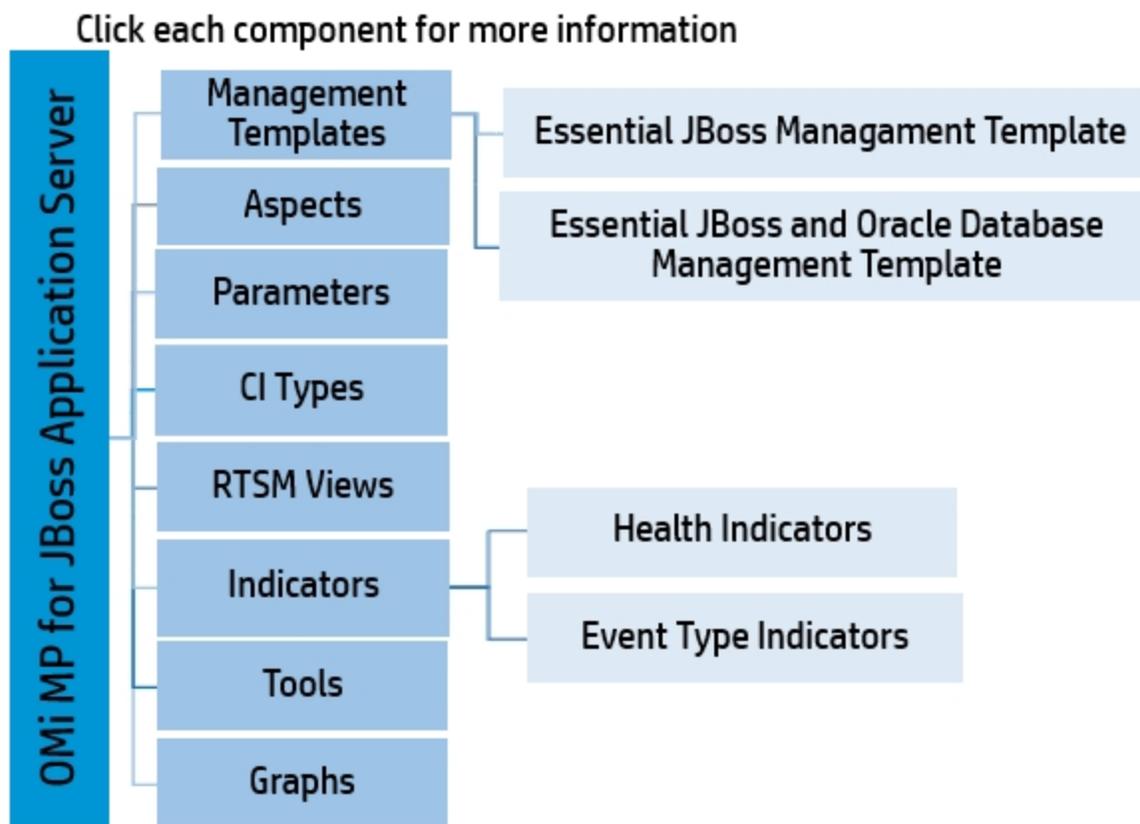
To view the Performance Perspective of JBoss Application Server CIs using graphs, follow these steps:

1. Open the Operations Management pane:
On BSM 9.2x, click **Applications > Operations Management > Performance Perspective**.
On OMi 10.x, click **Workspaces > Operations Console > Performance Perspective**.
2. In the Operations Management pane, click the **Performance Perspective** tab. The View Explorer pane appears.
3. In the **Browse Views** tab, select **JBoss_Deployment_MP** that contains the JBoss Application Server CI. You can also use the **Search** tab to find JBoss Application Server CIs.
4. From the **Graphs** tab, click the graph you want to plot and then click  **Draw Graphs**. The selected graph is plotted on the right pane.

Chapter 4: Components

The OMi MP for JBoss Application Server includes components for monitoring JBoss Application Servers in your environment.

For more information on the OMi MP for JBoss Application Server components, click on each of the boxes in the following diagram:



Overview of JBoss Application Server Management Templates

The JBoss Application Server Management Templates provide a complete management solution for monitoring the health and performance of JBoss Application Servers. By default, OMi MP for JBoss Application Server consists of a set of Management Templates with predefined settings to monitor the

JBoss Application Servers. You can deploy the JBoss Application Server Management Templates with the default parameters and seamlessly monitor the systems in your environment. These management templates comprises several Aspects which enable you to monitor the application servers.

The OMi MP for JBoss Application Server comprises the following Management Templates:

- [Essential JBoss Management Template](#)
- [Essential JBoss and Oracle Database Management Template](#)

The following section provides information on creating Management Templates for the JBoss Application Server:

How to Access JBoss Application Server Management Templates

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 > Application Server Management > JBoss Management**.

Tasks

This section provides procedures on monitoring the JBoss Application Servers using Management Templates.

How to Deploy JBoss Application Server Management Templates

A management template provides a complete solution for managing an application or service. Management Templates contain aspects which help to monitor an aspect of a CI. For information about deploying JBoss Management Templates, see [Task 5: Deploying the JBoss Management Templates or Aspects](#).

How to Automatically Assign JBoss Application Server Management Templates and Aspects to CIs

An assignment defines which instance of a CI is to be monitored against the values defined for the corresponding CI type referenced in a management template or aspect. You can define automatic assignment rules if a CI is modified or newly discovered.

To automatically assign JBoss Application Server Management Templates and Aspects, follow these steps:

1. Open the Automatic Assignment Rules pane:

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

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

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

2. Click  in the toolbar of the Auto-Assignment Rules pane and select the appropriate option. The Create Auto-Assignment Rule wizard is shown.
3. In the **Select Target View** tab, select the **JBoss_Deployment_View** containing the CIs for which you want to create an automatic assignment, and click **Next** to go to **Select Item to Assign** tab.
4. In the **Select Item to Assign** tab, click the JBoss Management Template or Aspect that you want to automatically assign to all CIs with a CI type appearing in the selected view.

Note: The list in the **Select Item to Assign** tab shows only the management templates that have a root CI type. If an Aspect is auto-assigned, it shows the compatible aspects.

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 the **Version** column.

5. Click **Next** to go to **Required Parameters** tab.

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 or **Parameter Summary** tab on OMi 10.x, where you can override the default value of any parameter, including those that are not required.

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

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 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**.

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

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

7. *(Optional)*. In the **Configure Options** tab, clear the **Enable Assigned Objects** check box on BSM 9.2x and **Enable Assignment(s)** check box on OMi 10.x if you do not want to activate the assignment immediately. You can activate automatic assignment rules later using Automatic Assignment Rules at **Admin > Operations Management > Monitoring > Automatic Assignment Rules** on BSM 9.2x or **Administration > Monitoring > Assignments & Tuning** on OMi 10.x.
8. Click **Finish** to save the changes and close the wizard. The assignment rule is added to the list of auto-assignment rules.

Follow the steps to check if the automatic assignment rule successfully created the expected assignments:

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 view you identified while creating your automatic assignment rule.
3. 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 **AutoAssignment** in the column **Assigned By**.

You can consider the following options for tuning the assignment:

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

How to Display an Assignment Report for a JBoss Management Template

You can generate an assignment to check the CI assignments. An assignment report lists which CIs are assigned to a selected management template, aspect or policy template.

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

The preconfigured Assignment Report opens. You can view additional types of reports from the Assignments & Tuning pane.

For more information about *Automatic Assignment Rules*, see the *HPE OMi Administration Guide*.

Essential JBoss Management Template

The Essential JBoss Management Template monitors the primary areas of server such as the server status, JVM, JDBC, Servlets, and server logs. It also monitors critical infrastructure areas of CPU, memory, and disk.

How to Access the Essential JBoss 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. Click **Configuration Folders > Application Server Management > JBoss Management > Management Templates**.

User Interface Reference

Management Template - General

Provides an overview of the attributes of the Management Template.

UI Element	Description
Name	Essential JBoss Management Template.
Description	Monitors JBoss Application Server environment key areas such as Availability, JVM, JDBC, EJB, Servlets, and Server logs along with infrastructure areas of CPU,

UI Element	Description
	Memory, and Disk.
ID	A unique identifier for the GUID version.
Version ID	A unique identifier for this version of the Essential JBoss Management Template.
Version	The current version of the Management Template. In this instance, the version of the Management Template is 1.0.

Management Template - Topology View

UI Element	Description
Topology View	JBoss_Deployment_View is the topology view for the Essential JBoss Management Template. It contains the CI Types that you want to manage using the Management Template.
CI Type	Indicates the type of CI managed by the Essential JBoss Management Template. The Essential JBoss Management Template contains the J2EE Domain CI Type.

Management Template - Aspects

The Essential JBoss Management Template consists of the following Aspects:

- [JBoss Availability](#)
- [JBoss Discovery](#)
- [JBoss MP Self-Monitoring](#)
- [JBoss EJB Performance](#)
- [JBoss JVM Memory](#)
- [JBoss Garbage Collector Statistics](#)
- [JBoss JDBC Connection Pool Status](#)
- [JBoss Servlet Statistics](#)
- [JBoss System Thread Statistics](#)
- [JBoss Web Application Statistics](#)
- [JBoss Web HTTP Connector](#)

List of Infrastructure Aspects

Bandwidth utilization and Network IOPS

This Aspect monitors IO operations, and performance of the systems in the network. It monitors the network IO operations and performance based on the bandwidth used, outbound queue length and average bytes transferred per second.

Remote Disk Space Utilization

The Remote Disk Space Utilization Aspect monitors space utilization of remote disk.

Resource Bottleneck Diagnosis

This 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) 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 Fault Analysis

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

Memory and Swap Utilization

This Aspect 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).

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.

Space Availability and Disk IOPS

This Aspect monitors the disk IO operations and space utilization of the system.

System Infrastructure Discovery

This Aspect discovers and gathers information regarding the system resources, operating system, and applications on a managed node.

Essential JBoss and Oracle Database Management Template

The Essential JBoss and Oracle Database Management Template monitors JBoss Application Server environment key areas such as availability, JVM, JDBC, EJB, Servlets, and Server logs along with infrastructure areas of CPU, Memory and Disk. It also adds monitoring capabilities for Oracle database areas such as Availability, Locks, and Memory.

How to Access the Essential JBoss and Oracle Database 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. Click **Configuration Folders > Application Server Management > JBoss Management > Management Templates**.

User Interface Reference

Management Template - General

Provides an overview of the attributes of the Management Template.

UI Element	Description
Name	Essential JBoss and Oracle Database Management Template
Description	Monitors the primary areas of JBoss Application Server environment monitors JBoss Application Server environment key areas such as Availability, JVM, JDBC, EJB, Servlets, and Server logs along with infrastructure areas of CPU, Memory and Disk. It also adds monitoring capabilities for Oracle database areas such as Availability, Locks, and Memory.
ID	A unique identifier for the GUID version.
Version ID	A unique identifier for this version of the Essential JBoss and Oracle Database Management Template.
Version	The current version of the Management Template. In this instance, the version of the Management Template is 1.0.

Management Template - Topology View

UI Element	Description
Topology View	JBoss_Deployment_View is the topology view for the Essential JBoss and Oracle Database Management Template. It contains the CI Types that you want to manage using the Management Template.
CI Type	Indicates the type of CIs managed by the Essential JBoss and Oracle Database Management Template. The Essential JBoss and Oracle Database Management Template contains the J2EE Domain CI Type.

Management Templates - Aspects

The Essential JBoss and Oracle Database Management Template consists of the following Aspects:

- [JBoss Discovery](#)
- [JBoss Availability](#)
- [JBoss JVM Memory](#)
- [JBoss Garbage Collector Statistics](#)
- [JBoss Classloading Statistics](#)
- [JBoss JDBC Connection Pool Status](#)
- [JBoss Servlet Statistics](#)
- [JBoss Web Application Statistics](#)
- [JBoss Web HTTP Connector](#)
- [JBoss Transaction Status](#)
- [JBoss EJB Performance](#)
- [JBoss MP Self-Monitoring](#)
- [JBoss System Thread Statistics](#)

List of Infrastructure Aspects

Memory and Swap Utilization

This Aspect 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).

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.

Space Availability and Disk IOPS

This Aspect monitors the disk IO operations and space utilization of the system.

System Infrastructure Discovery

This Aspect discovers and gathers information regarding the system resources, operating system, and applications on a managed node.

Bandwidth Utilization and Network IOPS

This Aspect monitors IO operations, and performance of the systems in the network. It monitors the network IO operations and performance based on the bandwidth used, outbound queue length and average bytes transferred per second.

Remote Disk Space Utilization

The Remote Disk Space Utilization Aspect monitors space utilization of remote disk.

Resource Bottleneck Diagnosis

This 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) 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 Fault Analysis

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

List of Oracle Aspects

Oracle Database Availability

This Aspect monitors the Oracle database connection status, processes, and logons.

Oracle Discovery

This Aspect discovers the Oracle, RAC, and ASM instances.

Basic Oracle Locks & Latches

This Aspect monitors the consumption of Oracle locks (in percentage) and also checks the usage of session wait lock count and latch count.

Basic Oracle Memory Performance

This Aspect monitors the Oracle memory units - buffer cache, shared pool, and library cache.

JBoss Aspects

The OMi MP for JBoss Application Server Aspects monitor the basic and advanced components of the JBoss Application Servers in your environment. An aspect is defined for a specific CI Type and contains all policy templates required to monitor a certain aspect of the CI, for example, its performance or availability. To start monitoring an application or service you can assign an aspect directly to a CI.

How to Access JBoss Application 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 > Application Server Management > JBoss Management > Aspects**.

Tasks

This section provides procedures to monitor JBoss Application Servers using Aspects.

How to Deploy JBoss Application Server Aspects

For more information about deploying JBoss Application Server Aspects, see [Task 5b: Identifying and Deploying JBoss Aspects](#).

How to Create JBoss Application Server Aspects

An aspect contains parameters, instrumentation, and policy templates which are used to monitor the JBoss Application Servers. To create JBoss Application Server Aspects, 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. Click **Configuration Folders > Application Server Management > JBoss Management > Aspects**.

3. In the Management Template & Aspects pane, click  , and then select **Create Aspect**.

The Add New Aspect dialog box opens.

4. In the **General** tab, specify a Name, ID, Version ID, and Description for the Aspect. Click **Next**.
5. In the **CI Types** tab, select one or more Configuration Item (CI) types from the Available CI Types pane to associate with the Aspect and click  to move them to the Assigned CI types pane, and click **Next**.
6. In the **Policy Templates** tab, click **Add Policy Template** to select the policy templates that has to be added to an Aspect. The Add New Policy Template to Aspect dialog box opens and lists the Policy Templates. Select one or more Policy Templates by selecting either the **CTRL** or **SHIFT** key. Click **OK** and then click **Next**.
7. In the **Aspects** tab, click  **Add Existing Aspect** to select the required aspects that you want to include within another aspect. The Add Existing Aspect dialog box opens and lists the Aspects. Select one or more Aspects by using either the **CTRL** or **SHIFT** key. Click **OK** and then click **Next**.
8. Click **Next**.
9. In the **Parameters** tab, you see a list of parameters.
 - a. Click  **Edit**. The Edit Parameter dialog box opens.
 - b. Modify the required details and click **OK**.
10. In the Add New Aspect dialog box, click **Finish** to save the Aspect. The new Aspect appears in the Management Templates & Aspects pane.

Grouping of JBoss Aspects

Each JBoss Aspect comprises policy templates, instrumentation, and parameters for monitoring the health and performance of the JBoss Application Servers.

User Interface Reference

UI Element	Description
General	Provides an overview of the general attributes of the JBoss Aspects.
CI Type	The type of configuration items that the Aspect can be assigned to. The JBoss Aspects contain the Computer and JBoss AS CI types.
Instrumentation	Provides a single package which contains the binaries for discovery, collection, and data logging.
Aspects	Lists the Aspects present within each JBoss Aspect. The JBoss Base Aspect is a part of all other Aspects.
Policy Templates	Provides an overview of the policy templates that the JBoss Aspect contain. You can expand each item in the list to see more details about the policy templates.

Note: The Aspects such as JBoss JCA Statistics, JBoss JMS Performance, JBoss Classloading Statistics, and JBoss Application Status are not part of any of the out of the box Management Templates. These Aspects are used to monitor specific areas such as application status, JCA status, JMS utilization and performance, and so on. You can add one or more of these Aspects to Management Templates based on your monitoring requirements. For more information, see the [Creating New Aspects](#) section.

Following are the Aspects provided by the OMi MP for JBoss Application Server:

JBoss Discovery

This Aspect discovers the JBoss Application Server instances.

CI Type	Policy Template	Indicator	Description	Policy Type
Host_node	JBoss_Discovery	NA	Discovers JBoss Server Domains, Clusters, Application Servers along with deployed applications, and JDBC datasources.	Service Auto-Discovery
Host_node	JBoss_MPLog	NA	Monitors the JBoss Perl, Discovery and Collector Log files.	LogFile Entry
Host_node	JBoss_Messages	NA	JBoss Message Interceptor	Open Message Interface

JBoss Availability

This Aspect monitors the availability of the JBoss Application Server, process controller, and host controller.

CI Type	Policy Template	Indicator	Description	Policy Type
JBoss AS	JBoss_Availability_Check	NA	Runs the JBoss Availability every VERYHIGH schedule.	Scheduled Task
JBoss AS	JBoss_Availability	ServerStatus:Unavailable, ServerStatus:Available	Monitors the status of JBoss server, Process Controller, and Host Controller.	Measurement Threshold

JBoss JVM Memory

This Aspect monitors the JVM parameters of the JBoss Application Server.

CI Type	Policy Template	Indicator	Description	Policy Type
JBoss AS	JBoss_HeapMemUtilPct	JVMMemoryUtilization:High, JVMMemoryUtilization:Normal	Monitors the percentage of heap memory used by the JVM.	Measurement Threshold
JBoss AS	JBoss_NonHeapMemUtilPct	JVMMemoryUtilization:High, JVMMemoryUtilization:Normal	Monitors the percentage of non-heap memory used by the JVM.	Measurement Threshold

JBoss Garbage Collector Statistics

This Aspect monitors the Garbage Collector Statistics of the JBoss Server.

CI Type	Policy Template	Indicator	Description	Policy Type
JBoss AS	JBoss_GarbageCollectorThreadCount	NA	Monitors the Garbage Collector Thread Count.	ConfigFile

CI Type	Policy Template	Indicator	Description	Policy Type
JBoss AS	JBoss_GarbageCollectorCollectionTime	NA	Monitors the collection time of the Garbage Collector.	ConfigFile
JBoss AS	JBoss_GarbageCollectorCollectionCount	NA	Monitors the collection count of the Garbage Collector.	ConfigFile
JBoss AS	JBoss_GarbageCollectorIntervalTime	NA	Monitors the interval time of the Garbage Collector.	ConfigFile

JBoss Classloading Statistics

This Aspect monitors the classloading statistics of the JBoss Application Server.

CI Type	Policy Template	Indicator	Description	Policy Type
JBoss AS	JBoss_ClassLoadingLoadedClassCount	NA	Monitors the number of classes that are loaded.	ConfigFile
JBoss AS	JBoss_ClassLoadingTotalLoadedClassCount	NA	Monitors the total number of classes that are loaded.	ConfigFile
JBoss AS	JBoss_ClassLoadingUnloadedClassCount	NA	Monitors the number of classes that are not loaded.	ConfigFile

JBoss JDBC Connection Pool Status

This Aspect monitors the JDBC connection availability and connection pools of the JBoss Application Server.

CI Type	Policy Template	Indicator	Description	Policy Type
JBoss AS	JBoss_PoolAvailableCount	NA	Monitors the number of available threads in the pool.	ConfigFile
JB	JBoss_PoolInUseCount	NA	Monitors the	ConfigFile

CI Type	Policy Template	Indicator	Description	Policy Type
JBoss AS			number of physical connections in the pool that are currently in use.	Measurement Threshold
JBoss AS	JBoss_JDBCConnectionPoolThruRt	DataSourceConnectionPoolUtilization:High, DataSourceConnectionPoolUtilization:Normal	Monitors the number of JDBC connections allocated and returned by applications per second.	Measurement Threshold
JBoss AS	JBoss_JDBCPreparedStatementCacheMissCount	NA	Monitors the number of times a statement request was missed from the JDBC PreparedStatement cache.	ConfigFile
JBoss AS	JBoss_PoolActiveCount	NA	Monitors the number of concurrently active threads in the pool.	ConfigFile
JBoss AS	JBoss_PoolDestroyedCount	NA	Monitors the number of connections that are physically destroyed in the Thread pool.	ConfigFile
JB	JBoss_	NA	Monitors the	ConfigFile

CI Type	Policy Template	Indicator	Description	Policy Type
oss AS	JDBCPreparedStatementCacheDeleteCount		number of statements discarded from the JDBC PreparedStatement cache.	e
JB oss AS	JBoss_PoolCreatedCount	NA	Monitors the number of threads created in the pool.	ConfigFile
JB oss AS	JBoss_PoolMaxUsedCount	NA	Monitors the maximum number of threads used for connection in the pool.	ConfigFile
JB oss AS	JBoss_JDBCPreparedStatementCacheHitCount	NA	Monitors the number of times the statements from the JDBC PreparedStatement cache were used.	ConfigFile
JB oss AS	JBoss_JDBCPreparedStatementCacheCurrentSize	NA	Monitors the number of prepared and callable statements currently cached in the JDBC PreparedStatement cache.	ConfigFile

CI Type	Policy Template	Indicator	Description	Policy Type
JBoss AS	JBoss_JDBCPreparedStatementCacheAccessCount	NA	Monitors the number of times the JDBC PreparedStatement cache was accessed.	ConfigFile
JBoss AS	JBoss_PoolInUsePct	DataSourceConnectionPoolUtilization:High, DataSourceConnectionPoolUtilization:Normal	Monitors the percentage of physical connections in the pool that are currently in use.	Measurement Threshold

JBoss Servlet Statistics

This Aspect monitors the Servlet statistics deployed on the JBoss Application Server.

CI Type	Policy Template	Indicator	Description	Policy Type
JBoss AS	JBoss_WebServletmaxTime	NA	Monitors the minimum processing time of a request by the Web Servlet.	ConfigFile
JBoss AS	JBoss_WebServletloadTime	NA	Monitors the load time of the Web Servlet.	ConfigFile
JBoss AS	JBoss_WebServletrequestCount	NA	Monitors the number of requests processed by the Web Servlet.	ConfigFile
JBoss AS	JBoss_WebServletminTime	NA	Monitors the maximum processing time of a request by the Web Servlet.	ConfigFile
JBoss AS	JBoss_WebServletProcessingTime	NA	Monitors the total execution time of the Web Servlet's service method.	ConfigFile

JBoss Web Application Statistics

This Aspect monitors the web application statistics of the deployed JBoss Application Servers.

CI Type	Policy Template	Indicator	Description	Policy Type
JBoss AS	JBoss_WebAppSessionAvgAliveTime	NA	Monitors the average Alive time of the web application session.	ConfigFile
JBoss AS	JBoss_WebAppSessionsCreated	NA	Monitors the web application sessions that are created.	ConfigFile
JBoss AS	JBoss_WebAppExpiredSessions	NA	Monitors the expired sessions of the web application.	ConfigFile
JBoss AS	JBoss_WebAppSessionMaxAliveTime	NA	Monitors the maximum Alive time of the web application session.	ConfigFile
JBoss AS	JBoss_WebAppDuplicatedSessionIds	NA	Monitors duplicated session IDs of the web application.	ConfigFile
JBoss AS	JBoss_WebAppRejectedSessions	NA	Monitors the rejected sessions of the web application.	ConfigFile
JBoss AS	JBoss_WebAppActiveSessions	NA	Monitors the active sessions of the web application.	ConfigFile

JBoss Web HTTP Connector

This Aspect monitors the web HTTP connector statistics on the JBoss Application Server.

CI Type	Policy Template	Indicator	Description	Policy Type
JBoss AS	JBoss_WebConnectorHTTPBytesReceived	NA	Monitors the number of bytes received by the web HTTP connector.	ConfigFile
JBoss AS	JBoss_WebConnectorHTTPErrorCount	NA	Monitors the number of errors that occurs when requests are processed by the web HTTP connector.	ConfigFile
JBoss AS	JBoss_WebConnectorHTTPProcessingTime	NA	Monitors the processing time used by the web	ConfigFile

CI Type	Policy Template	Indicator	Description	Policy Type
			HTTP connector.	
JBoss AS	JBoss_WebConnectorHTTPBytesSent	NA	Monitors the number of bytes sent by the web HTTP connector.	ConfigFile
JBoss AS	JBoss_WebConnectorHTTPRequestCount	NA	Monitors the number of requests processed by the web HTTP connector.	ConfigFile

JBoss JCA Statistics

This Aspect monitors JCA status of the JBoss Application Server.

CI Type	Policy Template	Indicator	Description	Policy Type
JBoss AS	JBoss_JCAShortThreadcoreThreads	NA	Monitors the core thread pool size of JCA short-running-threads.	ConfigFile
JBoss AS	JBoss_JCAWorkManagerQueueUtilPct	ConnectionsInUse:High, ConnectionsInUse:Normal	Monitors the JCA WorkManager Thread Pool Utilization Percentage.	Measurement Threshold
JBoss AS	JBoss_JCALongThreadrejectedCount	NA	Monitors the number of tasks that have been passed to the handoff-executor (if one is specified) or discarded for JCA long-running-threads.	ConfigFile

CI Type	Policy Template	Indicator	Description	Policy Type
JBoss AS	JBoss_JCASHortThreadlargestThreadCount	NA	Monitors the largest number of threads that have ever simultaneously been in the pool for JCA short-running-threads.	ConfigFile
JBoss AS	JBoss_JCASHortThreadcurrentThreadPct	ConnectionsInUse:High, ConnectionsInUse:Normal	Monitors the percentage of current threads in the pool for JCA short-running-threads.	Measurement Threshold
JBoss AS	JBoss_JCAMaxQueueSize	NA	Monitors the maximum queue size of JCA.	ConfigFile
JBoss AS	JBoss_JCALongThreadcurrentThreadPct	ConnectionsInUse:High, ConnectionsInUse:Normal	Monitors the percentage of current threads in the pool for JCA long-running-threads.	Measurement Threshold
JBoss AS	JBoss_JCALongThreadqueueLength	NA	Monitors the queue length of JCA long-running-threads.	ConfigFile
JBoss AS	JBoss_JCALongThreadcurrentThreadCount	NA	Monitors the current number of threads in the pool for JCA long-running-threads.	ConfigFile

CI Type	Policy Template	Indicator	Description	Policy Type
JBoss AS	JBoss_JCASHortThreadcurrentThreadCount	NA	Monitors the current number of threads in the pool for JCA short-running-threads.	ConfigFile
JBoss AS	JBoss_JCASHortThreadqueueLength	NA	Monitors the queue length of JCA short-running-threads.	ConfigFile
JBoss AS	JBoss_JCALongThreadmaxThreads	NA	Monitors the maximum thread pool size of JCA long-running-threads.	ConfigFile
JBoss AS	JBoss_JCASHortThreadmaxThreads	NA	Monitors the maximum thread pool size of JCA short-running-threads.	ConfigFile
JBoss AS	JBoss_JCASHortThreadrejectedCount	NA	Monitors the number of tasks that have been passed to the handoff-executor (if one is specified) or discarded for JCA short-running-threads.	ConfigFile
JBoss AS	JBoss_JCAQueueSize	NA	Monitors the queue size of JCA.	ConfigFile

CI Type	Policy Template	Indicator	Description	Policy Type
JBoss AS	JBoss_JCALongThreadcoreThreads	NA	Monitors the core thread pool size of JCA long-running-threads.	ConfigFile
JBoss AS	JBoss_JCALongThreadlargestThreadCount	NA	Monitors the largest number of threads that have ever simultaneously been in the pool for JCA long-running-threads.	ConfigFile

JBoss JMS Performance

This Aspect monitors the JBoss Application Server's JMS utilization and performance.

CI Type	Policy Template	Indicator	Description	Policy Type
JBoss AS	JBoss_JMSTopicSubscriptionCount	NA	Monitors the number of (durable and non-durable) subscribers for the JMS Topic.	ConfigFile
JBoss AS	JBoss_JMSTopicMessagesAdded	NA	Monitors the number of messages added to the JMS Topic since it	ConfigFile

CI Type	Policy Template	Indicator	Description	Policy Type
			was created.	
JBoss AS	JBoss_JMSTopicDurableMessageCount	NA	Monitors the number of messages for all durable subscribers for the JMS Topic.	ConfigFile
JBoss AS	JBoss_JMSTopicDurableMessagePct	JMSServerUtilization:High, JMSServerUtilization:Normal	Monitors the percentage of messages for all durable subscribers for the JMS topic.	Measurement Threshold
JBoss AS	JBoss_JMSTopicNonDurableSubscriptionCount	NA	Monitors the number of non-durable subscribers for the JMS Topic.	ConfigFile
JBoss AS	JBoss_JMSTopicMessageCount	NA	Monitors the number of messages currently in the JMS Topic.	ConfigFile
JBoss AS	JBoss_JMSQueueDeliveringCount	NA	Monitors the number of	ConfigFile

CI Type	Policy Template	Indicator	Description	Policy Type
			messages the JMS Queue is currently delivering to its consumers.	
JBoss AS	JBoss_JMSTopicDeliveringCount	NA	Monitors the number of messages the JMS Topic is currently delivering to its consumers.	ConfigFile
JBoss AS	JBoss_JMSQueueScheduledCount	NA	Monitors the number of scheduled messages in the JMS Queue	ConfigFile
JBoss AS	JBoss_JMSTopicDurableSubscriptionCount	NA	Monitors the number of durable subscribers for the JMS Topic.	ConfigFile
JBoss AS	JBoss_JMSQueueConsumerCount	NA	Monitors the number of consumers consuming messages from the	ConfigFile

CI Type	Policy Template	Indicator	Description	Policy Type
			JMS Queue.	
JBoss AS	JBoss_JMSQueueMessageCount	NA	Monitors the number of messages currently in the JMS Queue.	ConfigFile
JBoss AS	JBoss_JMSQueueMessagesAdded	NA	Monitors the number of messages added to the JMS Queue since it was created.	ConfigFile
JBoss AS	JBoss_JMSTopicNonDurableMessagePct	JMSServerUtilization:High, JMSServerUtilization:Normal	Monitors the percentage of messages for all non-durable subscribers for the JMS topic.	Measurement Threshold
JBoss AS	JBoss_JMSTopicNonDurableMessageCount	NA	Monitors the number of messages for all non-durable subscribers for the JMS Topic.	ConfigFile

JBoss Transaction Status

This Aspect monitors the JBoss Application Server Transaction activities.

CI Type	Policy Template	Indicator	Description	Policy Type
JBoss AS	JBoss_ TranResourceRollbackPct	TransactionResourceErrors:High, TransactionResourceErrors:Normal	Monitors the percentage of transactions that are rolled back because of resource failure.	Measurement Threshold
JBoss AS	JBoss_TransactionsNested	NA	Monitors the total number of nested transactions that are created.	ConfigFile
JBoss AS	JBoss_ TranTimeoutPct	TransactionTime:High, TransactionTime:Normal	Monitors the percentage of transactions that have rolled back due to time out.	Measurement Threshold
JBoss AS	JBoss_ TransactionsAppRollbacks	NA	Monitors the number of transactions that have been rolled back based on the application request.	ConfigFile

CI Type	Policy Template	Indicator	Description	Policy Type
JBoss AS	JBoss_TransactionsCommitted	NA	Monitors the number of committed transactions.	ConfigFile
JBoss AS	JBoss_TransactionsTimedOut	NA	Monitors the number of transactions that have rolled back due to timeout.	ConfigFile
JBoss AS	JBoss_TransactionsAborted	NA	Monitors the number of aborted transactions.	ConfigFile
JBoss AS	JBoss_TransactionsResourceRollbacks	NA	Monitors the number of transactions that rolled back due to resource failure.	ConfigFile
JBoss AS	JBoss_TransactionsHeuristics	NA	Monitors the number of transactions which have terminated because of heuristic outcomes.	ConfigFile
JBoss AS	JBoss_TransactionsTotal	NA	Monitors the total number of transactions.	ConfigFile

CI Type	Policy Template	Indicator	Description	Policy Type
			s (top-level and nested) created.	
JBoss AS	JBoss_TransApplicationRollbackPct	TransactionApplicationErrors:High, TransactionApplicationErrors:Normal	Monitors the percentage of transactions that have been rolled back based on the request sent by an application.	Measurement Threshold

JBoss EJB Performance

This Aspect monitors the EJB transactions and pool status of the JBoss Application Server.

CI Type	Policy Template	Indicator	Description	Policy Type
JBoss AS	JBoss_EJBMessageDrivenBeanPoolCurrentSize	NA	Monitors the current size of EJB Message Driven Bean pool.	ConfigFile
JBoss AS	JBoss_EJBMessageDrivenBeanRemoveCountRt	EJBPerformance:Low, EJBPerformance:Normal	Monitors the number of EJB Message Driven Bean instances removed per second.	Measurement Threshold

CI Type	Policy Template	Indicator	Description	Policy Type
JBoss AS	JBoss_ EJBStatelessBeanPoolMaxSize	NA	Monitors the maximum size of EJB Stateless Session Bean pool.	ConfigFile
JBoss AS	JBoss_ EJBMessageDrivenBeanCreateCountRt	EJBPerformance:Low, EJBPerformance:Normal	Monitors the number of EJB Message Driven Bean instances created per second.	Measurement Threshold
JBoss AS	JBoss_ EJBStatefulBeanPassivatedCountRt	EJBPerformance:Low, EJBPerformance:Normal	Monitors the number of EJB Stateful Session Bean instances passivated per second.	Measurement Threshold
JBoss AS	JBoss_ EJBStatelessBeanCreateCountRt	EJBPerformance:Low, EJBPerformance:Normal	Monitors the number of EJB Stateless Session Bean instances created per second.	Measurement Threshold
JBoss AS	JBoss_ EJBMessageDrivenBeanAvailableCount	NA	Monitors the number of available (i.e. not in use) EJB	ConfigFile

CI Type	Policy Template	Indicator	Description	Policy Type
			Message Driven Bean instances in the pool.	
JBoss AS	JBoss_ EJBStatefulBeanCreateCountRt	EJBPerformance:Low, EJBPerformance:Normal	Monitors the number of EJB Stateful Session Bean instances created per second.	Measurement Threshold
JBoss AS	JBoss_ EJBStatefulBeanPoolCurrentSize	NA	Monitors the current size of EJB Stateful Session Bean pool.	ConfigFile
JBoss AS	JBoss_ EJBStatefulBeanRemoveCountRt	EJBPerformance:Low, EJBPerformance:Normal	Monitors the number of EJB Stateful Session Bean instances removed per second.	Measurement Threshold
JBoss AS	JBoss_ EJBStatelessBeanAvailableCount	NA	Monitors the number of available (but not in use) EJB Stateless Bean instances in the pool.	ConfigFile

CI Type	Policy Template	Indicator	Description	Policy Type
JBoss AS	JBoss_EJBStatefulBeanPoolMaxSize	NA	Monitors the maximum size of EJB Stateful Session Bean pool.	ConfigFile
JBoss AS	JBoss_EJBStatelessBeanPoolCurrentSize	NA	Monitors the current size of EJB Stateless Session Bean pool.	ConfigFile
JBoss AS	JBoss_EJBMessageDrivenBeanPoolMaxSize	NA	Monitors the maximum size of EJB Message Driven Bean pool.	ConfigFile
JBoss AS	JBoss_EJBStatelessBeanRemoveCountRt	EJBPerformance:Low, EJBPerformance:Normal	Monitors the number of EJB Stateless Session Bean instances removed per second.	Measurement Threshold
JBoss AS	JBoss_EJBStatefulBeanAvailableCount	NA	Monitors the number of available (but not in use) EJB Stateful Bean instances in the pool.	ConfigFile

JBoss Application Status

This Aspect monitors the status of the JBoss application.

CI Type	Policy Template	Indicator	Description	Policy Type
JBoss AS	JBoss_ApplicationStatus	ApplicationStatus:High, ApplicationStatus:Normal	Monitors the status of JBoss applications.	Measurement Threshold

JBoss MP Self-Monitoring

This Aspect monitors the JBoss MP components. This aspect ensures to restart the collector and resume monitoring when the server is restarted or if there is any other failure. Ensure this Aspect is deployed along with other JBoss MP Aspects.

CI Type	Policy Template	Indicator	Description	Policy Type
Computer	JBoss_Collector_Availability	NA	Monitors the status of JBoss MP Collector.	Measurement Threshold
Computer	JBoss_Collector_Availability_Check	NA	Runs the JBoss Collector Availability every VERYHIGH schedule.	Scheduled Task
Computer	JBoss_MPLog	NA	Monitors the JBoss Perl, Discovery, and Collector Log files.	LogFile Entry
Computer	JBoss_Messages	NA	JBoss Message Interceptor	Open Message Interface

JBoss Base

The Base Aspect is used for monitoring JBoss Application Servers that contain the config, message, scheduler, and logger policies.

CI Type	Policy Template	Indicator	Description	Policy Type
JBoss AS	JBoss_Low	NA	Runs the JBoss Collector/Analyzer every LOW schedule.	Scheduled Task
JBoss	JBoss_	NA	Discovers JBoss Server Domains, Clusters,	Service

CI Type	Policy Template	Indicator	Description	Policy Type
AS	Discovery		Application Servers along with deployed applications, and JDBC datasources.	Auto-Discovery
JBoss AS	JBoss_High	NA	Runs the JBoss Collector/Analyzer every HIGH schedule.	Scheduled Task
JBoss AS	JBoss_Medium	NA	Runs the JBoss Collector/Analyzer every MEDIUM schedule.	Scheduled Task
JBoss AS	JBoss_Configuration	NA	JBoss Application Server Configuration	ConfigFile
JBoss AS	JBoss_LogTemplate	NA	Monitors the JBoss Application server's FATAL, ERROR and WARN level messages.	LogFile Entry
JBoss AS	JBoss_MPLog	NA	Monitors the JBoss Perl, Discovery and Collector Log files.	LogFile Entry
JBoss AS	JBoss_VeryHigh	NA	Runs the JBoss Collector/Analyzer every VERYHIGH schedule.	Scheduled Task
JBoss AS	JBoss_Messages	NA	JBoss Message Interceptor	Open Message Interface

JBoss System Thread Statistics

This Aspect monitors the thread statistics of the JBoss system.

CI Type	Policy Template	Indicator	Description	Policy Type
JBoss AS	JBoss_SysThreadQueueSize	NA	Monitors the queue size of system threads.	ConfigFile
JBoss AS	JBoss_SysThreadQueueUtilPct	ConnectionsInUse:High, ConnectionsInUse:Normal	Monitors the system thread queue's percentage of utilization.	Measurement Threshold
JBoss AS	JBoss_SysThreadMaxQueueSize	NA	Monitors the maximum queue size of the system thread.	ConfigFile

Parameters

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

The parameters are grouped as follows:

- Instance Parameters - These parameters are essential for monitoring JBoss Application Servers. For example: JBoss Server Port.
- Mandatory Parameters - These parameters contain the essential information required by policy templates. For example: JBoss JMX Username and JBoss JMX Password.
- Expert Parameters - These parameters can be used by SMEs and Administrators on a particular node. For example: Frequency of Medium Scheduler is an expert parameter.

Grouping of Parameters

The following is a grouping of parameters used to monitor the OMi MP for JBoss Application Server:

Parameter	Parameter Type	Description	Default Values
JBoss Application Instance	Instance	Application instance for which data needs to be fetched.	
JBoss JMX Username	Mandatory	Username corresponding to this profile	
JBoss JMX Password	Mandatory	Password corresponding to this profile	
JBoss JAVA Home	Optional	JBoss Application Server Home	
JBoss Application Server JMX Port Number	Optional	JBoss Application Server JMX Port Number	

Parameter	Parameter Type	Description	Default Values
JBoss Application Server SSL Keystore File Path	Optional	JBoss Application Server SSL Keystore File Path	
JBoss Application SSL Keystore File Password	Optional	JBoss Application SSL Keystore File Password	
JBoss Application Server Jar File Path	Optional	JBoss Application Server Jar File Path	
Frequency of JBoss MP High Scheduler (Common Setting)	Expert	Frequency of data collection when the scheduler interval is set to HIGH. You can define the frequency in minutes between 0 and 59. Example 15. The frequency changes when you modify the value from any deployed Aspect or Management Template.	0 to 59 minutes
Frequency of JBoss MP Application Log Template (Common Setting)	Expert	Frequency for monitoring JBoss MP Application Log Template with defined patterns. Frequency should be multiple of minutes within the range 0 to 59 minutes only. Example 1. The frequency changes when you modify the value from any deployed Aspect or Management Template.	0 to 59 minutes
Frequency of JBoss MP Low Scheduler (Common Setting)	Expert	Frequency for the scheduler which is expected to run on low interval. Frequency should be multiple of hours within the range of 1 to 24 hours only. Example 24. The frequency changes when you modify the value from any deployed Aspect or Management Template.	1 to 24 hours
Frequency of JBoss MP Medium Scheduler (Common Setting)	Expert	Frequency for the scheduler which is expected to run on medium interval. Frequency should be multiple of hours within the range of 1 to 24 hours only. Example 1. The frequency changes when you modify the value from any deployed Aspect or Management Template.	1 to 24 hours
Frequency of JBoss MP Log on Node (Common Setting)	Expert	Frequency for monitoring JBoss MP Logs with defined patterns. Frequency should be multiple of minutes within the range 0 to 59 minutes only. Example 5. The frequency changes when you modify the value from	0 to 59 minutes

Parameter	Parameter Type	Description	Default Values
		any deployed Aspect or Management Template.	
Frequency of JBoss MP VeryHigh Scheduler (Common Setting)	Expert	Frequency for the scheduler which is expected to run on very short interval. Frequency should be multiple of minutes within the range 0 to 59 minutes only. Example 5. The frequency changes when you modify the value from any deployed Aspect or Management Template.	0 to 59 minutes

Configuration Items (CIs) and Configuration Item Types (CITs)

CIs are components that need to be managed to deliver an IT Service. CIs typically include IT services, hardware, and software. CIT describes the type of a CI and its attributes. The OMi MP for JBoss Application Server consists of the following CIs:

- Computer
- JBoss AS
- J2EE Domain
- JVM
- Web Application
- Oracle
- J2EE Application
- JDBC Data Source
- CICollection (JBoss Server Group)
- EJB Module
- Entity Bean
- Message Driven Bean
- Stateless Session Bean
- Stateful Session Bean

- Web Module
- Servlet

Run-time Service Model (RTSM) Views

The RTSM Views¹ for OMi MP for JBoss Application Server enables you to visualize the topology of JBoss Application Server environment that you want to monitor. The RTSM Views for OMi MP for JBoss Application Server can be used to view and manage the Event Perspective and Health Perspective of the JBoss Application Server CIs discovered using JBoss Discovery Aspect. You can also use RTSM Views for assigning and tuning the OMi MP for JBoss Application Server in the JBoss Application Server environment.

How to Access RTSM Views

1. Open the RTSM Views:

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

On OMi 10.x, click **Administration > RTSM Administration > Modeling > Modeling Studio > Resources**.

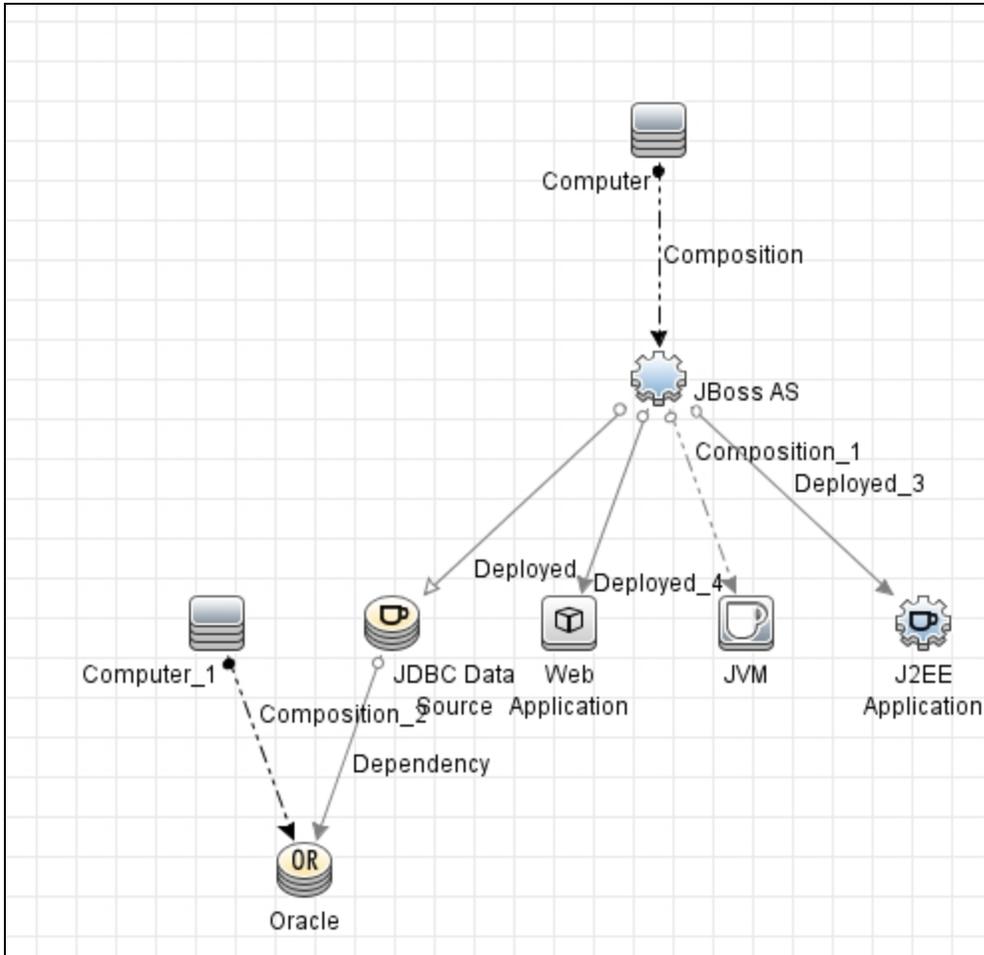
2. Select **Views** from the **Resource Type** drop-down list.
3. Select **Operations Management > J2EE Application Servers > JBoss_Deployment_MP**.

By default, the OMi MP for JBoss Application Server contains the following RTSM Views:

JBoss_Topology_MP: This RTSM view shows the JBoss AS, Computer, JVM, JDBC Data Source, Oracle, J2EE Application, and Web Application CI types. You can use this view if you want to have a snapshot of the CIs used in JBoss Application Server health perspective.

The following image shows the relationship among the CI types:

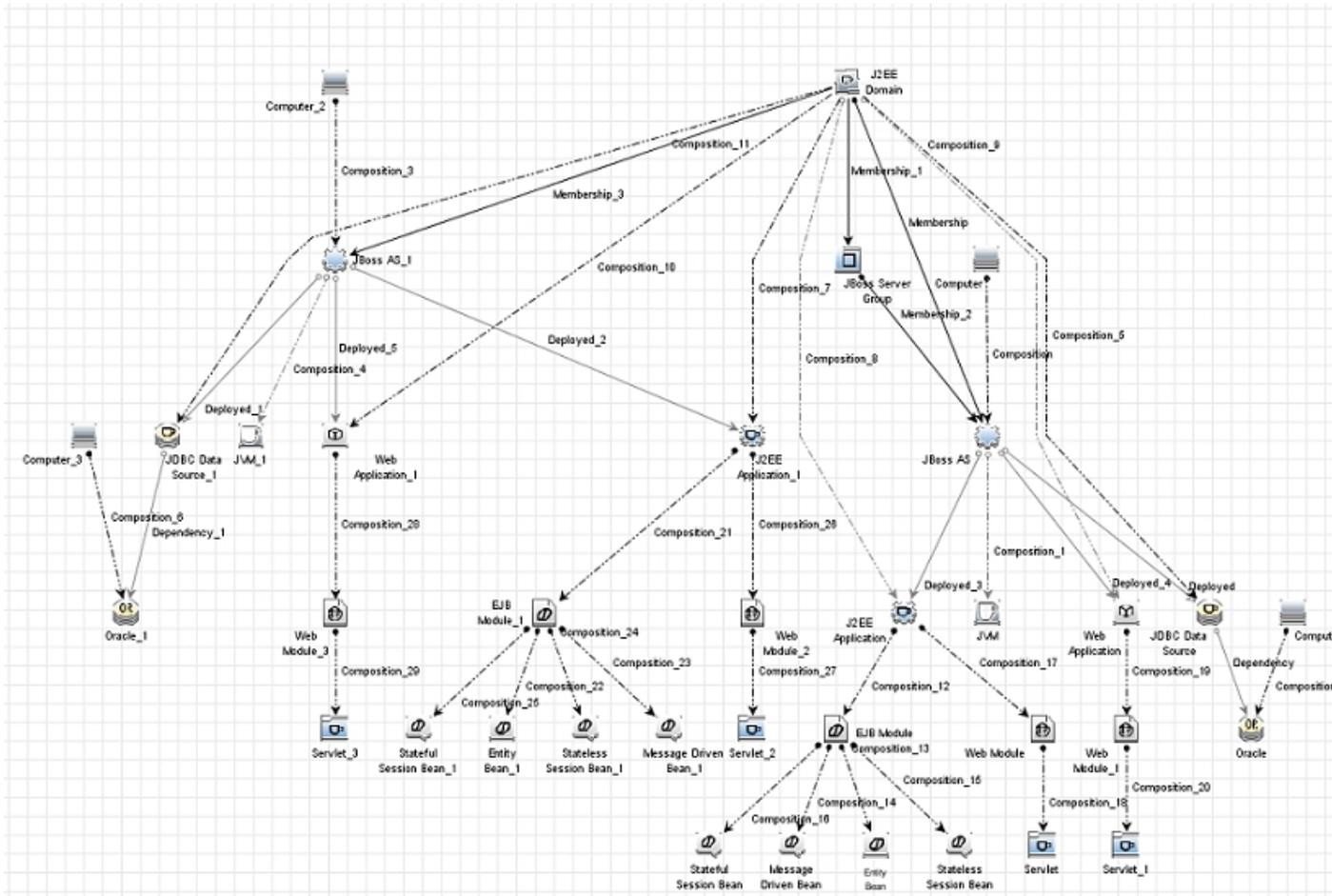
¹An RTSM View enables you to build and visualize a subset of the overall RTSM model.



JBoss_Deployment_MP: This RTSM view shows the JBoss AS, JBoss ServerGroup, JDBC Datasource, J2EE Application, Computer, JVM, and Oracle CIs. To have a broader view of the CI types used in the JBoss Application Server environment, you can use the **JBoss_Deployment_MP**. You can also:

- Visualize the Event and Health perspectives of the JBoss Application Server CIs that you monitor.
- Visualize events that are specific to the monitored JBoss Application Servers.
- Assign and tune the OMi MP for JBoss Application Server deployment in the JBoss Application Server environment.
- Monitor composite applications.

The following image shows the relationship among the CI types:



Event Type Indicators (ETIs)

ETIs categorizes events based on the type of occurrence. The OMi MP for JBoss Application Server provides the following Event Type Indicators to monitor JBoss related events.

How to Access JBoss ETIs

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**.

- In the CI Types pane, select **Configuration Item > Infrastructure Element > Running Software > J2EE**.

The OMi MP for JBoss Application Server includes the following Event Type Indicators (ETIs) to monitor the JBoss Application Server related events:

CI Type	ETI	Description	Value
J2EE Server	Server Status	The server status in terms of availability.	High, Normal
J2EE Server	Thread Pool Utilization	The number of threads used in the server to execute tasks.	High, Normal
J2EE Server	Active Sockets Count	The number of HTTP socket connections opened to the server.	High, Normal
J2EE Server	Server Sessions	The number of sessions opened to the server.	High, Normal
J2EE Server	Servlets Loaded	The number of servlets currently loaded for a web application.	High, Normal
J2EE Server	Thread Pool Availability	The availability of threads in the thread pool.	High, Normal
J2EE Server	Thread Pool Utilization	The number of threads used in the server to execute the tasks.	High, Normal
J2EE Server	Thread Hung Rate	The rate at which the threads are declared hung.	High, Normal
J2EE Server	Transaction Time	Time taken to complete a transaction.	High, Normal
J2EE Server	Transactions Rolled Back	Percentage of transactions rolled back due to system, resource or other errors.	High, Normal
J2EE Server	Transactions Rolled Back Rate	Percentage of transactions rolled back due to system, resource or other errors.	High, Normal
J2EE Server	Transaction Timeout Rate	The number of transactions that timed out per second.	High, Normal
J2EE Server	Transaction Commit Rate	The number of transactions that were committed per second.	High, Normal
J2EE Server	Transaction Start Rate	The number of transactions that were begun per second.	High, Normal
J2EE	Transaction Capacity	The number of simultaneous transactions in progress.	High,

CI Type	ETI	Description	Value
Server	Utilization		Normal
J2EE Server	JMS Server Utilization	The JMS server queue utilization.	High, Normal
J2EE Server	Execute Queue Wait Count	The number of client requests waiting to be serviced by the execute queue.	High, Normal
J2EE Server	Transaction Resource Errors	Transaction errors caused due to system resource errors.	High, Normal
J2EE Server	Transaction Application Errors	Transaction errors caused due to application errors.	High, Normal
J2EE Server	Transaction Timeout Errors	Transaction errors caused due to timeout errors.	High, Normal
J2EE Server	Transaction System Errors	Transaction errors caused due to system errors.	High, Normal
J2EE Server	Deferred Thread Requests	Number of threads that were denied a thread for execution because of the maximum thread constraint.	High, Normal
J2EE Server	Thread Request Wait Time	The time a request had to wait for a thread.	High, Normal
J2EE Server	Threads Request Pending	The requests that are pending because of available threads.	High, Normal
J2EE Server	Thread Request Service Time	The time a request had to wait for a thread.	High, Normal
J2EE Server	JVM Memory Utilization	The percentage of heap size used.	High, Normal
J2EE Server	Total Garbage Collection Count	The number of times garbage collector has run.	High, Normal
J2EE Server	Total Garbage Collection Time	Total time taken for garbage collection.	High, Normal
J2EE Server	Total Number of Threads	Total number of threads spawned for garbage collection.	High, Normal
J2EE Server	All Processors Average Load	Average load on all the processors on the system.	High, Normal
J2EE Server	Cluster Outgoing Message Failure Rate	The number of multicast messages to the cluster that were sent again.	High, Normal
J2EE	Cluster Incoming	The number of multicast messages from the cluster that	High,

CI Type	ETI	Description	Value
Server	Message Failure Rate	were lost.	Normal
J2EE Server	Cluster Health	Cluster Health in terms of performance.	High, Normal
J2EE Server	Cluster Status	Cluster Status in terms of availability.	High, Normal
J2EE Server	EJB Transaction Throughput Rate	Number of EJBs transactions completed in unit time.	High, Normal
J2EE Server	EJB Transaction Rollback Rate	Number of EJB transactions rolled back in unit time.	High, Normal
J2EE Server	EJB FreePool Wait Rate	The number of times per minute no EJBs were available from the free pool.	High, Normal
J2EE Server	EJB Concurrent Lives	The average number of bean objects in the pool.	High, Normal
J2EE Server	EJB Timeout Rate	The number of times per minute a client timed out waiting for an EJB.	High, Normal
J2EE Server	EJB Performance	The performance statistics namely cache utilization.	High, Normal
J2EE Server	EJB Missed Count Rate	The total number of times a failed attempt was made to get an instance from the free pool.	High, Normal
J2EE Server	EJB Utilization	The utilization of the EJB pool.	High, Normal
J2EE Server	Servlet Performance	The performance statistics such as execution time.	High, Normal
J2EE Server	Servlet Requests	Number of incoming requests to the servlet.	High, Normal
J2EE Server	HTTP Sessions	Number of open servlet sessions.	High, Normal
J2EE Server	JDBC Connection Pool Wait Count	The number of clients waiting for a JDBC connection.	High, Normal
J2EE Server	Data Source Connection Waiters	The average number of threads waiting for a connection from the connection pool.	High, Normal
J2EE Server	Data Source Connection Pool Utilization	DataSource connection pool utilization.	High, Normal

CI Type	ETI	Description	Value
J2EE Server	Data Source Leaked Connections Rate	The rate of new leaked JDBC connections.	High, Normal
J2EE Server	Data Source Connection Pool Availability	Availability of JDBC connections in the connection pool.	High, Normal
J2EE Server	Data Source Connection Pool Performance	DataSource connection pool performance.	High, Normal

Health Indicators (HIs)

HIs analyze the events that occur in the JBoss Application Servers and report the health of the JBoss Application Server CIs.

How to Access JBoss Application Server HIs

- To access the Health Indicators:

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

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

- Click **Configuration Item > Infrastructure Element > RunningSoftware > J2EE Server > JBoss AS**.

The OMi MP for JBoss Application Server includes the following Health Indicators (HIs) to monitor the JBoss Application Server related events:

CI Type	HI	Description	Value
J2EE Server	Active Sockets Count	Number of HTTP socket connections opened to the server.	High, Normal
J2EE Server	Application Server Load	Load on the application server.	High, Normal
J2EE Server	Deferred Thread Requests	The number of requests that were denied a thread for execution because of the max-threads-constraint.	High, Normal

CI Type	HI	Description	Value
J2EE Server	HTTP Request Average Service Time	Average time required to service an HTTP request.	High, Normal
J2EE Server	HTTP Request Total Service Time	Total time required to service HTTP requests.	High, Normal
J2EE Server	HTTP Server Active Connections	Number of connections currently open.	High, Normal
J2EE Server	HTTP Server Active Request	Child servers currently in the request processing phase.	High, Normal
J2EE Server	HTTP Server Connection Time	Total time spent servicing HTTP connections.	High, Normal
J2EE Server	JMS Active Connection Count	Number of active JMS connections.	High, Normal
J2EE Server	JMS Server Utilization	JMS server queue utilization.	High, Normal
J2EE Server	Oracle Web Cache Average Latency Current Interval	Average latency for 10 second intervals to process requests for Oracle Web Cache.	High, Normal
J2EE Server	Oracle Web Cache Latency Since Start	Average number of seconds to process requests for Oracle Web Cache since the application Web server started.	High, Normal
J2EE Server	Server Sessions	Number of sessions opened to this server.	High, Normal
J2EE Server	Server Status	Shows the server status in terms of availability.	Unavailable, Available
J2EE Server	Servlets Loaded	Number of servlets currently loaded for a web application (cumulative value per server).	High, Normal
J2EE Server	Thread Hung Rate	Rate at which the threads are declared hung.	High, Normal
J2EE Server	Thread Pool Availability	The availability of the threads in the Thread Pool.	Low, Normal
J2EE Server	Thread Pool Utilization	The number of threads used in the server to execute tasks.	High, Normal
J2EE Server	Thread Request Service Time	The time a request has to wait for a thread.	High, Normal

CI Type	HI	Description	Value
J2EE Server	Thread Request Wait Time	The time (in milliseconds) a request had to wait for a thread.	High, Normal
J2EE Server	Threads Request Pending	Requests that are pending because they are waiting for an available thread.	High, Normal
J2EE Server	Transaction Application Errors	Transaction errors due to application errors.	High, Normal
J2EE Server	Transaction Capacity Utilization	The number of simultaneous in-progress transactions.	High, Normal
J2EE Server	Transaction Commit Rate	The number of transactions that were committed per second.	High, Normal
J2EE Server	Transaction Resource Errors	Transaction errors caused due to system resource errors.	High, Normal
J2EE Server	Transaction Rollback Rate	The number of transactions rolled back due to system, resource, or others.	High, Normal
J2EE Server	Transaction Start Rate	The number of transactions that were begun per second.	High, Normal
J2EE Server	Transaction System Errors	Transaction errors caused due to system errors.	High, Normal
J2EE Server	Transaction Time	Time taken to complete a transaction.	High, Normal
J2EE Server	Transaction Timeout Errors	The number of transaction errors caused due to transaction timeout.	High, Normal
J2EE Server	Transaction Timeout Rate	The number of transactions that timed out per second.	High, Normal
J2EE Server	Transactions Rolled Back	Number or percentage of transactions rolled back due to system, resource or other errors.	High, Normal
J2EE Server	EJB Concurrent Lives	The average number of bean objects in the pool.	High, Normal
J2EE Server	EJB Utilization	The utilization of the EJB pool.	High, Normal
J2EE Server	Execute Queue Wait Count	The number of client requests waiting to be serviced by the execute queue.	High, Normal
J2EE Server	HTTP Sessions	Number of open HTTP sessions.	High, Normal

CI Type	HI	Description	Value
J2EE Server	EJB Missed Count Rate	Total number of times a failed attempt was made to get an instance from the free pool.	High, Normal
J2EE Server	EJB Free Pool Wait Rate	The number of times no EJBs were available from the free pool for each minute.	High, Normal
J2EE Server	EJB Performance	The performance statistics such as cache utilization.	Low, Normal
J2EE Server	EJB Timeout Rate	The number of times per minute a client timed out waiting for an EJB.	High, Normal
J2EE Server	EJB Transaction Rollback Rate	Number of EJB Transaction Rolled back in unit time.	High, Normal
J2EE Server	Servlet Performance	Performance statistics such as execution time.	Low, Normal
J2EE Server	Servlet Requests	Number of incoming requests to the servlet.	High, Normal
J2EE Server	Connections in Use	Number of currently used JDBC connections.	High, Normal
J2EE Server	JDBC Connection Pool Wait Count	Number of clients waiting for a JDBC connection.	High, Normal
J2EE Server	Data Source Connection Pool Availability	Availability of JDBC connections in the connection pool.	Low, Normal
J2EE Server	Data Source Connection Pool Failures	Number of failed attempts to refresh a connection in the connection pool.	Critical, Normal
J2EE Server	Data Source Connection Pool Utilization	Utilization of the data source connection pool	High, Normal
J2EE Server	Data Source Connection Pool Performance	Performance of the data source connection pool	Low, Normal
J2EE Server	Data Source Connection Waiters	The average number of threads waiting for a connection from the connection pool.	High, Normal
J2EE Server	JDBC Active Connection Count	Number of JDBC connections that are Active.	High, Normal
J2EE	Total Number of	Total number of threads for garbage collection.	High,

CI Type	HI	Description	Value
Server	Threads		Normal
J2EE Server	Total Garbage Collection Count	Number of times garbage collector has run.	High, Normal
J2EE Server	Total Garbage Collection Time	Total time taken for garbage collection.	High, Normal
J2EE Server	JVM Memory Utilization	The percentage of heap size used.	High, Normal
J2EE Server	All Processors Average Load	Average load on all the processors on the system.	High, Normal
J2EE Cluster	Cluster Health	Cluster health in terms of performance.	Poor, Normal
J2EE Cluster	Cluster Incoming Message Failure Rate	The number of multicast messages that were lost from the cluster.	High, Normal
J2EE Cluster	Cluster Outgoing Message Failure Rate	The number of multicast messages that were sent to the cluster.	High, Normal
J2EE Cluster	Cluster Status	Cluster Status in terms of availability.	Started, Partial Stopped, Stopped
J2EE Server	Connections in Use	Number of currently used JDBC connections.	High, Normal
J2EE Server	Data Source Connection Waiters	The average number of threads waiting for a connection from the connection pool.	High, Normal
J2EE Server	Data Source Connection Pool Availability	Availability of JDBC connections in the connection pool.	Low, Normal
J2EE Server	Data Source Connection Pool Failures	The number of failed attempts to refresh a connection in the connection pool.	Normal, Critical
J2EE Server	Data Source Connection Pool Performance	Data source connection pool performance.	Low, Normal
J2EE Server	Data Source Connection Pool Utilization	Data source connection pool utilization.	High, Normal

CI Type	HI	Description	Value
J2EE Server	Data Source Leaked Connections Rate	The rate of new leaked JDBC connections.	High, Normal
J2EE Server	JDBC Active Connections Count	Active JDBC connections	High, Normal
J2EE Server	JDBC Connection Pool Wait Count	The number of clients waiting for a JDBC connection.	High, Normal
J2EE Server	EJB Concurrent Lives	The average number of bean objects in the pool.	High, Normal
J2EE Server	EJB Free Pool Wait Rate	The number of times per minute no EJBs were available from the free pool.	High, Normal
J2EE Server	EJB Missed Count Rate	The total number of times a failed attempt was made to get an instance from the free pool.	High, Normal
J2EE Server	EJB Performance	The performance statistics such as cache utilization.	Low, Normal
J2EE Server	EJB Timeout Rate	The number of times per minute a client timed out waiting for an EJB.	High, Normal
J2EE Server	EJB Transaction Rollback Rate	Number of EJB transaction rolled back in unit time.	High, Normal
J2EE Server	EJB Transaction Throughput Rate	Number of EJBs Transactions completed in unit time.	High, Normal
J2EE Server	EJB Utilization	The utilization of the EJB pool.	High, Normal
J2EE Server	HTTP Sessions	Number of open HTTP sessions.	High, Normal
J2EE Server	Servlet Performance	The performance statistics such as execution time.	Low, Normal
J2EE Server	Servlet Requests	Number of incoming requests to the servlet.	High, Normal
J2EE Server	All Processors Average Load	Average load on all the processors on the system.	High, Normal
J2EE Server	Heap Free Current	Amount of free heap available.	Low, Normal
J2EE Server	Heap Size Current	Amount of heap in use.	High, Normal

CI Type	HI	Description	Value
J2EE Server	JVM Memory Utilization	The percentage of heap size used.	High, Normal
J2EE Server	Total Garbage Collection Count	Number of times garbage collector has run.	High, Normal
J2EE Server	Total Garbage Collection Time	Total time taken for garbage collection.	High, Normal
J2EE Server	Total Number of Threads	Total number of threads for garbage collection.	High, Normal
J2EE Server	Domain Status	The status of a domain.	Normal, Poor

Tools

The OMi MP for JBoss Application Server is packaged with tools which helps in administering, monitoring, and troubleshooting the JBoss Application Server CIs. Tools enable operators to perform actions in the context of an event from the Event Browser.

Following are the different types of tools available:

- Executables - Native commands that are launched locally on a host through a deployed Operations Manager Agent.
- Scripts - Different kinds of scripts that are executed on a host through a deployed Operations Manager Agent.

OMi MP for JBoss Application Server comprises of the following tools:

How to Access JBoss Application Server 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 Type pane, click **ConfigurationItem > InfrastructureElement > RunningSoftware > ApplicationServer > J2EE Server > JBoss AS**.

Following are the tools provided by the OMi MP for JBoss Application Server:

CI Type	Tool Category	Tool	Description
Computer	JBoss Monitoring Tools	Start JBoss Monitoring	Starts JBoss monitoring on the managed server.
		Stop JBoss Monitoring	Stops JBoss monitoring on the managed server.
		Restart JBoss Monitoring	Restarts JBoss monitoring on the managed server.
		Data Capture Tool	Captures and archives MP logs and configuration data.
		JBoss Monitoring Status	Checks status of JBoss monitoring on the managed server.

Graph Templates

The OMi MP for JBoss Application Server provides a set of graph templates to monitor the performance of the JBoss Application Servers. The JBoss Graphs are mapped to the JBoss AS CI.

How to Access the JBoss Application Server Graph Templates

1. Open the CI Types pane:

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

On OMi 10.x, click **Administration > Operations Console > Performance Graph Mappings**.

2. In the CI Types pane, select **Configuration Item > Infrastructure Element > Running Software > Application Server > J2EE Server**.

Following are the graph templates provided by the OMi MP for JBoss Application Server:

Graph Family	Graph Templates	Description	Metric Name	Metric Description
JBoss JVM Statistics	JVM Utilization	This graph shows the utilization of the JVM heap and non-heap.	HEAPMEMUTILPCT	Shows the percentage of heap memory used in the JVM
			NONHEAPMEMUTILPCT	Shows the percentage of non-heap memory used in the JVM
	Garbage Collector Statistics	This graph shows the statistics of a Garbage Collector.	COLLECTIONCOUNT	Shows the collection count of the JBoss Garbage Collector.
			COLLECTIONTIME	Shows the collection time of the JBoss Garbage Collector.
			THREADCOUNT	Shows the Thread count of the JBoss Garbage Collector.

Graph Family	Graph Templates	Description	Metric Name	Metric Description
			INTERVALTIME	Shows the Interval Time of the JBoss Garbage Collector.
JBoss Transaction	Transaction Rollback Statistics	This graph shows the Transaction Rollback statistics.	TRANAPPROLBACKSPCT	Shows the percentage of Application Transactions Rolled back.
			TRANRESROLLBACKSPCT	Shows the percentage of Resource Transactions rolled back.
			TRANTIMEDOUTPCT	Shows the percentage of Timed Out transactions.
			TRANROLLBACKSPCT	Shows the percentage of Total Transactions rolled back.
JBoss JCA Statistic	JCA Performance	This graph shows the JCA performance statistics of the JBoss Server.	JCATHDPOLPCTUTL	Shows the current utilization of the JCA WorkManager Thread Pool Percentage.
			JCACONPOLPCTUTL	Shows the utilization of the JCA connection pool in percentage.
			JCACONPOOLWTCNT	Shows the number of threads waiting for a connection from the JCA pool.
			JCACONCRTRATE	Shows the number of new connections created in the JCA

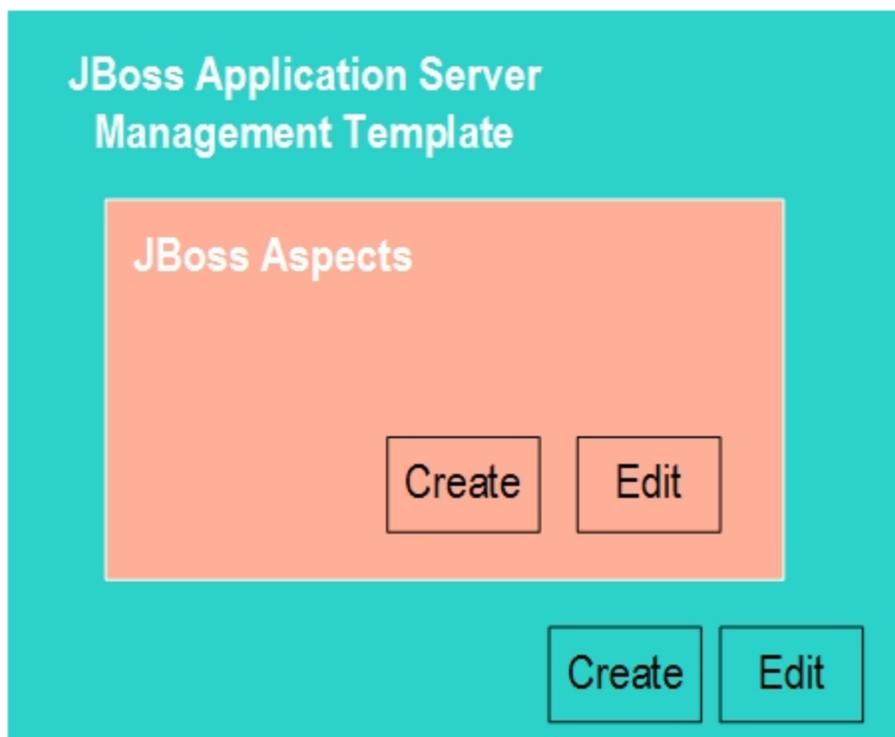
Graph Family	Graph Templates	Description	Metric Name	Metric Description
				pool per second.
			JCACONCLSRATE	Shows the number of connections closed in JCA pool per second.
			JCACONNLEAK	Shows the number of leaked connections in JCA pool.
			JCACONAVGWTTIME	Shows the average time spent waiting for a connection in the JCA pool.
JBoss JCA Long and Short Thread	JCA Long and Short Thread Performance	This graph shows the JCA Long and Short Thread performance statistics.	JCASHORTCRRNTTHRDPCT	Shows the percentage of current Long Threads in JCA.
			JCALONGCRRNTTHRDPCT	Shows the percentage of current Short Threads in JCA.
JBoss Server	Server Status	This graph shows the status of the JBoss Server.	SERVERSTATUS	Shows the status of the JBoss Server.
JBoss System Thread Statistics	System Thread Performance	This graph shows the performance of the system thread statistics.	SYSTHRDQUEUEUTILPCT	Current system thread pool percentage utilization.

Chapter 6: Customizing OMi Management Pack for JBoss Application Server

OMi MP for JBoss Application Server can be customized to suit your monitoring requirements. You can customize the OMi MP for JBoss Application Server using some customization scenarios:

- [Tuning Components of OMi MP for JBoss Application Server](#)
- [Creating new Management Template with JBoss Aspects](#)
- [Creating new Aspects with JBoss policies](#)
- [Customizing Log Files for JBoss Application Servers](#)

Click on the Create or Edit labels to view the customization scenarios for Management Templates and Aspects.



Tuning Components of OMi Management Pack for JBoss Application Server

Parameters are variables that are an integral component of JBoss Management Templates, Aspects, and Policy Templates. Parameters contain default values that are used for monitoring different components of JBoss Application Servers.

Tuning Parameters

You can edit the following parameters:

Parameters	Default Values
Frequency of JBoss MP High Scheduler (Common Setting)	15
Frequency of JBoss MP Low Scheduler (Common Setting)	24
Frequency of JBoss MP Medium Scheduler (Common Setting)	1
Frequency of JBoss MP VeryHigh Scheduler (Common Setting)	5
Frequency	HIGH
Threshold	0.5
Severity	CRITICAL

To modify the frequency of a collection, modify the corresponding Schedule Task policy. To modify the individual policy schedule, modify the corresponding frequency parameters.

After Deploying the JBoss 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 **JBoss_Deployment_View** that contains the CI for which you want to edit the value.

3. In the list of CIs, select the JBoss AS CI for which you want to change the threshold. The Assignment Details pane shows the current parameter values.
4. You can change the value of the default parameter values by following these steps:
 - a. Double-click the **Frequency of JBoss Availability Scheduler** parameter. The Edit Parameter dialog box opens.
 - b. Change the value and click **OK**. The updated parameter is assigned to the selected CIs.

Creating New Management Template with JBoss Aspects

You can create a new JBoss Management Template using the JBoss Aspects.

To create a new Management Template, 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. Click **Configuration Folders > Application Server Management > JBoss Management**.
3. In the Management Templates & Aspects pane, select the new configuration folder and click  **Create Management Template**. The Create Management Template window opens.
4. In the **General** tab, specify a **Name** and **Version** to the new Management Template and click **Next**.
5. In the **Topology View** tab, select **JBoss_Deployment_View**. The Topology View displays all the CI types that you want to manage with this Management Template.
6. From the **CI Type** drop-down list, select **JBoss Domain** CI to which the Management Template can be assigned. Click **Next**.
7. In the **Aspects** tab, add the existing **JBoss Base** Aspect to the Management Template. Click **Next**.
8. In the **Parameters** tab, combine all instances of **Application Instance** parameter.

Similarly, combine all the **JBoss JMX Usernames** and **JBoss JMX Passwords**.

9. Click **Finish** in the Create Management Template window.

The New Management Template appears in the Management Templates & Aspects pane.

If authentication is not enabled for the JMX on the JBoss Application Server, you can mark the user name and password parameters as optional. To mark the parameters as optional, 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. Select the **JBoss Base** Aspect and right-click. Select **Edit Item**.

The JBoss Base Aspect dialog box appears.

3. In the **Policy Templates** tab, select the **JBoss_Configuration** policy template and click  **Edit Policy Template**.

The Properties Page dialog box appears.

4. In the **Policy Data** tab, under **Policy Parameters**, select **JBoss JMX Username**, **LOGIN** and click  **Edit Parameter**.

The Edit Parameter dialog box appears.

5. Uncheck the **Mandatory** check box under the **Flags** group.
6. Click **OK**.
7. Click **Save & Close**.

8. Select the Essential JBoss Management Template and click  **Update to Latest**.

In the Update to Latest... dialog box, select the following options:

- **Select the Update to the latest major and minor version** - This allows the system to update both major and minor version numbers to the latest version.
 - **Update this object and all containing objects, recursively** - This updates all the objects in the entire tree.
9. Click **Next** and **Finish** to update the Essential JBoss Management Template.

The Essential JBoss Management Template version is updated to 1.1.

10. Open the latest version of the Management Template. In the Management Templates & Aspects pane, select the Essential JBoss Management Template version 1.1 and right-click.
11. Select  **Edit Item**.

The Essential JBoss Management Template: Edit Management Template dialog box appears.

- a. In the **Parameters** tab, select the **JBoss JMX Username** and right-click.
- b. Select the **Uncombine** option.

You are prompted if you want to really uncombine the selected parameter.

- c. Click **Yes** to uncombine.

After an uncombine is done, select the **JBoss JMX Username** parameter, right-click, and select **Combine**.

The parameters for the Essential JBoss Management Template is changed from Mandatory to Optional.

Creating New Aspects

You can create a new JBoss Application Server Aspect using JBoss policy templates.

To create a new Aspect, 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. Click **Configuration Folders > Application Server Management > JBoss Management**.
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 name for the new aspect, and then click **Next**.
5. In the **CI Type** tab, select the **JBoss AS** CI to which this Aspect can be assigned.
 - a. If you need the aspect to be assignable to a node independent of its CI type, select **Node Compatible** check box.

- b. Click **Next**.
6. In the **Aspects** tab, add **JBoss Base** and **JBoss MP Self-Monitoring** Aspects.
7. In the **Policy Templates** tab, select the required **Policy Template** and click **Next**.
8. In the **Parameters** tab, if required modify the default values.
9. In the Add New Aspect dialog box, click **Finish** to save the Aspect.

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

Customizing Log Files for JBoss Application Servers

Log files contain important information regarding the status of operations and any information that you want to analyze. IT administrators monitor log files to know the performance of systems in mission critical applications.

By default, log files with the FATAL status are monitored every 1 minute. You can create your own thresholds for monitoring a log file.

You can customize the JBoss_LogTemplate file to monitor the JBoss Application server's WARN and ERROR messages.

Note: The Log Template is a part of the JBoss Base Aspect.

To customize the JBoss_LogTemplate to monitor WARN level messages, perform the following steps:

1. Open the Policy Templates pane:
 - On BSM 9.2x, click **Administration > Operations Management > Monitoring > Policy Templates**.
 - On OMi 10.x, click **Administration > Monitoring > Policy Templates**.
2. In the Policy Templates Group pane, click **Templates grouped by type > Logfile Entry Templates**.
3. Click on the JBoss_LogTemplate and click  **Edit Policy Template...**

The Logfile Entry Policy Editor is shown.

You can also select the JBoss_LogTemplate and right-click. Select **Edit Policy Template**.

Note: You can also edit a policy template from the Management Templates & Aspects pane.

4. Click on the **Rules** tab and set the following:
 - a. Click on  **Event on Matched Rule**.
 - b. Click in the **Rule Description** pane and specify the description. Example: JBoss Application Server's WARN Message.
 - c. In the Rule Content pane, do the following:
 - i. In the **Condition** tab, specify the pattern you want the policy to compare with the log file line. For example: `^<*.date>WARN <*.message>$`.
 - ii. In the **Event Attributes** tab, enter the following details:
 - Specify a title for the event. For example: JBossMP: WARN: <message> LogFile: <\${LOGPATH}> [Policy: JBoss_LogTemplate].
 - Select the level of Severity related to the event.

Icon	Severity Level
	Unknown
	Normal
	Warning
	Minor
	Major
	Critical

- Specify the related CI for the event. For example: `@@<${MSG_NODE_NAME}>`.

5. Click **Save**.

A new version of the policy template is created. You can use deploy the new policy template to the required CI.

Chapter 7: Deployment Scenarios

This section provides information about deployment OMi MP for JBoss Application Server on different configurations of the JBoss Application Servers. You can use OMi MP for JBoss Application Server to monitor the following types of environments:

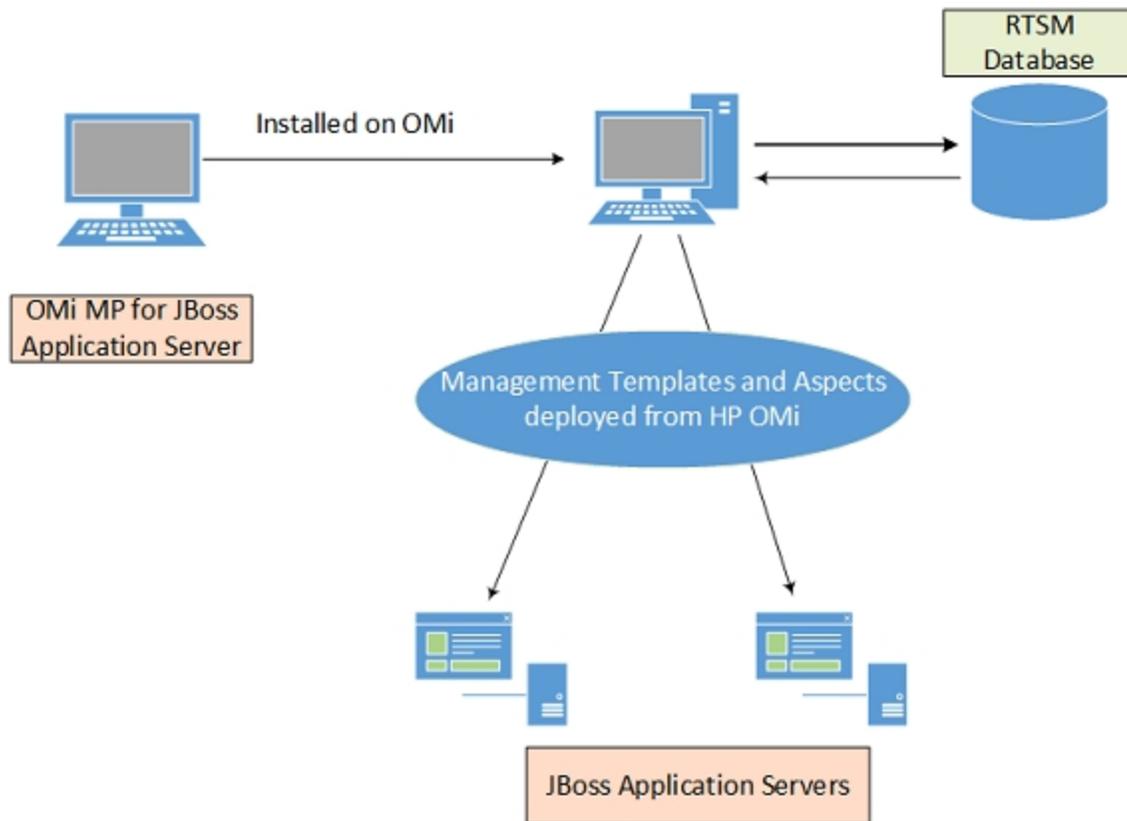
- Standalone
- Domain
- Secure configuration with SSL authentication

JBoss Application Servers in a Standalone Environment

The JBoss standard environment consists of standalone JBoss Application Servers monitored by a management server. Do the following to monitor JBoss Servers in a JBoss standalone environment:

1. Add the nodes you want to monitor to the BSM 9.2x or OMi 10.x console. For more information about adding nodes, see [Task 1: Adding Nodes to the BSM 9.2x or OMi 10.x Console](#).
2. Deploy the JBoss Discovery Aspect to discover the JBoss Application Server CIs on the managed nodes. For more information about deploying Discovery Aspect, see [Task 3: Deploying the JBoss Discovery Aspect](#).
3. Deploy the JBoss Management Template as per your monitoring requirements. For more information about deploying Management Templates, see [Task 5a: Identifying and Deploying JBoss Management Templates](#).

The following figure shows a typical deployment scenario where the OMi MP for JBoss Application Server is deployed on JBoss Application Servers in Standard environment:

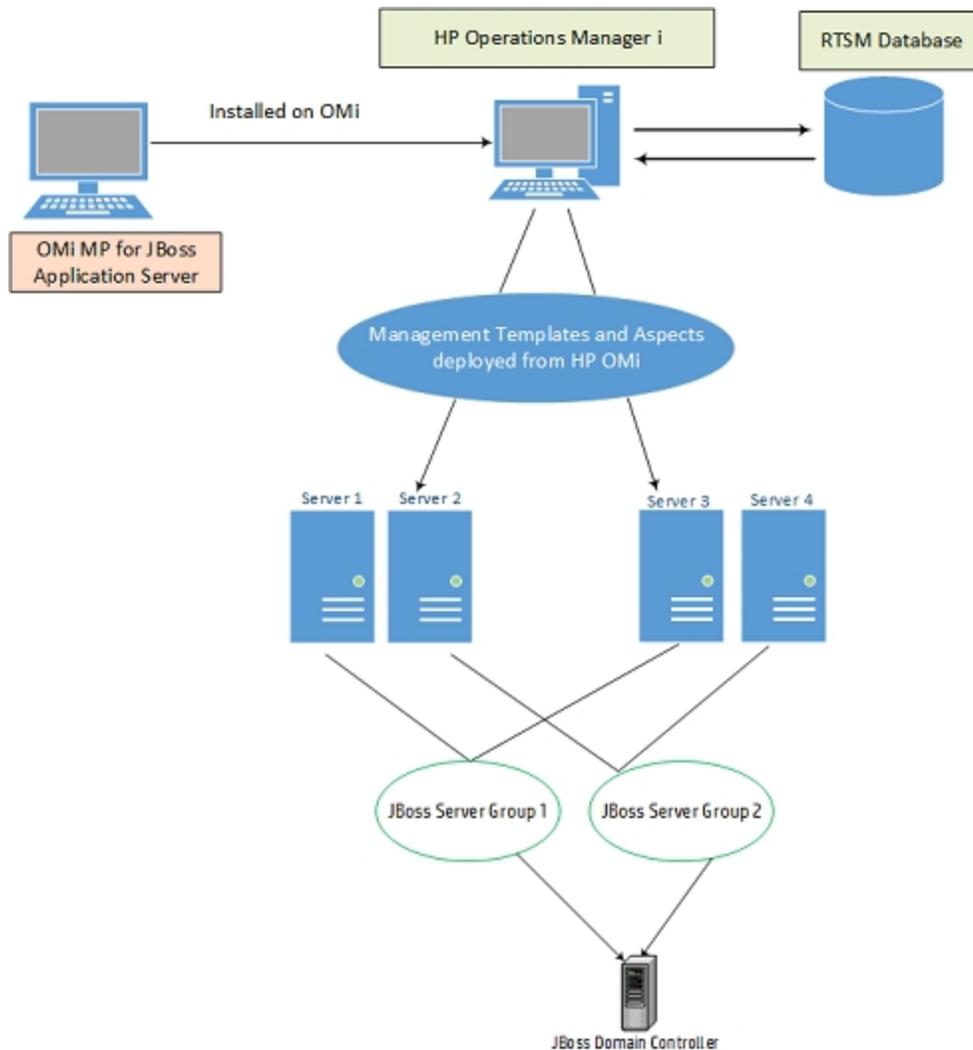


JBoss Application Servers in a Domain Environment

JBoss cluster environment consists of different JBoss Application Server instances connected to each other operating simultaneously to provide load balancing and parallel processing. To deploy OMi MP for JBoss Application Server in the JBoss Domain environment, follow these steps:

1. Add the nodes you want to monitor to the BSM 9.2x or OMi 10.x console. For more information about adding nodes, see [Task 1: Adding Nodes to the BSM 9.2x or OMi 10.x Console](#).
2. Deploy the JBoss Discovery Aspect to discover the JBoss Application Server CIs on the managed nodes. For more information about deploying the Discovery Aspect, see [Task 3: Deploying the JBoss Discovery Aspect](#).
3. Deploy the JBoss Essential Management Template as per your monitoring requirements. For more information about deploying Management Templates, see [Task 5a: Identifying and Deploying JBoss Management Templates](#).

The following figure shows a typical deployment scenario where the OMi MP for JBoss Application Server is deployed on the JBoss Application Servers in the Domain environment:



JBoss Application Servers with SSL Support

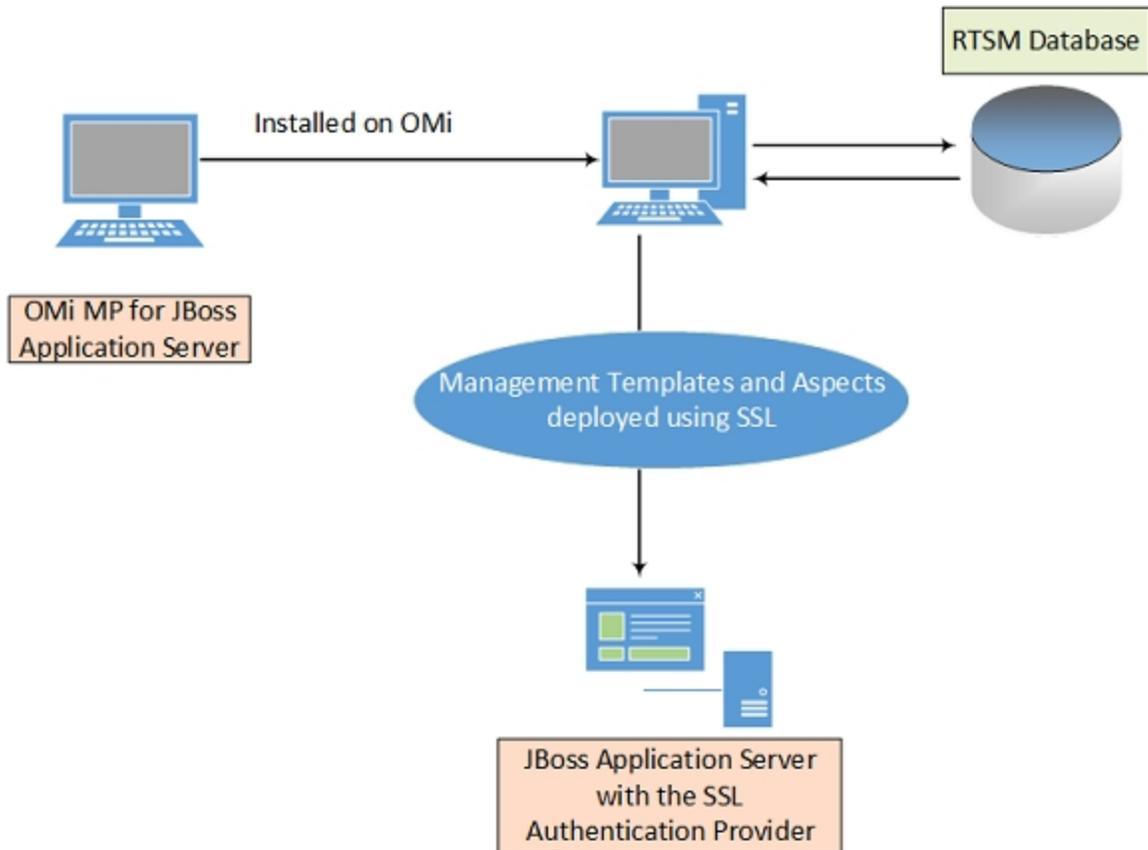
For any task pertaining to online transactions such as secure online banking activities, sharing files, database connections and so on, you must configure an authentication provider. The OMi MP for JBoss Application Server are configured using the Secure Socket Layer (SSL) authentication provider to provide a secure and stable environment.

To deploy OMi MP for JBoss Application Server on JBoss Application Servers using the SSL authentication, follow these steps:

1. Add the nodes you want to monitor to the BSM 9.2x or OMi 10.x console. For more information about adding nodes, see [Task 1: Adding Nodes to the BSM 9.2x or OMi 10.x Console](#).

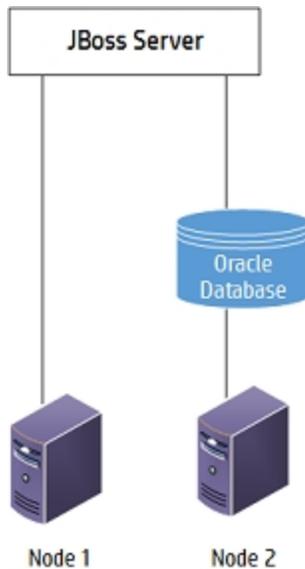
2. Deploy the JBoss Discovery Aspect to discover the JBoss Application Server CIs on the managed nodes. For more information about deploying Discovery Aspect, see [Task 3: Deploying the JBoss Discovery Aspect](#).

The following figure shows a typical deployment example where the OMi MP for JBoss Application Server is deployed on the JBoss Application Servers using the SSL Authentication Provider:



Chapter 8: Monitoring Composite Applications

This section provides information about monitoring Composite Application that includes JBoss Application Server, Oracle Database, and its infrastructure.



Consider an enterprise environment topology for an instance of the Composite Application. The above diagram consists of nodes connected to the JBoss Server and Oracle Database. To monitor JBoss Application Servers, Oracle instances, and infrastructure elements, you can deploy the Essential JBoss and Oracle Database Management Template.

Monitoring Composite Applications

To monitor an instance of a composite application, follow these tasks:

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

Console

Before you monitor an instance of Composite Application, you must add the nodes you want to monitor to the BSM 9.2x or OMi 10.x console and ensure that the Agent is installed on all the nodes that are

added to the BSM 9.2x or OMi 10.x console.

For more information on adding nodes, see [Task 1: Adding Nodes to the BSM 9.2x or OMi 10.x Console](#) in the [Getting Started](#) section.

Task 2: Deploying JBoss Discovery Aspect

The JBoss Discovery Aspect enables you to discover JBoss Server instances in your environment. To discover the JBoss Application Server Configuration Items (CIs) on the added managed nodes, you must deploy the JBoss Discovery Aspect to a Computer CI. The JBoss Discovery Aspect deployment discovers the CIs of the following CI types (CITs):

- Computer
- JBoss AS
- CICollection
- J2EE Domain

For more information about deploying the JBoss Discovery Aspect, see [Task 3: Deploying the JBoss Discovery Aspect](#) in the [Getting Started](#) section.

Task 3: Verifying Discovery

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

For more information about verifying the discovery, see [Task 4: Verifying Discovery](#) in the [Getting Started](#) section.

Task 4: Deploying the JBoss Availability Aspect

You need to deploy JBoss Availability Aspect to the JBoss Server Nodes. The JBoss Availability Aspect deployment discovers the Configuration Item (CIs) of the CI types (CITs) such as JVM, J2EE Applications, and JDBC Datasources. If the datasources are configured with the Oracle database, then the Oracle CI along with its hosted node will be discovered.

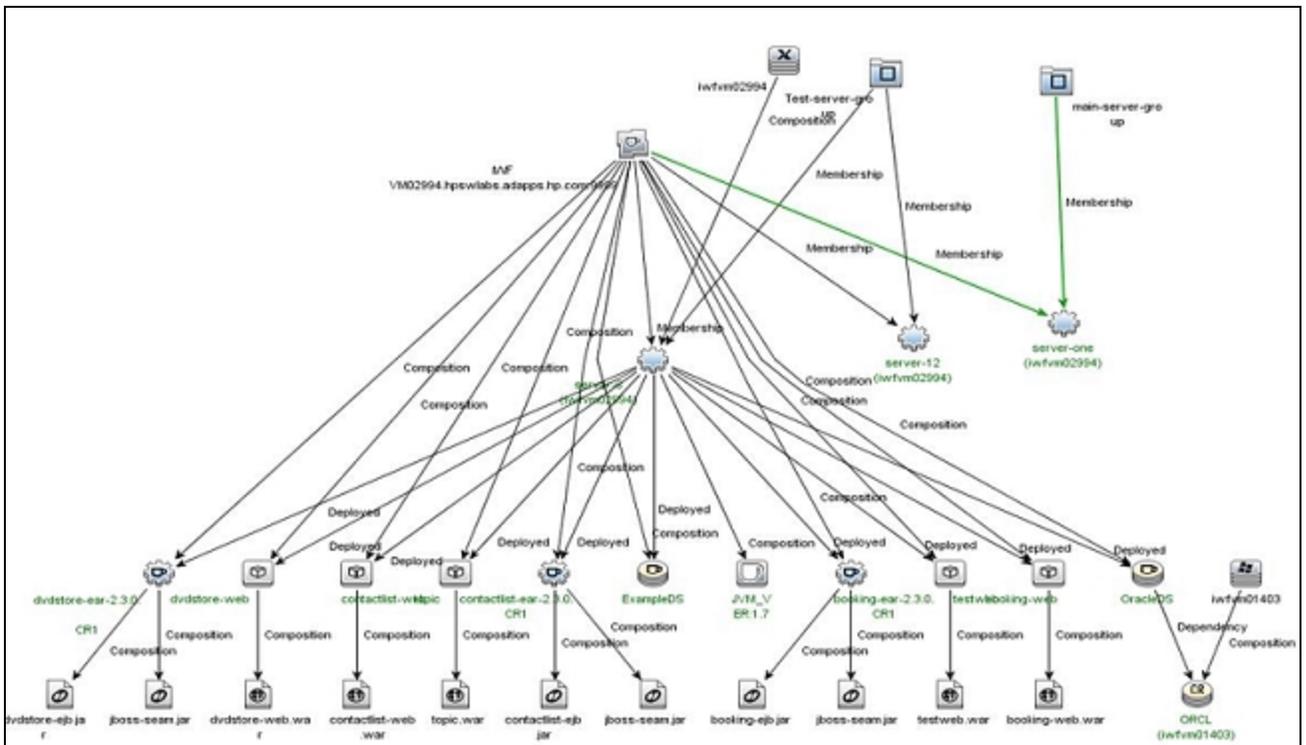
Note: The Auto assignment rule must be created to deploy JBoss Availability Aspect to the JBoss Servers.

For more information about deploying JBoss Aspects, see [Task 5b: Identifying and Deploying JBoss Aspects](#) in the [Getting Started](#) section.

Task 5: Deploying Essential JBoss and Oracle Database Management Template

The Essential JBoss and Oracle Database Management Template discovers the CIs of the following CITs and completes the topology as shown in the following figure:

- JVM
- Application Servers
- JDBC and underlying databases
- Oracle



To deploy Essential JBoss and Oracle Database Management Template to the J2EE Domain CI, 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:

Click **Configuration Folders > Application Server Management > JBoss Management > Management Templates**.

3. In the Management Templates folder, click the Essential JBoss and Oracle Database Management Template that you want to deploy, and then click  **Assign and Deploy**. The Assign and Deploy wizard opens.
4. In the **Configuration Item** tab, click the **JBoss AS** CI to which you want to assign the Management Template, and then click **Next**. You can select multiple items by holding down the **CTRL** or **SHIFT** key while selecting them. Click **Next** to accept the CIs and go to **Required Parameters**.
5. In the **Required Parameters** tab, all the mandatory parameters that do not yet have a value are listed. Since the parameters are mandatory, you must assign a value before you deploy the Management Template. Do the following steps to assign values:

- a. Select the **JMX JBoss Username** parameter in the list and click  **Edit**.

The Edit Parameter: JBoss JMX Username dialog box opens.

- b. Click **Value**, specify the user name, and then click **OK**.

- c. Select the **JMX JBoss Password** parameter in the list and click  **Edit**.

The Edit Parameter: JMX JBoss Password dialog box opens.

- d. Enter the password for the user name and then click **OK**.

For the discovered Oracle database CIs, you must specify the values of mandatory parameters such as the Oracle Username and Password.

- i. Select the **Oracle Instance User Name** parameter in the list, and then click  **Edit**.

The Oracle Instance User Name dialog box opens.

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

- iii. Select the **Oracle Instance Password** parameter in the list, and then click  **Edit**.
The Oracle Instance Password dialog box opens.

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

(Optional). For JBoss Application Servers using SSL authentication:

- a. Select the **JBoss Application Server SSL KeyStore File Path** parameter in the list, and then click  **Edit**.

The Edit Parameter: JBoss Application Server SSL KeyStore File Path dialog box opens.

- b. Click **Value**, specify the path to JBoss Application Server SSL KeyStore File Path, and then click **OK**.

- c. Select the **JBoss Application Server SSL KeyStore File Password** parameter in the list, and then click  **Edit**. The Edit Parameter: JBoss Application Server SSL KeyStore File Password dialog box opens.

- d. Click **Value**, specify the **JBoss Application Server SSL KeyStore File Password** password, and then click **OK**.

- e. Click **OK**.

6. Click **Next** to go to the **All Parameters** tab on BSM 9.2x or **Parameter Summary** tab on OMi 10.x.

7. In the **All Parameters** tab on BSM 9.2x or **Parameter Summary** tab on OMi 10.x, to change the default values of the parameters, you can select the parameter and then click  **Edit**.

The Edit Parameter dialog box appears.

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 displayed. To display expert parameters, click  **Show Expert Parameters**.

8. In the **All Parameters** tab on BSM 9.2x or **Parameter Summary** tab on OMi 10.x, click **Next**.
9. (Optional). In the **Configure Options** tab, if you do not want to enable the assignment immediately, clear the **Enable Assigned Objects** check box on BSM 9.2x or **Enable Assignment(s)** check box on OMi 10.x. You can then enable the assignments later using the

Assignments & Tuning pane.

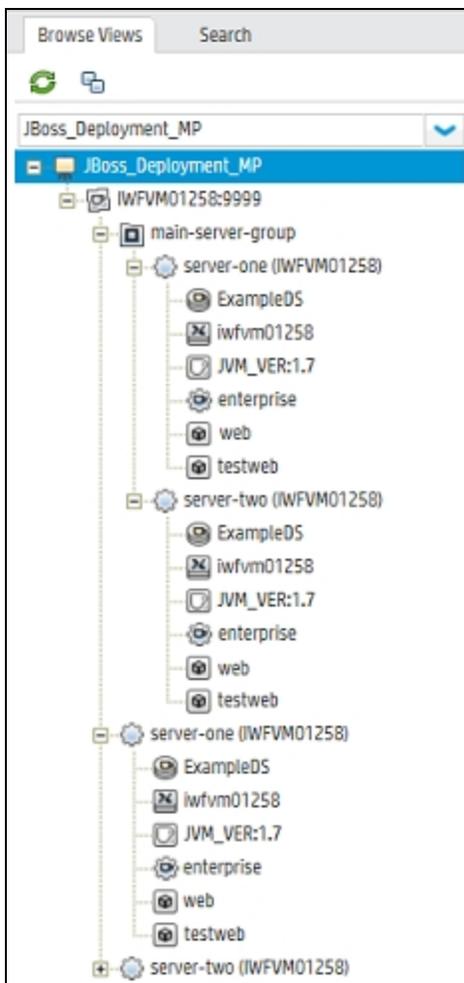
10. Click **Finish**.

After you deploy the Essential JBoss and Oracle Database Management Template, the JBoss Aspects get deployed on the JBoss Application Server CIs, Infrastructure Aspects are deployed on the Node CIs, and the Oracle Aspects are deployed on the Oracle CIs related to JDBC data source. This ensures that the composite application is monitored from a single deployment.

Task 6: Verifying Discovery for Extended Topology

After you deploy the Essential JBoss and Oracle Database Management Template, you can verify if the CIs are populated in the View Explorer.

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



Chapter 9: Troubleshooting Scenarios

The following are some common Troubleshooting scenarios:

Note: The troubleshooting steps provided here must be executed on the JBoss node.

Licensing count is not updated

Problem: Licensing count is not updated on License Management.

Solution: To resolve this problem, follow these steps:

1. Open License Management:

On BSM 9.2x, click **Admin > Platform > Setup and Maintenance > License Management**.

On OMi 10.x, click **Administration > Setup and Maintenance > License Management**.

The License Management window shows details about the name, license type, days left, expiration date, capacity, and capacity details.

2. To check for the license usage on the JBoss managed node, run the following command on the managed node:

```
<OvAgentDir>/bin/ovodetect -t
```

If the output of the preceding command is `mpinstance="1"`, then JBoss Application Server is being monitored. If the output of the preceding command is `mpinstance="0"`, then JBoss Application Server is not being monitored.

3. If the license is still not updated in License Management, restart agent on the JBoss managed node by running the following command:

```
<OvAgentDir>/bin/ovc- restart opcmsga
```

Management Templates and Aspects are not deployed to the managed nodes

Problem: Management Templates and Aspects are not deployed to the managed nodes.

Solution: To resolve the problem, do the following steps:

1. To check the deployment status if the deployment has failed:

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

On OMi 10.x, click **Administration > Operations Management > Monitoring > Deployment Jobs**.
2. To check the assignment status if the servers are not assigned to the CIs:

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

On OMi 10.x, click **Administration > Operations Management > Monitoring > Assignments & Tuning**.
3. If both the deployment status and assignment status are successful and the aspects and MTs are still not deployed, check the following BSM and OMi log files:

Linux:

`/opt/HP/BSM/log/EJBContainer/opr-webapp.log`

`/opt/HP/BSM/log/jboss/opr-configserver.log`

Windows:

`%topaz_home%\log\EJBContainer\opr-webapp.log`

`%TOPAZ_HOME%\log\jboss\opr-configserver.log`

OMi MP for JBoss Application Server displays errors during installation

Problem: Installation of OMi MP for JBoss Application Server returns errors.

Solution: You can identify specific errors by checking the `mpinstall.log` file. The `mpinstall.log` file is available at the following location:

UNIX:

`$TOPAZ_HOME/log/mpinstall.log`

Windows:

`%TOPAZ_HOME%\log\mpinstall.log`

Domains do not get reconciled

Problem: Domains do not get reconciled after enabling the enrichment rule.

Solution: Check if you have saved the enrichment rule after enabling it.

OMi MP for JBoss Application Server displays errors during upload of Management Pack

Problem: OMi MP for JBoss Application Server returns error during upload.

Solution: You can identify specific errors by checking the `opr-configserver.log` file.

The `opr-configserver.log` file is available at the following locations:

UNIX:

`$TOPAZ_HOME/log/jboss/opr-configserver.log`

Windows:

`%TOPAZ_HOME%\log\jboss\opr-configserver.log`

Cls do not get populated in the View after deploying the JBoss Discovery Aspect

Problem: Views for the OMi MP for JBoss Application Server are not shown even after deploying the

JBoss Discovery Aspect.

Solution: You can identify the error by following these steps:

1. Open the JBoss AS **Instrumentation** folder:

UNIX:

```
/var/opt/OV/bin/instrumentation
```

Windows:

```
%OVADATADIR%\bin\instrumentation
```

2. In the Instrumentation folder, look for the following file:

```
JBoss_Discovery_Log4j.properties
```

3. Open the JBoss_Discovery_Log4j.properties file.

4. Select the `log4j.appender.FILE.Threshold` and modify to `log4j.appender.FILE.Threshold=trace`.

Tracing is enabled for JBoss Discovery. The `JBossDiscovery.log` file is created.

5. Check the `JBossDiscovery.log` file for specific errors.

The `JBossDiscovery.log` file is available at the following locations.

UNIX:

```
/var/opt/OV/log/JBoss/
```

Windows:

```
%OVADATADIR%\log\JBoss\
```

JMX Connection could not be established for server

Problem: JMX Connection could not be established for server in the Event Console.

Solution: To resolve this problem, follow these steps:

1. Check if the credentials entered during deployment have the required access permissions to the JBoss Application Server.
2. Configure JBoss Keystore and Passphrase if the JBoss Application Server uses the SSL

Authentication Providers.

3. Check if JMX is enabled for the JBoss server. If JMX is not enabled, enable it.

Collection Manager of OMi MP for JBoss Application Server is not getting started

Problem: Collection manager of OMi MP for JBoss Application Server is not getting started for data collection.

Solution: To resolve this problem, follow these steps:

1. Open the JBoss Instrumentation folder:

UNIX:

```
/var/opt/OV/bin/instrumentation
```

Windows:

```
%ovdatadir%\bin\instrumentation
```

2. In the Instrumentation folder, look for the following file:

```
JBoss_cmlog4j.properties
```

3. Open the `JBoss_cmlog4j.properties` file.
4. Select `log4j.appender.FILE.Threshold` and modify to `log4j.appender.FILE.Threshold=trace`.

Tracing is enabled for JBoss Collection Manager.

5. Check the `Collector.log` and `CollectionManager.log` files for specific errors.

The `Collector.log` file is available at the following location:

UNIX:

```
/var/opt/OV/log/JBoss
```

Windows:

```
%OVDATADIR%\log\JBoss
```

The `CollectionManager.log` file is available at the following location:

UNIX:

```
/var/opt/OV/log/JBoss/collectionManager
```

Windows:

```
%OVDATADIR%\log\JBoss\collectionManager
```

No data for Performance Manager i (PMi) Graphs

Problem: Data is not available for PMi graphs from the OMi MP for JBoss Application Server.

Solution: To resolve this problem, follow these steps:

1. Run the following command to check if the graph data sources are created:

```
ovcodautl -obj
```

2. Run the following command to check data dumps of JBOSS_DATA data source:

```
ovcodautl -dumpds JBOSS_DATA
```

If there are empty instances, perform step 3 and 4.

3. From the JBoss_cmlog4j.properties file, select log4j.appender.FILE.Threshold and modify to log4j.appender.FILE.Threshold=trace.

Tracing is enabled for JBoss Collection Manager.

4. Check the Collector.log and CollectionManager.log file for specific errors.

The Collector.log file is available at the following location:

UNIX:

```
/var/opt/OV/log/JBoss
```

Windows:

```
%OVDATADIR%\log\JBoss
```

The CollectionManager.log file is available at the following location:

UNIX:

```
/var/opt/OV/log/JBoss/collectionManager
```

Windows:

```
%OVDATADIR%\log\JBoss\collectionManager
```

Data Logging for Metric may show values as -1

Problem: Data logging for a few metrics may show values of -1 for one of the following reasons:

- If the JBoss run-time Mbean returns null values for raw metrics.
- If the calculated metric contains operands as raw metrics which have null values.
- Delta and rate of change metrics will result in -1 values for the first scheduled collection. This is the expected behavior.

Solution: To view the data logged for metrics:

1. Run the following command:

```
ovcodautl -dumpds JBOSS_DATA
```

2. Identify the metric name and check for the metric which contains value logged as -1 in the CODA dump.
3. Determine the metric ID using the `JBoss_MetricDefinition.xml` available at the following location:

```
%ovdatadir%/bin/instrumentation
```

4. Verify that the collector logs on the managed node and check for the collection ID that is showing exceptions with null value return message in the `Collector.log` file available at the following location:

```
%ovdatadir%/log/JBoss
```

5. The message provides exact details about which MBean query failed and which returned a null value for the metric.

Unable to find JAVA HOME

Problem: The Collection process does not start if the JBoss `JAVA_HOME` parameter is not set. The CIs such as the JDBC datasource, JVM, and J2EE Application are not discovered.

Solution(s): Provide JAVA_HOME and restart Collector using Tools.

Provide JAVA_HOME and redeploy assignments.

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Feedback on User Guide (OMi Management Pack for JBoss Application Server 1.00)

Just add your feedback to the email and click send.

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