

HP Operations Smart Plug-in for User Defined Metrics

for HP Operations Manager for UNIX®

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User Guide

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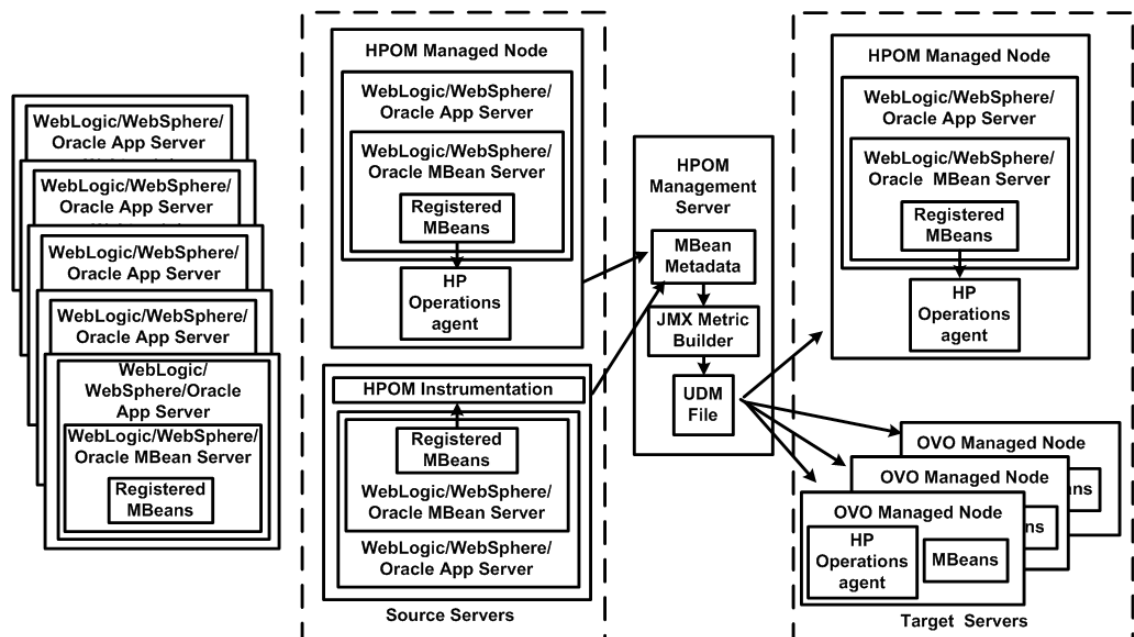
1 Overview

User defined metrics (UDMs) are created by the user to gather data from application MBeans registered in a BEA WebLogic MBean server and Oracle Application Server (version 10gR3 only), or PMI counters if you are running a WebSphere Application Server. You can create UDMs by using the JMX Metric Builder (JMB), JMB Plug-in for Eclipse, or by editing the metrics definition XML file (also referred to as the UDM file).

To monitor your applications using HP Operations Manager (HPOM), configure your MBean server environment and create templates to monitor and collect the data generated by the UDMs.

The MBean Server Environment

Using HPOM and the HP Operations Smart Plug-in for WebSphere Application Server (WebSphere SPI), HP Operations Smart Plug-in for BEA WebLogic Server (WebLogic SPI), or HP Operations Smart Plug-in for Oracle Application Server (version 10gR3 only) the HPOM management server can monitor servers whose MBeans are registered in a WebLogic, WebSphere or Oracle AS (version 10gR3 only) MBean Server. The HPOM management server must be configured to gather MBean data (also referred to as metadata) from source servers and to monitor target servers using UDMs.



Source servers are systems on which the WebSphere, WebLogic, Oracle AS (version 10gR3 only) MBean Server resides. The HPOM instrumentation must be distributed to the source servers (the HPOM management server might not monitor them). The source servers can be an MBean staging area or development server.

The HPOM management server collects MBean data from the source servers. Select a subset of your MBean servers (those that have a representative set of MBeans registered) to be your source servers.

Target servers are systems that are monitored by the HPOM management server. The target server can be a production server. Alarms, graphs, and reports are generated by UDMs based on MBeans registered in the WebLogic, WebSphere, or Oracle AS (version 10gR3 only) MBean Server.

Using the WebLogic, WebSphere, or Oracle AS (version 10gR3 only) MBean Server

The WebLogic, WebSphere (WebSphere Application Server version 5.0 or higher), and Oracle AS (version 10gR3 only) include a built-in MBean server. Additional tasks are required to create UDMs such as, installing the SPIJMB software, configuring the WebLogic SPI, WebSphere SPI, or Oracle AS (version 10gR3 only) SPI to collect the MBean data, and using the JMX Metric Builder (an application that helps you create UDMs and browse MBeans). These tasks are described in [Chapter 2, Installation, Upgrade, and Removal](#) and [Chapter 3, Configuration](#).



See <http://support.openview.hp.com/> for information on using a JMX-Compliant MBean Server which is not part of the WebLogic or WebSphere or Oracle (version 10gR3 only) Application Server.

HPOM and Other Components

Additional components are required to create UDMs. Some of these components require additional configuration.

JMX Metric Builder

The JMX Metric Builder (JMB) is an application integrated with HPOM used to create UDMs that gather data from application MBeans registered in the WebLogic or WebSphere or Oracle (version 10gR3 only) MBean Server. You can edit the UDM file by mapping MBeans to UDMs, validate metric IDs, and create UDMs that conform to the metric definitions DTD. JMB generates policies only for Oracle AS(version 10gR3 only) and not for WebSphere and WebLogic application server. You can also use the JMB to browse MBeans on a configured MBean server and generate HPOM templates. For more information about using the JMB, see the online help.

MBean data is obtained from a cache on the HPOM management server. You must run the Gather MBean Data application to gather the MBean data that is stored in the cache on the HPOM management server. For more information about the Gather MBean Data application and configuration requirements, see [The Gather MBean Data Application](#) on page 13.

The JMB is installed with the SPIJMB software. For more information, see [Installing the SPIJMB Software](#) on page 16.

JMX Metric Builder Plug-in for Eclipse

The JMX Metric Builder Plug-in for Eclipse (JMB Plug-in for Eclipse) is the same application as the JMB but is run independently from the HPOM environment—The JMB Plug-in for Eclipse is launched from Eclipse, not HPOM. The JMB Plug-in for Eclipse includes the same features as the JMB and can also test UDMs. For more information about these features, see the JMB Plug-in for Eclipse online help.

MBean data is obtained directly from the application server (currently, the JMB Plug-in for Eclipse only supports the BEA WebLogic Application Server). This enables a developer to create UDMs and templates outside of the HPOM environment. UDMs and templates generated by the JMB Plug-in for Eclipse must be copied to the HPOM management server and deployed to managed nodes.

The JMB Plug-in for Eclipse is downloaded from the HPOM management server (you must install the SPIJMB software (for more information, see [Installing the SPIJMB Software](#) on page 16).



The JMB Plug-in for Eclipse only supports the BEA WebLogic Application Server.

The Gather MBean Data Application

The Gather MBean Data application gathers MBean information from selected managed node(s) and enables you to gather the MBean data at any time. The COLLECT_METADATA property must be set on the managed node for the collection to occur. The tasks required to set this property are included in the configuration chapter of this guide. For more information, see [Gather MBean Data Application](#) on page 74.

The Gather MBean Data application is installed with the SPIJMB software. For more information, see [Installing the SPIJMB Software](#) on page 16.

Metric and Collector Templates

Metric and collector templates are monitor templates you must create before you can successfully monitor the target servers in your MBean server environment.

A metric template monitors performance levels of a metric by defining threshold conditions for the metric. Within a metric template, you can also define the message text sent to the HPOM message browser when the threshold is exceeded, the actions to execute, and the instruction text that appears.

A collector template specifies the collection interval of one or more metric templates. That is, it determines how often data is collected for a metric or group of metrics and compared to the threshold condition.

Both templates must be defined and distributed to the target servers. For more information about these tasks, see [Chapter 4, UDM Development](#).



See <http://support.openview.hp.com/> for information on SPI applications and the JMX connector if you are using a JMX-Compliant MBean Server which is not part of the WebLogic or WebSphere or Oracle (version 10gR3 only) Application Server.

PMI Counters

If you are creating UDMs based only on PMI counters, you must install the WebSphere SPI and SPIJMB software (to install the Deploy UDM application). For more information, see [Installing the WebSphere SPI/WebLogic SPI/Oracle AS SPI Software](#) on page 15 and [Installing the SPIJMB Software](#) on page 16.

After you configure the WebSphere SPI, no additional configuration is needed to create UDMs based on PMI counters .



You cannot use the JMB to create or edit UDMs based on PMI counters. Do not open the `/opt/OV/jmb/conf/wbs/UDMetrics-sample.xml` file in the JMB. If you open this file in the JMB, all your PMI counter metrics are converted to hidden metrics. Hidden metrics can only be used to calculate other metrics. They cannot be used as alarming, graphing, or reporting metrics.

2 Installation, Upgrade, and Removal

Before you can develop UDMs using the JMX Metric Builder (JMB), you must install the SPI software and SPIJMB software. Depending on your MBean server environment, additional software (the JMX connector) might need to be installed.

Built-in MBean server requirements: If you are using the MBean server that is built into the WebLogic or WebSphere or Oracle (version 10gR3 only) application server, you must install the following software:

- WebSphere SPI or WebLogic SPI or Oracle AS SPI (version 10gR3 only)
- SPIJMB

This chapter includes instructions for installing the WebSphere SPI/WebLogic SPI/Oracle AS SPI (version 10gR3 only) software, and installing and removing the SPIJMB software.

Installing the WebSphere SPI/WebLogic SPI/Oracle AS SPI Software

► Complete SPI software installation information is available in the respective SPI Configuration Guide.

For an HP-UX 11.23 and 11.31 (PA and IA) management server, type:

```
swinstall -s /cdrom/OV_DEPOT/11.0HPUX.depot WBSSPI or
swinstall -s /cdrom/OV_DEPOT/11.0HPUX.depot WLSSPI or
swinstall -s /cdrom/OV_DEPOT/11.0HPUX.depot OASSPI
```

On a Solaris management server the packages are supported in both depot and solaris native format.

For a Solaris management server in depot format, type:

```
swinstall -s /cdrom/OV_DEPOT/SOLARIS.depot WBSSPI or
swinstall -s /cdrom/OV_DEPOT/SOLARIS.depot WLSSPI or
swinstall -s /cdrom/OV_DEPOT/SOLARIS.depot OASSPI
```

For a Solaris management server in native format, perform the following steps:

- 1 Before installing the SPI software on the Solaris management server, set **PKG_NONABI_SYMLINKS** to **true** to avoid breakage of existing links during the installation. Type:

```
PKG_NONABI_SYMLINKS=TRUE
export PKG_NONABI_SYMLINKS
```

- 2 The SPIs have dependencies on “DSI2DDF” and “SPI-SVCDISC-OVO”. These two packages are not available in the native format of solaris. Hence, install “DSI2DDF” and “SPI-SVCDISC-OVO” from SOLARIS.depot before installing from the HPOMSpiDVD-8.1.sparc package.
- 3 To install from the HPOMSpiDVD-8.1.sparc, type:


```
pkgadd -d /cdrom/OV_DEPOT/HPOMSpiDVD-8.1.sparc
```
- 4 Select the following SPIs for installation:
 - For WBSSPI, select:
 - HPOvSpiWbs
 - HPOvSpiJmx
 - HPOvSpiShs
 - For WLSSPI, select:
 - HPOvSpiWls
 - HPOvSpiJmx
 - HPOvSpiShs
 - For OASSPI, select:
 - HPOvSpiOas
 - HPOvSpiJmx
 - HPOvSpiShs

If you are using the MBean server that is built into the application server, you must configure the WebSphere SPI or WebLogic SPI or Oracle AS (version 10gR3 only) SPI software. For more information, see the WebLogic SPI, Oracle AS SPI (version 10gR3 only) or WebSphere SPI configuration guide.

For instructions on how to remove the SPI software, see the respective SPI configuration guide.

Installing the SPIJMB Software



The following examples show the command line usage of `swinstall`. For HP-UX systems, you can also use the graphical user interface (GUI).

For an HP-UX 11.23 and 11.31 (PA and IA) management server, type:

```
swinstall -s /cdrom/OV_DEPOT/11.0HPUX.depot SPIJMB
```

On a Solaris management server the packages are supported in both depot and solaris native format.

For a Solaris management server in depot format, type:

```
swinstall -s /cdrom/OV_DEPOT/SOLARIS.depot SPIJMB
```

For a Solaris management server in native format, perform the following steps:

- 1 Before installing the SPIJMB software on the Solaris management server, set `PKG_NONABI_SYMLINKS` to `true` to avoid breakage of existing links during the installation. Type:


```
PKG_NONABI_SYMLINKS=TRUE
```

```
export PKG_NONABI_SYMLINKS
```

- The SPIs have dependencies on “DSI2DDF” and “SPI-SVCDISC-OVO”. These two packages are not available in the native format of solaris. Hence, install “DSI2DDF” and “SPI-SVCDISC-OVO” from SOLARIS.depot before installing from the HPOMSpiDVD-8.1.sparc package. To install from the HPOMSpiDVD-8.1.sparc, type:

```
pkgadd -d /cdrom/OV_DEPOT/HPOMSpiDVD-8.1.sparc
```

- Select HPOvSpiJmb for installing SPIJMB.

The SPIJMB software includes the following:

Item		Description	Location
Applications	Deploy UDM	Deploys the UDM file from the management server to the selected managed node(s)	JMX Metric Builder/ WBSSPI or JMX Metric Builder/ WLSSPI or JMX Metric Builder/ OASSPI application group
	Gather MBean Data	Gathers MBean information from the selected managed node(s)	
	JMX Metric Builder	Launches the JMB	
	UDM Graph Enable/Disable	Starts/stops data collection for UDM graphs	
Archive Packages	RMI_ConnectorPkg.tar RMI_ConnectorPkg.zip	JMX connector archive packages	<ul style="list-style-type: none">• /opt/OV/wasspi/wbs/jmx/or• /opt/OV/wasspi/oas/jmx/or• /opt/OV/wasspi/wls/jmx/

Removing the SPIJMB Software and HPOM Components

Complete these tasks only if you do not want to create or use UDMs and do not want to use the JMX Metric Builder.

Complete the tasks in the order listed:

- [Task 1: Remove Software from the Management Server](#)
- [Task 2: Remove Software from the Node Group and Managed Nodes](#)
- [Task 3: Delete Custom Templates and Template Groups](#)
- [Task 4: Delete Applications](#)
- [Task 5: Delete Custom Message and Node Groups](#)

Task 1: Remove Software from the Management Server

- 1 Open a terminal window and log on as root.
- 2 In the terminal window, enter the following:
 - For an HP-UX 11.23 and 11.31 (PA and IA) management server, type:
`/usr/sbin/swremove SPIJMB`
 - For a Solaris management server in depot format, type:
`/usr/sbin/swremove SPIJMB`
 - For a Solaris management server in native format, type:
`/usr/sbin/pkgrm HPOvSpiJmb`

The `swremove` and `pkgrm` command removes the files from the file system only. Your customized templates are still in the HPOM data repository and must be deleted manually. Before the templates can be deleted, they (and the software) must be de-assigned from the managed nodes (see [Task 2: Remove Software from the Node Group and Managed Nodes](#)).

Task 2: Remove Software from the Node Group and Managed Nodes

- 1 Open the Node Bank and from the Actions menu select **Agents** → **Assign Templates**.
- 2 Select all custom node groups and all managed nodes to which your customized templates were assigned.
- 3 Click **Remove nodes/groups**.
- 4 Open the Node Group Bank and select all custom node groups.
- 5 From the Action menu select **Install/Update SW & Config** and check the following check boxes:
 - Templates
 - Actions
 - Monitors
 - Commands
- 6 Select **Nodes in List**.

- 7 Select **Force Update**.
- 8 Click **OK** to remove the Templates, Actions, Commands and Monitors from the managed nodes. The following message appears in the Message Browser:

```
The following configuration information was successfully distributed:  
Templates Actions Commands Monitors
```

Task 3: Delete Custom Templates and Template Groups

Delete all custom templates and template groups for metrics that you do not want to collect.

- 1 Open the Message Source Templates window and double-click the custom template group
- 2 Press **SHIFT** and click to select all templates and template groups.
- 3 Click **Delete from All...** The following message appears:

```
Do you really want to delete the template(s)?
```
- 4 Click **YES**.
- 5 If there are additional custom templates or template groups, repeat steps 2 through 4 till you have deleted all custom templates and template groups.
- 6 Go up one level and delete the custom template group.

Task 4: Delete Applications

Unlike templates, applications can be removed in a single step.

- 1 Open the Application Bank.
- 2 Right-click the JMX Metric Builder application group and click **Delete**.
The following message appears:

```
Do you really want to delete the application group?
```
- 3 Click **Yes**.

Task 5: Delete Custom Message and Node Groups

- 1 From the Window menu select **Message Group Bank**.
- 2 In the Message Group Bank window right-click the custom group and click **Delete**.
- 3 Repeat for any other custom group.
- 4 From the Window menu select **Node Group Bank**.
- 5 In the Node Group Bank window right-click each custom group and click **Delete**.

3 Configuration

Before you can develop UDMs using the JMX Metric Builder (JMB), your environment must be configured so that MBean information (metadata) is collected from your MBean server(s).

To configure your environment, you must complete the following tasks:

- Register Your Custom MBeans (optional)
- Configure your MBean server environment (see [page 22](#))
- Complete additional configuration tasks (see [page 24](#))

Register Your Custom MBeans

Before configuring your MBean server environment, register your custom MBeans (this task is optional). However, custom MBeans must be registered in the WebLogic, WebSphere, or Oracle AS (version 10gR3 only) MBean server if you want to monitor and collect data from them.

If you are using the WebLogic or Oracle Mbean server the Name attribute is used to identify its MBeans. If your MBean is a multi-instance MBean, each MBean instance must have a unique value in its Name attribute. For example, WebLogic's ServletRuntime MBeans are multi-instance because a ServletRuntime MBean is instantiated by WebLogic for each deployed servlet. The Name attribute of the MBean identifies the servlet that the MBean is monitoring. If the Name attribute is not provided, the full ObjectName is used as the instance identifier.

If you are using the WebSphere MBean server, the mbeanIdentifier ObjectName key property is used to identify its MBeans. If your custom MBean is a multi-instance MBean, each MBean instance must have a unique value in its mbeanIdentifier ObjectName key property. If the mbeanIdentifier ObjectName key property is not provided, the full ObjectName is used as the instance identifier.

For any other JMX-compliant MBean server, the full ObjectName is used as the instance identifier.

See your JMX-compliant server documentation for information about creating and registering MBeans.

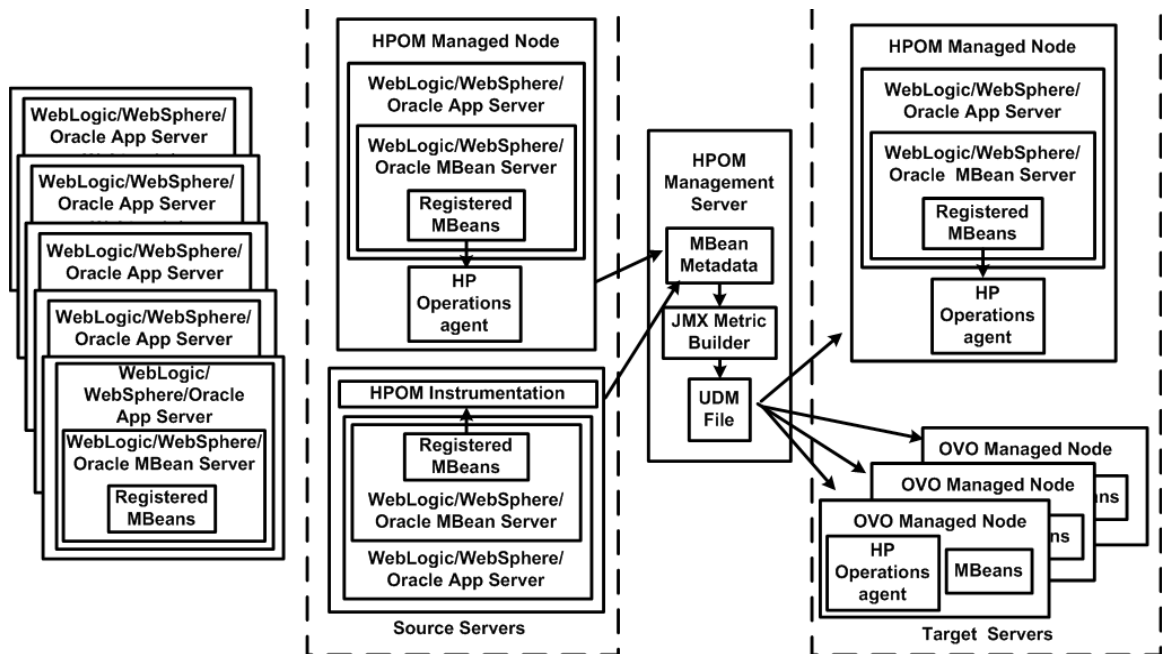
JMX specifications are located at <http://java.sun.com/products/JavaManagement/reference/docs/index.html>

MBean Server Environment Configuration

The node on which the WebLogic, WebSphere, or Oracle MBean server is running must be configured so that MBean information can be gathered.

WebLogic/WebSphere/Oracle MBean Server

If you are using the MBean server that comes with the WebLogic or WebSphere or Oracle application server (version 10gR3 only), your MBean server environment might look similar to the following:




To configure this MBean server environment, follow these steps:

- 1 Configure the WebLogic SPI/WebSphere SPI/Oracle AS SPI (version 10gR3 only) software on the source and target servers. For more information, see chapter 3 of the WebLogic SPI or WebSphere SPI or Oracle AS SPI configuration guide.

If you do not want to monitor the source server, do not distribute the SPI templates to the source server during the SPI configuration process.

- 2 Set the COLLECT_METADATA server property of the source server to ON and the JMB_JAVA_HOME property to an installation of Java version 1.5 or higher. This example shows the steps using the WebLogic SPI. If you installed the WebSphere SPI or Oracle AS SPI (version 10gR3 only), change any occurrence of WLSSPI to WBSSPI or OASSPI:
 - a At the HPOM console, select the source server in the Node Bank window.
 - b From the Window menu, select **Application Bank**.
 - c In the Application Bank window select **WLSSPI** → **WLSSPI Admin**.
 - d Double-click **Config WLSSPI**. The Introduction window opens. This window contains brief information about the configuration editor.

- e Click **Next**. The configuration editor opens.
 - f From the configuration editor, set the COLLECT_METADATA property to ON for the source server and the JMB_JAVA_HOME property to an installation of Java version 1.5 or higher for the management server. For more information about using the configuration editor, see Appendix B of the WebLogic SPI, WebSphere SPI or Oracle AS SPI configuration guide.
 - g Click **Next** to save the change and exit the editor. The Confirm Operation window opens.
 - h Click **OK**.
-  If you click **Cancel** and made changes to the configuration, those changes remain in the configuration on the management server. To make the changes to the selected managed nodes' configuration, you must select those nodes in the Node Bank window, start the Config WLSSPI application, click **Next** from the configuration editor, and then click **OK**.
- 3 Complete the [Additional Configuration](#) on page 24.

Additional Configuration

After you configure your MBean server environment, complete the following tasks:

- [Task 1: Run the Gather MBean Data Application](#)
- [Task 2: Add a UDM Message Group](#)
- [Task 3: Assign the Message Group to opc_adm](#)

Task 1: Run the Gather MBean Data Application

To gather the MBean information immediately, run the Gather MBean Data application.



The COLLECT_METADATA property must be set to ON for the managed node on which an MBean server is running (the source server). MBean information is collected from these managed nodes only. See [WebLogic/WebSphere/Oracle MBean Server](#) on page 22 for information on how to set the COLLECT_METADATA property.

To run the Gather MBean Data application, follow these steps. This example shows the steps using the WebLogic SPI; if you installed the WebSphere SPI or Oracle AS SPI (version 10gR3 only), change any occurrence of WLSSPI to WBSSPI or OASSPI:

- 1 At the HPOM console, select a node or nodes in the Node Bank window.
- 2 From the Window menu, select **Application Bank**.
- 3 In the Application Bank window, select **JMX Metric Builder** → **WLSSPI**.
- 4 Double-click **Gather MBean Data**.

For more information about this application, see [Gather MBean Data Application](#) on page 74.

Task 2: Add a UDM Message Group

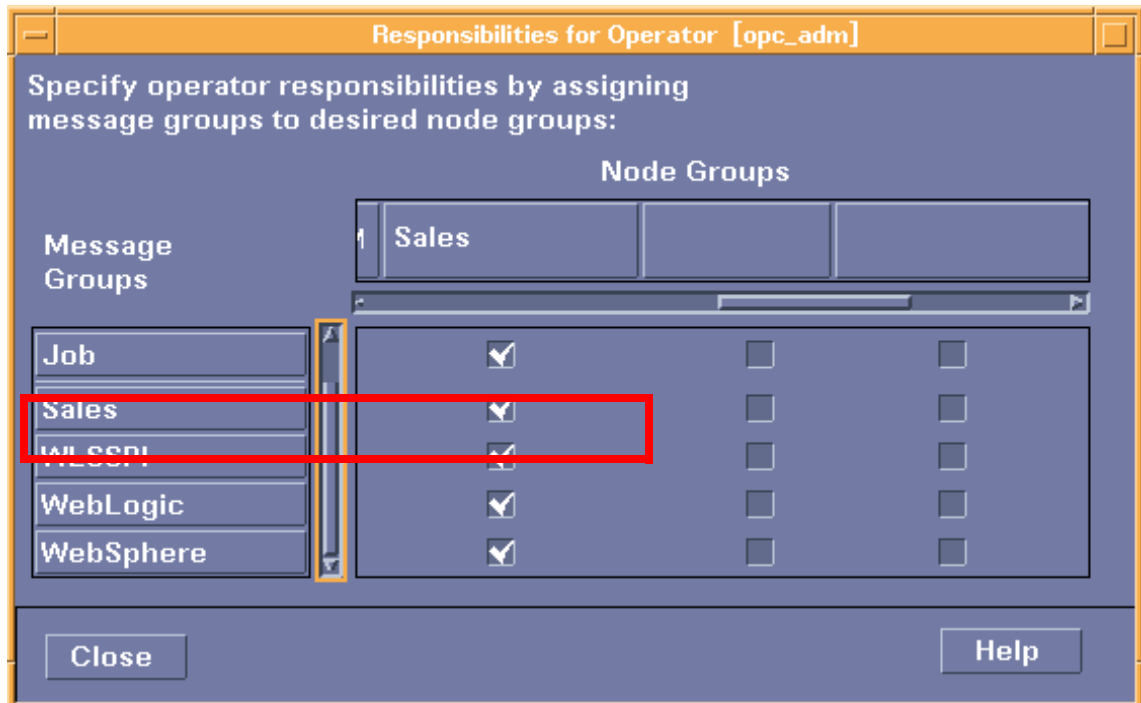
A message group combines management information about similar or related managed objects under a chosen name, and provides status information on a group level. For more information about message groups, see the *HP Operations for UNIX Concepts Guide*.

To add a message group, follow these steps:

- 1 Open the Add Message Group window.
- 2 Enter a name (for example, Sales), label, and description.
- 3 Click **OK**.

Task 3: Assign the Message Group to opc_adm

- 1 Log on to HPOM as the administrator (**opc_adm**).
- 2 Open the User Bank window, right-click the **opc_adm** user, and choose **Modify**.
- 3 In the Modify User:opc_adm user window, click **Responsibilities**.
- 4 For the Sales Message Group, ensure that all boxes are checked.



- 5 Assign the Sales Node or Message Groups to any other appropriate operators.
- 6 Click **Close**.

4 UDM Development

After your source and target servers are configured and metadata is being collected from your MBean server(s), you are ready to create and monitor UDMs.

To create and monitor UDMs, complete the following tasks in the given order:

- **Task 1: Update Existing UDMs** – If you have already created UDMs for the WebSphere SPI or WebLogic SPI or Oracle AS SPI (version 10gR3 only), update your UDMs.
- **Task 2: Run the JMX Metric Builder** – View registered MBeans and create UDMs based on registered MBeans.
- **Task 3: Create or Add UDMs Based on PMI Counters** – Add UDMs based on PMI counters. UDMs based on PMI Counters cannot be added using the JMB.
- **Task 4: Add JMX Actions (Optional)** – Add JMX actions to a template or metric. JMX actions cannot be added using the JMB.
- **Task 5: Copy Files Generated by the JMB/JMB Plug-in for Eclipse** – Copy UDMs and templates generated by the JMB/JMB Plug-in for Eclipse to the HPOM management server.
- **Task 6: Deploy the UDM File** – Deploy the UDM file from the HPOM management server to the selected managed node(s).
- **Task 7: Create a UDM Template Group and Templates** – Create a UDM template group to simplify or customize template distribution, create templates that monitor the UDMs created in task 1, and create templates that define the collection interval (how often the metrics are collected and monitored).
- **Task 8: Deploy the Templates to the Managed Nodes** – Distribute templates from the HPOM management server to the selected managed node(s).
- **Task 9: Disable and Re-enable Graphing** – If graphing is enabled, disable and re-enable it to create a data source with the new metrics for HP Performance Manager. If graphing is not enabled, enable it to create a data source with the new metrics for HP Performance Manager.

Task 1: Update Existing UDMs

If you have already created UDMs for the WebSphere SPI or WebLogic SPI or Oracle AS SPI (version 10gR3 only), follow these steps:

- 1 If your UDM file contains both UDMs based on PMI counters and registered MBeans, separate these metrics into two files (one file containing UDMs based on PMI counters and the other file containing UDMs based on register MBeans). UDMs based on PMI counters cannot be edited using the JMX Metric Builder (JMB).

- 2 If you want to use the JMB to edit existing UDMs (UDMs based on registered MBeans), update your alarming, graphing, and reporting UDMs to use a metric ID of WBSSPI_1xxx or WLSSPI_1xxx or OASSPI_1xxx or JMXUDM_1xxx (where xxx is a number from 000 through 999).

▶ Do not update your existing UDMs with metric IDs WBSSPI_07xx or WLSSPI_07xx or OASSPI_07xx. Also, you must not open the UDM file that contains these metrics in the JMB. The JMB converts these metrics to hidden metrics. Hidden metrics can only be used to calculate other metrics, they cannot be used as alarming, graphing, or reporting metrics.

- 3 If you updated your UDMs, update your templates to reflect the new metric IDs.
- 4 Move the existing UDM file(s) on the management server so that they are deployed by the Deploy UDM application to the managed nodes.

If you are using the WebSphere SPI, move the file

`/opt/OV/wasspi/wbs/conf/wasspi_wbs_udmDefinitions.xml` (and any other UDM file) to the directory

`/opt/OV/wasspi/wbs/conf/workspace/UDMProject.`

If you are using the WebLogic SPI, move the file

`/opt/OV/wasspi/wls/conf/wasspi_wls_udmDefinitions.xml` (and any other UDM file) to the directory

`/opt/OV/wasspi/wls/conf/workspace/UDMProject.`

If you are using the Oracle AS SPI (version 10gR3 only), move the file

`/opt/OV/wasspi/oas/conf/oracle.wasspi_oas_udmDefinitions.xml` (and any other UDM file) to the directory

`/opt/OV/wasspi/oas/conf/workspace/UDMProject.`

Task 2: Run the JMX Metric Builder

To start the JMB, follow these steps. This example shows the steps using the WebLogic SPI; if you have installed the WebSphere SPI or Oracle AS SPI (version 10gR3 only), simply change any occurrence of WLSSPI to WBSSPI or OASSPI:

▶ If you did not convert your alarming, graphing, and reporting metrics to use metric IDs of WBSSPI_1xxx or WLSSPI_1xxx or OASSPI_1xxx or JMXUDM_1xxx (where xxx is a number from 000 through 999) as described in [step 2 of Task 1: Update Existing UDMs on page 28](#), do not open this UDM file in the JMB.

▶ Do not open files containing metrics based on PMI counters or metrics containing JMX actions in the JMB. Currently, the JMB does not support these elements. These elements must be entered manually. For more information, see [Task 3: Create or Add UDMs Based on PMI Counters on page 29](#) and [Task 4: Add JMX Actions \(Optional\) on page 29](#).

- 1 At the HPOM console, open the Application Bank window.
- 2 In the Application Bank window, select **JMX Metric Builder** → **WLSSPI**.
- 3 Double-click **JMX Metric Builder**. Run only one instance of the JMB at a time.

For more information about JMB, see the online help.

Complete the following tasks to create a UDM using the JMB (For more information, see the online help):

- 1 Load metadata/MBean information
- 2 Organize MBeans (optional)

- 3 Open the UDM file
- 4 Add a metric
- 5 Change metric visibility (optional)



You can also complete these tasks using the JMB Plug-in for Eclipse. For more information, see [JMX Metric Builder Plug-in for Eclipse](#) on page 13.

Task 3: Create or Add UDMs Based on PMI Counters

If you are creating UDMs based only on PMI counters, you must install and configure the WebSphere SPI. After you configure the WebSphere SPI, no additional configuration is needed to create UDMs based on PMI counters.

You cannot use the JMB to create or edit UDMs based on PMI counters. You must directly edit the UDM file that contain these UDMs. If you open an XML file containing UDMs based on PMI counters in the JMB, all your PMI counter metrics are converted to hidden metrics. Hidden metrics can only be used to calculate other metrics, they cannot be used as alarming, graphing, or reporting metrics.

To create or add UDMs based on PMI counters, follow these steps:

- 1 On the HPOM management server, edit the `/opt/OV/wasspi/wbs/conf/wasspi_wbs_udmDefinitions.xml` file or create a new XML file in the `/opt/OV/wasspi/wbs/conf/workspace/UDMProject/` directory.



UDMs based on PMI counters must be assigned a metric ID in the range of 700 to 799. For more information about the structure and syntax of the UDM file, see [Appendix A, Metric Definitions DTD](#).

- 2 After you have saved your UDM file, copy the file to the `/opt/OV/wasspi/wbs/conf/workspace/UDMProject/` directory (if it is not already located there). When you deploy your UDMs in [Task 6: Deploy the UDM File](#) on page 31, only XML files in this directory are deployed to managed nodes.

Task 4: Add JMX Actions (Optional)

JMX actions are one or more JMX calls (invoke, get, set) performed on an MBean instance or type. See [Appendix E, Add JMX Actions](#), for information about adding JMX actions.

Task 5: Copy Files Generated by the JMB/JMB Plug-in for Eclipse

If both UDMs and templates or either of them were generated using the JMB/JMB Plug-in for Eclipse, they must be copied to the HPOM management server. Follow these step:

- 1 **Copy UDM Files to the HPOM Management Server:**

Copy the UDM files from the managed node/development system to the following directories on the HPOM management server:

Files on Managed Node/Development System	Location on HPOM Management Server
<code><User_Defined_Dir>/<UDM_File>.xml</code>	<ul style="list-style-type: none"> • WebSphere: <code>/opt/OV/wasspi/wbs/conf/workspace/<UDMProject>/</code> • WebLogic: <code>/opt/OV/wasspi/wls/conf/workspace/<UDMProject>/</code> • Oracle AS (version 10gR3 only): <code>/opt/OV/wasspi/oas/conf/workspace/<UDMProject>/</code>
<code><UDM_Path>/UDM/UDM<project>.xml</code> (JMB Plug-in for Eclipse)	<code>/opt/OV/wasspi/wls/conf/workspace/<UDMProject>/</code> (WebLogic)

In this instance,

- `<User_Defined_Dir>` is the directory selected by the user when the UDM file was saved.
- `<UDM_File>` is the file name selected by the user when the UDM file was saved.
- `<UDM_Path>` is the path displayed in the Preferences window (select **Window** → **Preferences** and select **JMX Metric Builder** in the tree).
- `<project>` is the name of the Eclipse project.

Each UDM file in `/opt/OV/wasspi/wbs/conf/workspace/<UDMProject>/` or `/opt/OV/wasspi/wls/conf/workspace/<UDMProject>/` or `/opt/OV/wasspi/oas/conf/workspace/<UDMProject>/` on the HPOM management server must be uniquely named and end with `.xml`. Verify that the UDMs in each file are uniquely named.

2 Copy Template Files to the HPOM Management Server

- Copy the generated template files from the managed node/development system to the following directories on the HPOM management server:

Files on Managed Node/Development System	Location on HPOM Management Server
<code><User_Defined_Dir>/ OVOU_Policies/C/set.idx</code>	<code><Template_Dir>/C/</code>
<code><User_Defined_Dir>/ OVOU_Policies/C/TEMPLATES/ MONITOR/monitor.dat</code>	<code><Template_Dir>/C/TEMPLATES/ MONITOR/</code>
<code><User_Defined_Dir>/ OVOU_Policies/C/TEMPLATES/ TEMPLGROUP/templgroup.dat</code>	<code><Template_Dir>/C/TEMPLATES/ TEMPLGROUP/</code>

In this instance,

- `<User_Defined_Dir>` is the directory selected by the user when the templates were generated using the JMB/JMB Plug-in for Eclipse
- `<Template_Dir>` is a user-specified directory on the HPOM management server. If you are only copying one set of template files (a set of template files consists of the `set.idx`, `monitor.dat`, and `templgroup.dat` files), use the

