HP Operations Smart Plug-in for Oracle Application Server

for HP Operations Manager for Windows®

Software Version: 7.04

Installation and Configuration Guide

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1 Introduction to HP Operations Smart Plug-in for Oracle Application Server

Oracle AS SPI

The Oracle AS SPI, used in conjunction with HPOM, helps you monitor and manage systems using the Oracle Application Server. You can monitor the availability, use, and performance of Oracle Application Servers running on HPOM managed nodes from the HPOM console. For more information on HPOM, see the *HPOM console online help*.

You can set threshold values for the Oracle AS SPI metrics. When these thresholds are crossed, the Oracle AS SPI generates an alarm and message. The metrics can also be consolidated into reports and graphs helps you analyze trends in server usage, availability, and performance.

You can integrate the Oracle AS SPI with HP Reporter and HP Performance Manager to get additional reporting and graphing flexibility and capabilities. For details on integrating the Oracle AS SPI with other HP products, see Chapter 6, Integrating HPOM Reporting and Graphing Features with the Oracle AS SPI.

Smart Plug-in Data

The Oracle AS SPI has several server-related metrics that gather data about the following:

- Server availability
- Server performance
- JVM memory usage
- EJB client and method wrapper active threads, execution times, and calls processed
- Servlet execution times and threads
- JSP service time and active requests
- Java message service connections and messages
- JDBC connection status
- Web application processing and open sessions
- HTTP server active connections and processed data

Smart Plug-in Uses and Customizations

As an Oracle AS SPI administrator, you can choose the metrics, which are crucial for the operation of Oracle Application Server by modifying the Oracle AS SPI policies. These policies contain settings that enable incoming data to be measured against predefined rules. These rules generate useful information in the form of messages. These messages have color-coding to indicate the severity level. You can review these messages for problem analysis and resolution.

Components of Oracle AS SPI

The Oracle AS SPI has the following components:

- Policies
- Tools (including reports)
- Reports
- Graphs

You can use the tools and policies to configure and receive data in the form of messages, annotations, and metric reports. These messages (available in the message browser), annotations (available through message properties), and metric reports (available through tools) provide information about the conditions present in the servers running on specific managed nodes.

The Oracle AS SPI configuration tools enable you to configure the management server's connection to selected server instances on specific managed nodes. You can assign policies to the nodes after you configure the connection. You can use the Oracle AS SPI reporting tools to generate metric reports with the HP Operations agent software running on the managed nodes. In addition, you can generate graphs, which show the Oracle AS SPI data (available through message properties).

Policies

The Oracle Application Server SPI consists of policies that monitor the Oracle Application Server. The policies contain settings which enable incoming data to be measured against predefined rules. These rules generate useful information in the form of messages.

The messages are color-coded to indicate the severity level. You can review these messages for problem analysis and resolution. There are several pre-defined corrective actions for specific events or threshold violations. These corrective actions are automatically triggered or operator-initiated. When you double-click a message text, corrective actions appear under the Instructions tab and automatically generated metric reports appear under the Annotations tab in the Message Properties window.

In the Policy bank window, the SPI for Oracle AS policy group contains policies grouped into two policy groups:

- OASSPI
- OASSPI Discovery

Tools

The Oracle AS SPI tools have configuration, troubleshooting, and report-generating utilities.

The Oracle AS SPI version 7.04 uses JMX standards to discover and monitor Oracle Application Server 10gR3. The metrics, policies, and reports for Oracle AS, therefore, are divided in two groups. For example, the OASSPI Reports is divided into OASSPI Reports group and OASSPI Reports (JMX) group. The OAS SPI tool groups are:

- OASSPI Admin Tools Group
- Oracle AS SPI Tools Group
- OASSPI Reports Group

- OASSPI Reports (JMX) Group - This tool group is available *only* if you install the SPIJMB software.

Reports

The SPI package contains the default reporting policies provided by the SPI. Reports are generated by the HP Reporter using the Oracle SPI data. The reports show consolidated, historical data generated as Web pages in management-ready presentation format, which helps you analyze the performance of the Oracle Server over a period of time. For details on integrating the Oracle SPI with HP Reporter to get consolidated reports, see Integrating with HP Reporter on page 50.

Graphs

The SPI package contains the default graphing policies provided by the SPI. Graphs are drawn from metrics that are collected in the datasources created by the SPI. The graphs help you analyze trends in server usage, availability, and performance. For details on integrating the Oracle SPI with HP Performance Manager to get consolidated graphs, see Integrating with HP Performance Manager on page 55.

Functions of Oracle AS SPI

The Oracle AS SPI messaging, reporting, and action-executing capabilities are based on the HPOM concept of policies. For more information on HPOM, see the HPOM console online help. The settings within these policies define various conditions that can occur within the Oracle Application Server and enable information to be sent back to the HPOM management server. This proactively addresses potential or existing problems and avoid serious disruptions to Web transaction processing. The Oracle AS SPI performs the following functions:

Collecting and Interpreting Server Performance and Availability Information

The SPI starts gathering server performance and availability data after you configure the SPI, and the policies are deployed on the managed nodes. This data is compared with the settings within the deployed policies. The policies define conditions that can occur within the Oracle AS Server, such as queue throughput rates, cache use percentages, timeout rates, and average transaction times. The policies monitor these conditions against default thresholds that are set within the policies and trigger messages when a threshold has been exceeded.

Displaying Information

The Oracle AS SPI policies generate messages when a threshold is exceeded. These messages can appear as messages in the Message Browser.

Generating Reports Using HP Reporter

You can integrate the Oracle AS SPI with HP Reporter to provide you with management-ready and Web-based reports. The HP Reporter package includes the policies for generating these reports. You can install the HP Reporter package on the Windows system.

HP Reporter generates reports of summarized, consolidated data every night, after you install the product and complete basic configuration. You can assess how the Oracle OC4J/OHS server is performing over a period of time with the help of these reports.

Graphing Data with HP Performance Manager

Metrics collected by the Oracle AS SPI can be graphed. The values can then be viewed for trend analysis.

You can integrate the Oracle AS SPI with HP Performance Manager to generate and see graphs. These graphs display the values of the metrics collected by the Oracle AS SPI.

Customizing Policies and Metrics

You can use the Oracle AS SPI policies without customization, or you can modify them to suit the needs of your environment. Some of the modifications and customizations that you can do are:

- Modify the default policies – Within a policy, you can change the default settings for:
    — Collection interval
    — Threshold
    — Message text
    — Duration
    — Severity level of the condition
    — Actions assigned to the condition (operator-initiated or automatic)

- Create custom policy groups – You can create custom policy groups, using default policies as base. For more information, see Chapter 5, Customizing Oracle AS SPI Policies.

- Create custom metrics – You can define your own metrics or User Defined Metrics (UDMs) to expand the monitoring capabilities of the Oracle AS SPI. For more information on UDMs, see the *HP Operations Smart Plug-in User Defined Metrics User Guide*.

2 Installing Oracle AS SPI

This chapter provides information on installation of the Oracle AS SPI on different environments. It discusses all the required prerequisites, instructions, and steps for installing the Oracle AS SPI. The following flowchart summarizes the steps for installing and configuring the Oracle AS SPI.

Figure 1   Flowchart for installing and configuring the SPI
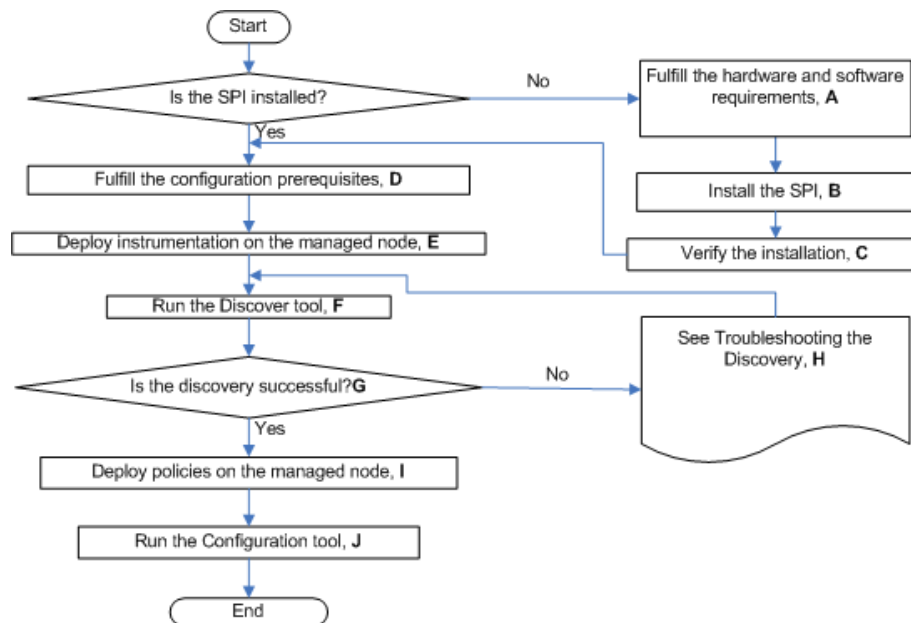
Table 1   References of the legends in the flowchart

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J	Run Configuration on page 25

Prerequisites

Install the HP Operations Manager (HPOM) management server before installing the Oracle AS SPI. It is not necessary to stop the existing HPOM sessions before installing the Oracle AS SPI.

You must install the prerequisite software on your system before installing the Oracle AS SPI.

Hardware Requirements

For information on hardware requirements for the management server, see the *HP Operations Manager for Windows* documents. For information on hardware requirements for the managed nodes, see the Support Matrix (SUMA) link:

http://support.openview.hp.com/selfsolve/document/KM323488.

Software Requirements

Ensure that the following software requirements are completed prior to the installation of the Oracle SPI:

On the Management Server:

- HP Operations Manager for Windows: 9.00
- HP Performance Manager: 9.00 (required if you want to generate graphs)
- HP Reporter: 3.90 (required if you want to generate Web-based reports)
- HP Operations SPI Data Collector (DSI2DDF): 2.41
- HP SPI Self-Healing Services (SPI-SHS-OVO): 3.04
- JMX Component (JMXSPI): 7.04
- HP Operations SPI Upgrade Toolkit: 2.03

On the Managed Node:

- HP Performance Agent: 5.00 (required if you want to use HP Performance Agent for data logging)
- HP Operations agent: 8.60 and above

See the Support Matrix (SUMA) link, for more information on supported versions of HP Operations Manager, application servers, HP Performance Agent, HP Performance Manager, and HP Reporter:

http://support.openview.hp.com/selfsolve/document/KM323488

Installation Packages

This SPI DVD comes with the SPI package, Reporting package, and Graphing package. The details are mentioned below.

SPI Package

The core package is the `HP Operations Smart Plug-ins.msi`, which contains all the functionality of the SPI. It must be installed on a server managed by HPOM. The SPIs consists of policies and instrumentation (binaries or scripts) that monitor the application server. Monitoring comprises of alarms related to critical events of the application, and the logging of important performance metrics of the application server. The metrics that are logged can be used to create graphs.

The Oracle AS SPI package is present at the following location in the media:

`<SPI DVD>\x64\SPIs\OAS SPI\OASSPI-Server.msi.`

Reporting Package

This package contains the default reporter policies provided by the SPI. These policies are static and cannot be modified unless Crystal Reports 10.0 or later is installed. The HP Reporter gathers the data from the nodes managed by the SPI through the HPOM server, stores it in its local database, and then creates .html reports based on the default SPI report policies.

The Oracle AS SPI Reporting package is present at the following locations in the media:

- `<SPI DVD>\x64\SPIs\Oracle SPI Reporter Package\OASSPI-Reporter.msi`
- `<SPI DVD>\x86\SPIs\Oracle SPI Reporter Package\OASSPI-Reporter.msi`

Graphing Package

This package contains the default graphing policies provided by the SPI. Graphs are drawn from metrics that are collected in the datasources created by the SPI.

The Oracle AS SPI Graphing package is present at the following locations in the media:

- `<SPI DVD>\x64\SPIs\Oracle SPI OVPMConfiguration Package\HPOvSpiOasGc.msi.`
- `<SPI DVD>\x86\SPIs\Oracle SPI OVPMConfiguration Package\HPOvSpiOasGc.msi.`

Installing Oracle AS SPI

The following section describes the steps for installing the Oracle AS SPI.

Installing Oracle AS SPI on the Management Server

To install the Oracle AS SPI on the management server:

1   Insert the HP Operations Smart Plug-ins DVD into the DVD drive of the management server system. The HP Operations Smart Plug-in InstallShield Wizard starts.

2   Click **Next**. The Smart Plug-ins Release Notes and Other Documentation window opens.

3   Click **Next**. The Program Maintenance window opens.

▶   If no SPI is installed on the management server, the Product Selection window opens instead of the Program Maintenance window.

4   Select **Install Products**. The Product Selection window opens.

5   From the options listed (there are three Product Selection windows) select the **Oracle Application Server** check box and click **Next**.

6   HP Operations Manager deploys policies automatically only when desired. Select to disable or enable the Auto Deployment feature and click **Next**.

7   Indicate your acceptance of licensing agreement terms by selecting the **I accept the terms in the license agreement** button and click **Next**.

8   Selecting Back enables you to edit previous selections, otherwise, click **Install** to start the installation.

▶   If you select the Cancel button after the installation has started, it does not halt the entire installation process, but only that of the product being installed currently (shown in the Status area). Now, installation of the next selected product starts.

9   You will see various status dialogs as the install program proceeds. Depending on the speed of your system and the components selected for installation, this process could take several minutes.

10   Click **Finish** to conclude the installation. Oracle Application Server SPI is installed.

Installing Oracle AS SPI in an HPOM Cluster Environment

The following section describes the steps for installing the Oracle AS SPI in an HPOM Cluster environment.

Prerequisites

Install the HPOM management server on each system in the cluster. When the management server cluster installations are complete, the setup for the installation of the Oracle AS SPI is ready. In addition, ensure that each node in the cluster has sufficient disk space for the Oracle AS SPI.

Cluster installation

To complete the installation in a cluster environment, follow these steps:

- For the first installation (Node A) in the cluster - Follow the standard installation procedure and make the product choices. Once you complete the installation on Node A, you will receive an instruction to proceed to the next system, Node B.

- For the Node B installation in the cluster - Follow the same procedure. You no longer need to make product choices. The installation detects the cluster configuration and copies all the required product choices from Node A to Node B.

- For Node C and all remaining installations in the cluster - Proceed as you did with Node B. You can no longer choose products, but enable the installation packages to be copied from Node B (the previously installed system within the cluster) to Node C (the current system within the cluster) until you are finished.

Task 1: At the first cluster-aware management server, select and install Smart Plug-in.

▶ Ensure that sufficient disk space is available on each management server for the Oracle AS SPI before starting installation. Cancelling the installation process before completion could result in partial installations and require manual removal of the partially-installed components.

Complete all the tasks in the section Installing Oracle AS SPI on the Management Server on page 15 and then proceed to the next management server.

Task 2: At the next cluster-aware management server, install pre-selected Smart Plug-in.

The task that follows is repeated on each management server in the cluster and prompts you to continue to every management server (as was defined in the HP Operations Manager cluster installation) until you are finished.

1 Insert the HP Operations Smart Plug-ins DVD in the DVD drive of the management server and follow instructions as they appear.

2 After the installation is complete, proceed as directed to the next management server until the installation on every management server in the cluster is complete.

> Note that the HPOM console will not function properly until installations are completed on all nodes in the cluster.

Verifying Installation

To verify the installation of the Oracle AS SPI:

- Verify the version of the policies of the installed SPI. It must be 7.0450.

- Verify that all the instrumentation files are present in `\<OvShareDir>\Instrumentation\Categories`.

- Run the `cscript List_Installed_SPI_Versions.vbs` present under the `<ovinstalldir>` to check the versions of installed SPI.

Migration of Oracle AS SPI from Previous Versions

For information about migrating the Oracle AS SPI from the previous versions to the latest version, see *HP Operations Smart Plug-ins DVD Release Notes*.

3 Configuring Oracle AS SPI

This chapter explains how to configure the Oracle AS SPI. It details all configuration prerequisites, Oracle AS SPI configuration for managed nodes and the management server, and additional configuration based on your environment.

Prerequisites

Complete the following tasks before configuring the Oracle AS SPI.

- Verify the Application Server Status
- Collect Oracle AS Login Information

Verify the Application Server Status

Verify if the Oracle Application Servers are running by checking the status of the server in the Oracle Application Server administrative console. You can see this console on the Web browser by typing: **http://**<*machinename*>**:**<*port no*>**/emd/console**

For example, **http://machine1.foo.bar.com:1156/emd/console**

The Oracle AS SPI discovery policies only discover the application servers that are running.

In the following figure, in the console, colored arrows (in the status column) show the status of the server:

- Green arrow (pointing upwards) - server is running.
- Red arrow (pointing downwards) - server is not running. If the arrow is red, start the server.

Collect Oracle AS Login Information

If security is enabled on the Oracle AS, collect the Oracle AS login and password for each OC4J/OHS server. If you do not want to use the existing login and password, create a new login and password. The Oracle AS SPI discovery process uses the login and password to gather basic configuration information, and the Oracle AS SPI data collector uses the login and password to collect metrics.

To simplify the Oracle AS SPI configuration, keep the login and password for both OC4J and OHS servers similar.

You can use the username and password for users or groups assigned to the administrator or operator role.

Configuring Oracle AS SPI

To complete the basic Oracle AS SPI configuration:

1   Deploy Instrumentation on the Managed Node

2   Run Discovery

3   The information about the HTTP Server will not appear in the service map because this information was manually entered and not discovered.

4   Deploy Oracle AS SPI Policies

5   Run Configuration

Deploy Instrumentation on the Managed Node

To deploy instrumentation on the managed node, follow these steps:

1   From the HPOM console select **Operations Manager** → **Nodes**.

2   Right-click the managed node, on which you want to run the Discover or Configure OASSPI tool.

3   Select **All Tasks** → **Deploy instrumentation.** The Deploy Instrumentation window opens.

4   Select JMX, SHS_Data_Collector, SPIDataCollector, and Oracle AS from the list of instrumentation files and click **OK**.

To verify that these files deployed successfully, check **Deployment Jobs** under **Policy management**. There should be no error messages.

Run Discovery

To run discovery, follow these steps:

1   From the HPOM console select **Operations Manager** → **Tools** → **SPI for Oracle AS** → **OASSPI Admin**.

2   Double-click **Discover or Configure OASSPI**. The Edit Parameters window opens.

3   Select the managed nodes on which Oracle Application Servers are running and click **Launch**. The Introduction window opens.

4   Click **Next**. The Configuration Editor opens.

5   If you have already set the LOGIN, PASSWORD, HOME or HOME_LIST, and JAVA_HOME properties, go to the next step.

If you have not set the LOGIN, PASSWORD, HOME or HOME_LIST, and JAVA_HOME properties, perform the following steps to set these mandatory properties.

▶   Ensure that the LOGIN, PASSWORD, HOME or HOME_LIST, and JAVA_HOME properties are set since these are mandatory properties. In earlier versions of the SPI, only LOGIN and PASSWORD were required properties.

a   Select LOGIN/PASSWORD from the **Select a Property to Set...** list.

The Set Access Info for Default Properties window opens.

Type the username and password collected in Collect Oracle AS Login Information on page 20. The LOGIN and PASSWORD properties are set to this information.

The LOGIN and PASSWORD properties set in this window are used as the default Oracle Admin Server login and password (they are set at the global properties level). If no NODE level or server-specific LOGIN and PASSWORD properties are set, this Oracle AS login and password is used by the Oracle AS SPI to log on to all Oracle Admin Servers. For more information about the configuration structure, see *HP Operations Smart Plug-in for Oracle Application Server Online Help*.

If the Oracle Admin Server login and password are the same for all Oracle Application Servers on all HPOM managed nodes, set the LOGIN and PASSWORD properties in the Set Access Info for Default Properties window and click **OK**.

If the Oracle Admin Server login and password are different for different instances of Oracle Application Servers, you must customize the Oracle AS SPI configuration by setting the LOGIN and PASSWORD properties at the NODE or server-specific level (for more information about the configuration structure, see *HP Operations Smart Plug-in for Oracle Application Server Online Help*), and click **OK**:

    b   Select HOME or HOME_LIST from the **Select a Property to Set...** list and click **Set Property**. Set the value for HOME or HOME_LIST.

    c   Select JAVA_HOME from the **Select a Property to Set...** list and click **Set Property**. Set the value for JAVA_HOME.

6   Click **Next** to save any changes and exit the editor.

7   The Confirm Operation window opens. Verify the nodes on which the operation is to be performed. Click **OK**.

> If you click **Cancel** and had 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, start the Discover or Configure OASSPI tool, launch the Discover tool, click **Next** from the configuration editor, and then click **OK**.

> Wait for the discovery process to complete before going to the next task. The discovery process might take several minutes.

JMX Discovery for Oracle AS

The Oracle AS SPI supports JMX discovery for Oracle Application Server version 10gR3.

In your environment you may have different versions of Oracle Application Servers, for example, version 10gR3 or earlier, installed on the same node. In such a scenario, select whether you want to run classic discovery or the JMX discovery.

> For the earlier versions of Oracle Application Servers, Oracle AS SPI uses DMS tool for Discovery. This is referred to as *classic discovery* in this document.

There can be three scenarios:

Scenario 1: If only Oracle Application Server version 10gR3 is installed on the node.

By default, the JMX Discovery runs.

Scenario 2: If Oracle Application Server versions earlier than 10gR3 (for example10gR1 and 10gR2) are installed on the node.

By default, the classic discovery runs.

Scenario 3: If different versions of Oracle Application Server (10gR3 along with 10gR1 or 10gR2) are installed on the node.

You can choose the method of discovery.

In the SPIConfig file, set the value of the **JMX_DISCOVERY** flag to `true` or `false`. By default, the value is `true`.

- If **JMX_DISCOVERY**=`true`, the JMX Discovery runs for OracleAS 10gR3 version only and all the earlier versions are not discovered.
- If **JMX_DISCOVERY**=`false`, the classic system of discovery is used for all the versions including 10gR3.

➤ If you set the JMX_DISCOVERY flag to false, the collection of JMX Metrics (belonging to the OASSPI-Metrics (JMX) policy group) will fail. All metrics belonging to the OASSPI Metrics group will be collected with the exception of OASSPI_0001, OASSPI_0002, OASSPI_0005, and OASSPI_0245

Discovering HTTP (OHS) Server

➤ The new JMX discovery will discover the HTTP server *only* if it is a part of a cluster.

There can be two discovery scenarios for HTTP (OHS) servers:

Scenario 1: HTTP (OHS) and OC4J servers are on the same system and have a common Oracle HOME.

The HTTP server is automatically discovered.

Scenario 2: HTTP (OHS) and OC4J servers are on different systems and /or have different Oracle HOME.

To discover the HTTP server:

1   In the cluster, identify the OC4J instance that is connected to the OHS server.

2   In the Configuration Editor, right-click the node on which the OC4J server is installed and select **Add OC4J/OHS Server**. The OASSPI Discover Tool: Add App Server window opens.

3   Select the **HTTP Server** check box and click **OK**. The HTTP Server is added below the OC4J server.

4   Select the HTTP Server. In the Properties for OC4J/OHS Server: HTTP Server pane, the NAME and TYPE properties appear by default.

5   Set the following properties:

To set a property, select the property from the Select a Property to Set dropdown menu and click **Set Property**. Double-click the empty space next to the property after the property appears in the following list.

— HOME: Similar to the value set for the OC4J server.
   For example: **E:/product/10.1.3.1/OracleAS_1**

— JAVA_HOME: Similar to the value set for the OC4J server.
   For example: **E:/product/10.1.3.1/OracleAS_1/jdk**

— LOGIN: Similar to the value set for the OC4J server.

— PASSWORD: Similar to the value set for the OC4J server.

— MAP_KEY_PREFIX: Any unique HTTP instance name.

— URL_PATH: Similar to the value set for the OC4J server. However, you must replace /home at the end of the URL with **/cluster**.
   For example: **/optmn://testsystem.com:6004/cluster**

   To get the port number in the URL, type the following command from the command prompt: *<directory>* **/product/10.1.3/OracleAS_1/opmn/bin> opmnctl status –port**.

— VERSION: 10.1 3

> There is a single space between 10.1 and 3 in the version.

6   Click **Next**. The OASSPI Discover Tool: Confirm Operation Window opens.

7   Click **OK**.

Limitations

There are two limitations in this scenario:

1   Manually type the information the SPI requires to monitor the HTTP server.
2   The information about the HTTP Server will not appear in the service map because this information was manually entered and not discovered.

Verify Discovery Process

> Depending on the number of managed nodes in your environment, verification may take several minutes.

To verify if the discovery process is completed:

1   Check if the following message appears in the message browser for each managed node:

    WASSPI-602: OASSPI Discovery is Successful

2   From the HPOM console tree, select **Operations Manager** → **Services** → **Applications** → **Oracle Application Servers**. The service map appears. It may take some time for the service map to appear completely.

3   Verify that the OC4J and OHS server instances are represented correctly.

> The appropriate Oracle AS SPI group policies are deployed on the managed nodes after the discovery process is complete. An automatic procedure to set up a managed node for the Oracle AS SPI operations starts after policy deployment.

4   Launch the Verify tool, 10 minutes after the service map appears, to verify if the installation is complete.

   To launch the Verify tool, follow these steps:

   a   From the HPOM console, select **Operations Manager** → **Tools** → **SPI for Oracle AS** → **OASSPI Admin**.

   b   Double-click **Verify**. Select where To Launch This Tool window opens.

   c   Select the nodes on which you want to run the Verify tool.

   d   Click **Launch**. The Tool Status window opens.

   e   In the Launched Tools field the status of the tool must appear as succeeded. In the Tool Output field, the message Installation is clean must appear.

      If this message does not appear, see the Tool Output field for error messages.

   f   Click **Close**.

Deploy Oracle AS SPI Policies

To deploy policies, follow these steps:

1 From the HPOM console for Windows, select **Operations Manager** → **Policy management** → **Policy groups**.

2 Right-click **SPI for Oracle AS** → **All Tasks** → **Deploy on...**.

3 Select the managed node on which you want to deploy the policies and click **OK**. The policies are deployed on the nodes.

Run Configuration

To run configuration, follow these steps:

1 From the HPOM console for Windows, select **Tools** → **SPI for Oracle AS** → **SPI Admin**.

2 Double-click **Discover or Configure OASSPI**.

3 Select the managed nodes on which you want to launch the tool.

4 Click **Launch**. The Tool Selector window opens.

5 Click **OK**. By default, the Launch Configure Tool button is selected. The Introduction window opens.

6 Click **Next**. The Configuration Editor opens.

> ▶ Ensure that the LOGIN, PASSWORD, HOME or HOME_LIST, and JAVA_HOME properties are set. You cannot proceed to the next window if the required properties are not set. For information on how to set the properties, see step 5 on page 23.

7 Set the configuration properties at the global or server specific level by selecting the property from the **Select a Property to Set...** list and then, click **Set Property.** Set the value for the property. For more information on the usage of configuration editor, see *HP Operations Smart Plug-in for Oracle Application Server Online Help*.

8 Select **Save** to save any changes made to the configuration. After you save the changes, you cannot make changes automatically.

9 Select **Finish** to exit the editor and start configuring the Oracle AS SPI on the managed node.

> ▶ If you click **Cancel**, the changes made by you are not saved to the selected managed nodes' configuration and remain in the configuration on the management server.

For more information on configuration properties, see *HP Operations Smart Plug-in for Oracle Application Server Online Help*.

Additional Oracle AS SPI Configuration

Complete the basic Oracle AS SPI configuration and then finish the process by setting properties that are not automatically discovered by the Discovery policies. Install and configure additional components. Set these properties and configure additional components depending on your environment.

- If you have installed the HP Reporter (must be purchased separately), for installation and configuration information, see Integrating with HP Reporter on page 50.

- If you have installed the HP Performance Manager (must be purchased separately) and you want to view graphs, set the GRAPH_URL property. For installation and configuration information, see Integrating with HP Performance Manager on page 55.

To set additional properties, see Run Configuration on page 25.

For a complete description of the Oracle AS SPI properties, and information on setting properties using the configuration editor, see the section Configuration properties in *HP Operations Smart Plug-in for Oracle Application Server Online Help*.

4 Using Tools

The Oracle SPI offers centralized tools that help you to monitor and manage systems using the Oracle Application Server. The Oracle AS SPI tools enable you to configure the management server's connection to selected server instances on specific managed nodes. The Oracle AS SPI tools include configuration, troubleshooting, and report-generating utilities.

This chapter describes the various tools which you can use to monitor and manage systems. The procedure to run the tools is mentioned at the last section of this chapter.

Overview

In the Tool Bank window, the OASSPI:TOOLS group contains the following Oracle AS SPI tool groups:

- Oracle Admin (OASSPI:ADMIN)
- SPI Admin (OASSPI:SPI_ADMIN)
- Reports (OASSPI:REPORTS)
- JMX Metric Builder (OASSPI:REPORTS_JMX): This tool group is available *only* if you install the JMX Metric Builder software bundle.

SPI Admin Tools Group

The SPI Admin tools group contains tools that enable you to configure, control, and troubleshoot the Oracle AS SPI. These tools require the **root** user permission, therefore it is recommended that this group is assigned to the HPOM administrator.

Additional SPI Admin tools for User Defined Metrics (UDMs) are available with the SPIJMB software bundle. For more information about how to install the software bundle and the additional tools, see the *HP Operations Smart Plug-in for User Defined Metrics User Guide.*

To access the SPI Admin tools, in the Tool Bank window, click **OASSPI:TOOLS →OASSPI:SPI_ADMIN**.

The Oracle SPI Admin tool group contains the following tools:

- Discover or Configure OASSPI
- Self-Healing Info
- Create OASSPI Node Groups
- Start Monitoring
- Stop Monitoring
- Start Tracing
- Stop Tracing

- Verify
- View Error Log

Discover or Configure OASSPI

You can run the discovery or configuration process using the Discover or Configure OASSPI tool. The Discover or Configure OASSPI tool launches the configuration editor. The tool enables you to either identify instances of an Oracle Application Server on a managed node from the HPOM console (on selecting Launch Discover Tool option), or maintain the Oracle SPI configuration by viewing, editing, or setting configuration properties in the configuration editor (on selecting Launch Configure Tool option).

Function

The following functions are performed by the Configure Tool:

- Updates the configuration on the HPOM management server and selected managed nodes.
- Creates the directories and files required by the Oracle SPI on the selected managed nodes.
- Sets up data sources for reporting and graphing.
- Sets up the Oracle Server log files and the Oracle SPI error log file for monitoring.

The Discover Tool updates the configuration on the HPOM management server and selected managed nodes.

Configuration information for all Oracle instances on all HPOM managed nodes is maintained on the HPOM management server. In addition, every managed node maintains information about Oracle Application Servers running on that node.

When you make changes using the configuration editor, the changes are saved on the HPOM management server. However, when launching the Discover or Configure OASSPI tool if you select a node, the changes affecting the selected node are saved on that node itself.

To save any changes on a managed node, you must select that node before launching the Discover or Configure OASSPI tool otherwise the changes are saved on the management server by default.

Self-Healing Info

The Self-Healing Info tool collects data that you can send to your HP support representative.

Setup

If you are collecting data for a reproducible problem, follow these steps before running the Self-Healing Info tool:

1 Run the Start Tracing tool. For more information, see Start Tracing on page 29.

2 Reproduce the problem.

Function

Self-Healing Info tool performs the following functions:

- Launches and saves data using the Verify tool (for more information, see Verify on page 30).

- Saves data in the following file:
  - on a UNIX or Linux managed node: `/tmp/wasspi_oas_support.tar`
  - on a Windows managed node: `wasspi_oas_support.zip` in `%TEMP%` directory.

  ➤ This file might be hidden on some Windows managed nodes. If you do not see the file, open Windows Explorer and, from the **Tools** menu, select **Folder Options**. Click the **View** tab. Under Hidden files and folders, select **Show hidden files and folders**.

Create OASSPI Node Groups

The Create OASSPI Node Groups tool creates the OAS SPI node groups, that contain all the managed nodes, which run the supported versions of WebSphere.

Function

The Create OASSPI Node Groups tool helps to create the OAS SPI node groups, that contain all the managed nodes, which run the supported versions of Oracle application server.

Start Monitoring

The Start Monitoring tool starts the Oracle AS SPI to collect metrics for OC4J/OHS server instances on a managed node.

Metrics generate alarms (when thresholds are exceeded), which you can use to create reports (automatically or manually generated) and graphs. The reports and graphs help in analyzing trends in server usage, availability, and performance.

Function

The Start Monitoring tool starts the collection of metrics for OC4J/OHS server instances on a managed node.

Stop Monitoring

When you launch the Stop Monitoring tool, the Oracle AS SPI stops collecting metrics for OC4J/OHS server instances on a managed node.

Typically, you might stop monitoring on a managed node if the node is not running for a known reason (for example, the node is down for maintenance). Stopping the monitoring prevents unnecessary alarms from being generated.

Function

The Stop Monitoring tool stops the collection of metrics for OC4J/OHS server instances on a managed node.

Start Tracing

The Start Tracing tool starts gathering information about the functioning of the SPI. Run this tool only when instructed by your HP support representative.

The tool collects the files created by this tool as a part of the data that the HP support representative can use.

Function

The Start Tracing tool starts enhanced logging about the functioning of the SPI in a file.

Stop Tracing

The Stop Tracing tool stops gathering information about the functioning of the SPI.

The tool collects the files created by this tool as a part of the data that the HP support representative can use.

Function

The Stop Tracing tool stops enhanced logging about the functioning of the SPI in a file.

Verify

The Verify tool enables you to verify if the files required for the functioning of the SPI (such as instrumentation, library and configuration) are deployed on the managed nodes.

> Ensure that you have installed the latest version of Self-Healing Service (SHS) component from the SPI DVD, before you launch the Verify tool.

Function

The Verify tool checks if the files (such as instrumentation, configuration and library) required for the functioning of the SPI, are deployed on the managed nodes.

View Error Log

The View Error Log tool enables you to view the contents of the Oracle SPI error log file.

Function

The View Error File tool enables you to view the contents of the Oracle SPI error log file `<OvAgentDir>/wasspi/oas/log/wasspi_perl.log` where `<OvAgentDir>` typically is:

- UNIX and Linux managed nodes: `/var/opt/OV`
- Windows managed nodes: `\Documents and Settings\All Users\Application Data\HP\HP BTO Software\`

Oracle Admin Tools Group

To access the Oracle Admin tools, in the Tool Bank window click **OASSPI:TOOLS** → **OASSPI:ADMIN**.

The Oracle Admin tool group contains the following tools:

- Launch Oracle AS Console
- Start Oracle AS
- Stop Oracle AS
- View Oracle AS Logs
- View Oracle AS Status

Launch Oracle AS Console

The Launch Oracle AS Console tool enables to bring up the Oracle Application Server Control Console.

Setup

- Install Oracle AS Enterprise Manager on the managed node

Function

The Launch Oracle AS Console tool brings up the Oracle Application Server Admin Console in a Web browser for a single application server or all application servers on the selected node.

Start Oracle AS

The Start Oracle AS tool starts an Oracle application server from the HPOM console. You can start one or more Oracle application servers on the selected managed nodes without logging on to each Oracle administration server.

Setup

The START_CMD, STOP_CMD, and USER configuration properties *must* be set before launching this tool. To set this property, run the Configure tool and select Oracle application servers displayed in the left pane. Set the preceding configuration properties for each Oracle application server.

Function

The Start Oracle tool starts one or all application servers on the selected managed nodes.

Stop Oracle AS

The Stop Oracle AS tool stops an Oracle application server from the HPOM console. You can stop one or more Oracle application servers on the selected managed nodes without logging in to each Oracle administration server.

Setup

The START_CMD, STOP_CMD, and USER configuration properties *must* be set before launching this tool. To set this property, run the Configure tool and select Oracle application servers displayed in the left pane. Set the preceding configuration properties for each Oracle application server.

Function

The Stop Oracle tool stops one or all application servers on the selected managed nodes.

View Oracle AS Logs

The View Oracle AS Logs tool enables you to select and view an Oracle Server log file without logging in to the system on which a Oracle Server is running.

Function

The View Oracle Logs tool performs the following functions:

- When you launch the View Oracle Logs tool without a parameter, the tool returns a numbered list of available log files for the selected managed node.

- When you launch the View Oracle Logs tool with an invalid parameter (for example, a non-numeric value or a number that does not correspond to the list of available log files), the tool returns a numbered list of available log files for the selected managed node.

- When you launch the View Oracle Logs with a valid parameter, the tool returns the contents of the corresponding log file for the managed node.

You can type only one numeric value in the parameter field. The log file designated to this number (for all managed nodes) will appear. Select one log file for one managed node to view each time you launch the tool.

If you keep the Tool Status window open and re-launch the tool, the output in the Tool Status window accumulates.

View Oracle AS Status

The View Oracle AS Status tool displays a status report of the Oracle Application Servers running on a selected managed node. You can use this tool to check the status of each application server running on the node.

Function

View Oracle AS Status displays the Oracle Application Server instance name, hostname, Oracle home, and processes (component, type, process ID, and status) for each application server instance.

Reports Tool Group

The Reports tool group helps to generate reports that show information on Oracle Application Server conditions in the server. Each report shows the condition of all configured server instances on the managed node in relation to the metric.

Function

Reports tool group helps to generate reports on Oracle Application Server conditions in the server.

Reports JMX Tool Group

Reports JMX tool group helps to generate ASCII metric reports that display information about the condition of the Oracle Application Server (JMX). These reports are only available for Oracle Application Server version 10gR3.

Function

Reports JMX tool group helps to generate ASCII metric reports on Oracle Application Server (JMX) conditions in the server.

Tool Bank Reports Generated from Alarms

An alarm condition can generate a report. These reports are generated automatically and are context sensitive, relating only to a single server on the managed node. These reports appear within the Annotations tab in Message Properties window.

If you configure the message browser to display the **SUIAONE** columns, a flag appears under the **S** column (adjacent to the message) when a report is generated.

Launching Tools

This section describes how you can launch the tools for the Oracle SPI. The steps in Launching Discover or Configure OASSPI tool describe how you can launch the Discover or Configure OASSPI tool. The steps in Launching All Tools describe how you can launch all the tools (excluding the Discover or Configure OASSPI) tool.

Launching Discover or Configure OASSPI tool

See Run Discovery on page 21 and Run Configuration on page 25 to know how to launch Discover or Configure OASSPI tool.

Launching All Tools

To launch all tools, follow these steps:

1   From the Administration UI, select **Operations Manager** → **Tools** →**SPI for Oracle AS** →**<Name of the Tool>**.

2   In the details pane, right-click on the tool you want to launch and select **All Tasks**→**LaunchTool**…. The Select where to launch this tool dialog box opens.

3   In the dialog box, select the checkbox next to every node you want to configure, and click the **Launch...** button. Select the nodes on which you want to launch the tool. The tool is launched.

5 Customizing Oracle AS SPI Policies

The Oracle AS SPI policies help to monitor the Oracle Application Servers. You can customize these policies depending on the requirement of your IT environment. This chapter includes general guidelines about the Oracle AS SPI policies and explains how you can customize them. For more information, see the Policies section in the *Oracle AS SPI Online Help*.

Oracle AS SPI Policy Groups and Types

You can customize the Oracle AS SPI policies to suit the needs of your IT environment. However, these policies can also work without any modification. For more information, see the Policy Groups section in the *Oracle AS SPI Online Help*.

Oracle AS SPI Policy Groups

The Oracle AS SPI policies are organized under the heading, SPI for Oracle AS .
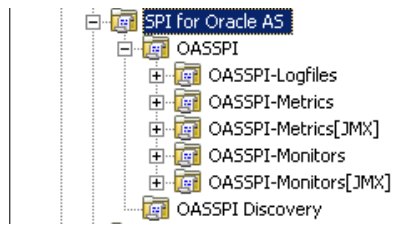
The parent policy group—SPI for Oracle AS— contains the OASSPI policy group and the OASSPI Discovery policy group.

The OASSPI policy group includes the following policy groups:

- **Logfiles**: Policies in this group generate messages according to logfile and error text detected in both the Oracle Application Server logfiles and in the Oracle AS SPI logfiles. The Logfiles policy group contains the following policies:

    — Oracle AS Log Template: This policy monitors the Oracle AS log files.

    — OASSPI-Logfile-Monitor: This policy monitors the Oracle AS log files.

    Both OASSPI-Logfile-Monitor and Oracle AS Log Template policies monitor Oracle AS log files.

    — OASSPI Error Log: This policy monitors the OASSPI error log.

    — OASSPI Java Collector Error Log: This policy monitors the Java Collector error log.

    — OASSPI Java Discovery Error Log: This policy monitors the Java Discovery error log.

- **Metrics**: The policies in this group generate messages according to threshold settings that monitor Oracle Application Server availability and performance metrics.

- **Monitors**: This group contains collector policies that pertain to all metrics scheduled to be collected in the specified collection interval. These policies are named according to collection intervals.

The Discovery policy group includes the following policies:

- **OASSPI Messages**: This policy intercepts the Oracle AS SPI messages for the HPOM message browser.

- **OASSPI Service Discovery**: This policy gathers the information used by the management server to update the service map.

The Discovery policy automatically updates the Oracle Application Server configuration information in the service map. For more information on the configuration editor, see the section Configuring Oracle AS SPI in *HP Operations Smart Plug-in for Oracle Application Server Online Help*.

Oracle AS SPI Policy Types

Metric policies define how data is collected for the individual metric and what is the threshold value. When this threshold is exceeded alerts or messages appear in the message browser.

You can change the threshold within a policy as follows:

1   Double-click the policy name to open it.

2   Click the **Threshold levels** tab, and then click **Threshold level** in the Level Summary pane.

In the following figure, incoming values for metric OASSPI-0220 are compared against its threshold limits. The default threshold is set at 100.
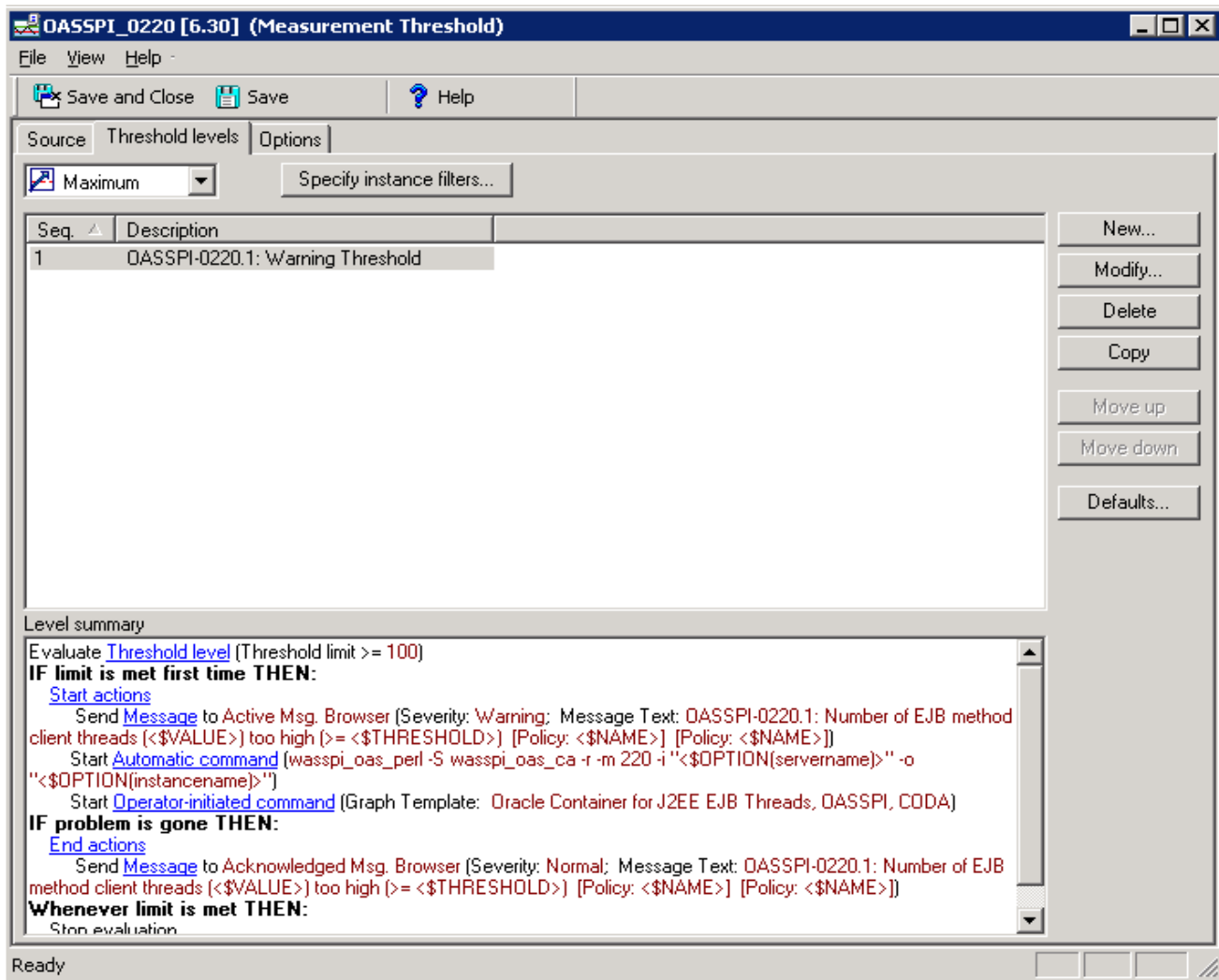
Collector policies - These policies define all metrics for the Oracle Application Server that are scheduled for collection at a specified interval. The collector policy names include the collection interval (for example, OASSPI-OC4J-15min if the collection interval is 15 minutes).

You can open a collector policy (double-click the policy name) and see all the metrics (by number) collected within an interval. When you double-click the policy, the Measurement Threshold window opens. All the collected metrics appear in the Command box. The metrics are preceded by the –m option of the collector or analyzer command `wasspi_ca`.

Basic Policy Customizations

This section covers basic policy customizations such as changing threshold values, scheduling or deleting a metric from data collection, and opening a metric or collector policy.

➤ Make copies of the original policies so that the default policies remain intact, before you customize any policy.

Modifying Metric Policies

You can modify the metric attributes for all monitored instances of Oracle Application Server. Some attributes are defined in the Configuration Properties section in the *Oracle AS SPI Online Help*.

Threshold Level and Actions

To modify the threshold level and actions of a policy:

1 From the HPOM console go to **Operations Manager** → **Policy management** → **Policy groups** → **SPI for Oracle AS** → **OASSPI** → **Metrics**.

2 Double-click the policy for which you want to change the threshold value. The policy window opens.

3 Select the **Threshold Levels** tab and double-click the policy description in the window that opens. The Threshold Level window opens.

The following figure shows the Threshold Level window.
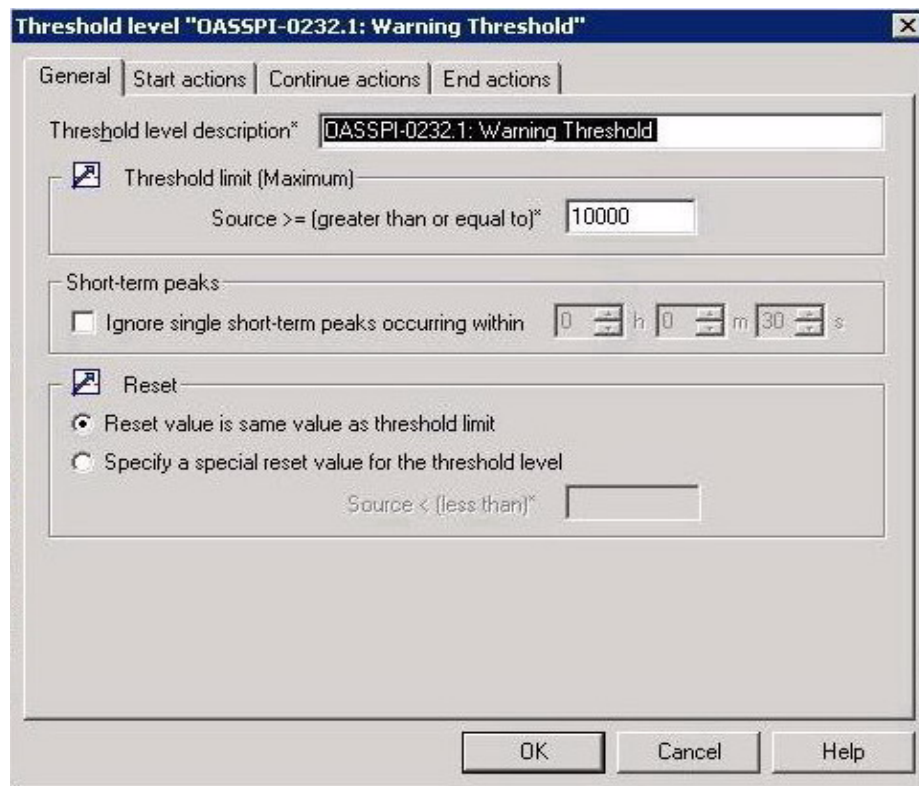
You can modify the following attributes from the Threshold Level window:

- Threshold limit: If the threshold limit is met or crossed, the Oracle AS SPI triggers an alarm or message.

- Short-term peaks: Short-term peak is a minimum time period over which the monitored value must exceed or drop the threshold (minimum threshold) before a message is generated. When you set a short-term peak value then a message is sent only if the monitored value exceeds the threshold limit, each time the value is measured during the duration of time you select. If the duration is set to 0 or the box is left empty, an alarm is generated as soon as HPOM detects that the threshold has been equaled or crossed.

- Reset: Reset is the limit below which the monitored value must drop or exceed (minimum threshold) to return the status of the monitored object to normal.

As the following figure shows, the Threshold level window has three action tabs. You can click any of the action tabs to set the related actions.
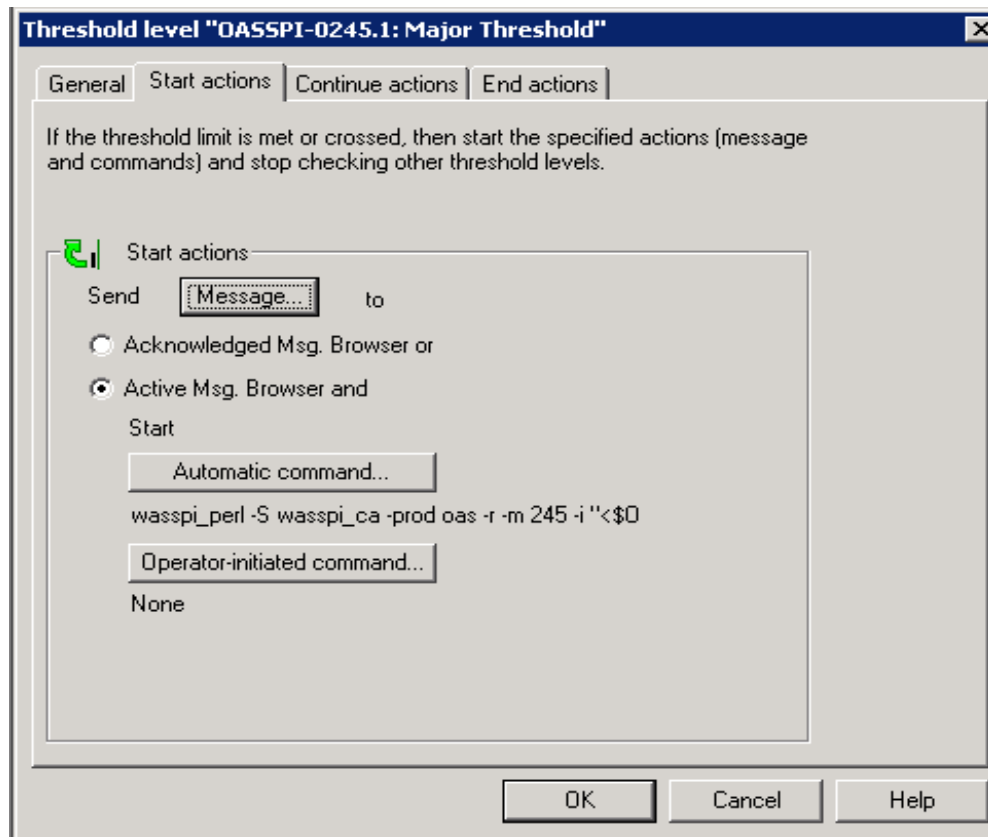
- Start actions: Start actions are the actions carried out the first time the threshold is crossed.

- Continue actions: Continue actions are actions carried out at each subsequent polling interval, if the monitored value did not attain the reset value.

- End Actions: End actions are actions carried out after the monitored value crosses the reset value.

In each of the actions tabs, you can set the type of actions to perform.

The Oracle AS SPI enables you to generate graphs and reports, or to add custom programs. You can generate the reports and graphs through:

- Automatic command: An automatic command runs when the rule is matched. The automatic command that is delivered with the Oracle AS SPI, generates a snapshot report. This report shows the data values at the time the action was triggered because of an exceeded threshold. You can view the report in the message annotations tab.

- Operator-initiated command: An operator-initiated command is attached to the message that the rule sends to the message browser. You can run this command from the message browser. The operator-initiated command delivered with the Oracle AS SPI enables you to view a graph of the metric, whose exceeded threshold generated the message, along with related metric values. You can view the graph by clicking **Perform Action** in the Message Properties window.

Message and Severity

To modify the message and severity of a policy:

1 From the HPOM console, select **Operations Manager** → **Policy management** → **Policy groups** → **SPI for Oracle AS** → **OASSPI** → **Metrics**.

2 Double-click the policy for which you want to modify the severity and message text. The Measurement Threshold window opens.

3 Double-click the threshold level description. A new window opens. Click the **Start Actions** tab.

4 Click **Message**. The Outgoing Message window opens.

5 Click the **Message Attributes** tab and make the necessary modifications. Click **OK**.

   You can modify the following attributes, in the Outgoing message defaults window:

   • Severity: Indicates the importance of the event that triggers this message.

   • Message Text: You can modify the text of the message but do *not* modify any of the parameters, which begin with $ and are surrounded by <> brackets, in a message.

6 Click **Save and Close** in the policy window to save the changes and exit.

Advanced Policy Customizations

Advanced Policy customizations include making copies of default policy groups to customize a few settings, and deleting whole groups of metrics within a policy's command line.

Creating a New Policy Group

Keep the custom policies separate from the default policies by creating new policy groups. Determine the metrics and policies you want to modify, before creating new policy groups.

1 Create a new policy group:

   a In the HPOM console, select **Operations Manager** → **Policy management** → **Policy groups**.

   b Right-click the policy group you want to copy and select **Copy**.

      For example, right-click the **Metrics** policy group under OASSPI and select **Copy**.

   c Right-click the group under which this policy group is located, and select **Paste**.

      For example, right-click **OASSPI** and select **Paste**.

   d Right-click the new group, and select **Rename**. Type in a new name.

      For example, right-click **Copy of Metrics** and select **Rename**.

2 Rename the original policies within the new policy group:

   a Double-click the new policy group to get a list of the policies.

   b Double-click a policy. The policy window opens.

   c Click **File** → **Save As**. The Save As window opens.

   d Type a new policy name and click **OK**.

   e Click **File** → **Exit** to close the policy window.

3   Delete all original policies within the new policy group. To do this, select the policies and press the **Delete** key. The Confirm multiple delete window opens.

Click **Yes** to confirm delete; otherwise click **No**.

4   Alter the renamed policies within the new group.

Oracle AS SPI Collector/Analyzer Command with Parameters

The `wasspi_perl -S wasspi_ca` command is used in every collector policy. You can view the default command line parameters within each collector policy, in the Command box in HPOM console. Double-click the policy to open the policy window. The Command box is a part of the policy window.

Basic Collector Command Parameters

The `wasspi_ca` command starts the Oracle AS SPI data collection. You can add other parameters to this command. The following table lists the parameters used by the default collector policies.

Table 2   Collector Command Parameters

Parameter	Description	Syntax with Example
-e	(exclude) enables you to exclude specific servers; may not be used with -i option.	**Syntax**: -e *<server_name>* **Example**: -e server2,server4
-i	(include) enables you to list specific servers to monitor. This option may not be used with -e option.	**Syntax**: -i *<server_name>* **Example:** -i server1,server3
-m	(metric) Specifies the metric numbers or number ranges on which to collect data.	**Syntax**: -m *<metric_number, metric_number_range>* **Example**: -m 1,3-5,9-11,15
-matchver	(match version) Specifies the exact Oracle Application Server version to monitor. This option may not be used with the -minver or -maxver options. If no matching versions are found, the command does not run.	**Syntax**: -matchver *<version_number>* **Example**: -matchver 6.1
-maxver	(maximum version) Specifies the highest Oracle Application Server version to monitor. Use with -minver to specify a range of versions. If no matching versions are found, the command does not run.	**Syntax**: -maxver *<version_number>* **Example**: -matchver 7
-minver	(minimum version) Specifies the lowest Oracle Application Server version to monitor. Use with -maxver to specify a range of versions. If no matching versions are found, the command does not run.	**Syntax**: -minver *<version_number>* **Example**: -matchver 6.1

Table 2   Collector Command Parameters

Parameter	Description	Syntax with Example
-r	(report) Generates an ASCII report for the specified metrics.	**Syntax**: -r
-t	Enables you to create a new policy group by adding a prefix to an existing collector policy along with the metric numbers.	**Syntax**: wasspi_ca -prod oas *<prefix>-<collector _policy>* -m *<metric_number>* -type *<prefix>-* **Example**: wasspi_ca -prod oas -m 1,2,10,11 -t DEV
-type	Enables you to specify the type of Oracle Application Server (OC4J or OHS).	**Syntax:** **Example:** wasspi_ca -prod oas -m 1,2,5,10,11,260 -type ajp13
-prod	(production) Identifies the SPI(s) on which the command is run on the node.	**Syntax:** -prod *<Name of the SPI>-* **Example:** wasspi_perl -S wasspi_ca -prod oas -m 220-223 -t DEV-
-x	Enables you to specify a property and value. **Syntax**: -x *<property>=<property_value>* *<property>* can be one of the following: • alarm: When off, overrides any default alarming defined for the metric. **Example**: -x alarm=off • prefix: Default: JMXUDM_. Specify the prefix of the metric ID. **Example**: -x prefix=SALES_ • Print: When on, prints the metric name, instance name, and metric value to STDOUT in addition to any configured alarming or logging. **Example**: -x print=on • graph: When off, prevents graphing function. **Example**: -x graph=off • report: When off, prevents reporting function. **Example**: -x report=off	

Examples

- To collect specific data on all configured servers:

    wasspi_ca -prod oas -m 1,2,10,11 -minver 10.0

- To collect data from specific servers only:

    wasspi_ca -prod oas -m 1,2,10,11 -minver 10.0-i server1,server2

- To not collect data from specific servers:

    wasspi_ca -prod oas -m 1,2,10,11 -minver 10.0-e server1,server2

Changing the Collection Interval for Scheduled Metrics

You can change the collection interval for all scheduled metrics by changing the Polling Interval in the respective collector policy.

For example, to change the collection interval of default metrics from 5 minutes to 10 minutes for the Oracle AS SPI collector policy OASSPI-0C4J-05min:

1 From the HPOM console, select **Operations Manager** → **Policy management** → **Policy groups** → **SPI for Oracle AS** → **OASSPI** → **Monitor**.

2 Double-click the collector policy **OASSPI-0C4J-05min**. The Measurement Threshold window opens.

3 Click **File** → **Save As.** The Save As window opens.

4 Change the existing name in the Name box to `OASSPI-0C4J-10min`.

5 Set the new interval.

   a Click the **Schedule** tab.

   b From the Schedule Task list select "Once per interval".

   a Set the interval to 10 minutes.

6 Deploy the new policy.

   a Right-click **OASSPI-0C4J-10min** and select **All Tasks** → **Deploy on...**.

   b Select the nodes on which to deploy the policy.

   c Click **OK**.

Changing the Collection Interval for Selected Metrics

You can change the collection interval of metrics, according to the requirements of your environment.

For example, you can change the collection interval from 15 minutes to 10 minutes for metrics C108 and C109.

▶ The following steps show how to change metrics C108 and C109 of collector policy OASSPI-OHS-15min, but you can change the collection interval of any metric using these steps.

To change the collection interval:

1 Rename the selected metrics to reflect the new interval.

   a From the HPOM console, select **Operations Manager** → **Policy management** → **Policy groups** → **SPI for Oracle AS** → **OASSPI** → **Monitor**.

   b Double-click the collector policy **OASSPI-OHS-15min**. The Measurement Threshold window opens.

   c Click **File** → **Save As**. The Save As window opens.

   d In the Name box change the existing name to OASSPI-OHS-10min. Click **OK** to confirm save or click **Cancel** to discard changes.

2 In the Command text box, delete all metrics after –m except 108, 109.

3 Set the new interval.

  a Click the **Schedule** tab.

  b From the Schedule task drop down list, select "Once per interval" and set the interval to 10 minutes.

  c Click **Save and Close** to confirm the changes and close the policy window.

4 Edit the original policy to remove the modified metrics.

  a Double-click the default collector policy **OASSPI-OHS-15min**. The policy window opens.

  b In the Command box, delete metrics 108, 109 after –m.

  c Click **Save and Close** to save the changes.

5 Deploy the modified policies.

  a Right-click **OASSPI-OHS-10min** and select **All Tasks → Deploy on...**.

  b Select the nodes on which you want to deploy the policy.

  c Click **OK**.

  d Right-click **OASSPI-OHS-15min** and repeat steps b-d.

Customizing Threshold for Different Servers

You can set different threshold values for the same metrics on different servers according to your needs. For example, you could set the threshold value for metric C220 at 90 for SERVER_1 but set the threshold to 100 for all other servers.

To do this you can copy the existing condition, and modify it to serve as the exception, and follow these steps:

1 Double-click the metric you want to customize (for example, double-click OASPI-0220). The Measurement Threshold window opens.

2 Select the **Threshold levels** tab.

3 Select the desired condition and click **Copy** to make a copy of the condition.

4 Name the condition **OASSPI-0220.2**.

5 Click **Specify instance filters**... The New Rule window opens.

6 Select the **Condition** tab and in the Object Pattern field, type the following details:

<ServerName.var1>:<ServerPort.var2>:<NodeName.var3>:<.var4>:<*.var5>:<*.var6>*

For Example: If you want to set threshold for the application server SERVER_1, type the following:

SERVER1:<*.var2>:<*.var3>:<*.var4>:<*.var5>:<*.var6>

var1, *var2*, *var3*, *var4*, *var5*, and *var6* are user defined variables. These variables must be different from the HPOM policy variables.

7 Click **OK**.

8 Double-click the condition **OASSPI-0212.2**. The Threshold Level window opens.

9 Change the threshold limit to 90. Click **OK**.

10 Click **Save and Close** in the Measurement Threshold window, to save the changes and exit.

Creating Custom Tagged Policies

You can customize a policy by using the tag option (-t on the command line). This enables the collector or analyzer to recognize customized policies that have a tag attached to the name. This option gives you with the flexibility to use more than a single set of policies to define conditions pertaining to specific installations of Oracle Application Server.

When multiple nodes are managed by a number of groups, you can use this option to create tagged policies that are separate from your original setup. In such a case, make copies of the policies, rename them with the tag, and rework the collector policy to pick up the tagged names. Now, assign policies to the various groups.

For example, you could create a group of policies and change each policy name to include CLIENT01 in it. You could name a metric policy as CLIENT01-OASSPI-0001 (retain the name of the metric used). The collector policy could be named FIRST_CLIENT-OHS-05min. You could also set up another group for SECOND_CLIENT and change all those policies to include CLIENT02 in the name.

Create a New Tagged Policy Group

To create a new tagged policy group, follow these steps:

1   Copy the original policy group and then:

   a   Right-click the policy group you want to copy, and select **Copy**. For example, right-click the **Metrics** policy group under OASSPI and select **Copy**.

   b   Right-click the group under which this policy group is located, and select **Paste**. For example, right-click **OASSPI** and select **Paste**.

   c   Right-click **Copy of Metrics** and select **Rename**. Rename the new group to identify the new metric policies.For example, rename the group to CLIENT01Metrics.

   d   Select **File→ Exit** to close the policy window.

2   Rename the original policies within the new policy group.

   The names of the metric policies in the new group must contain the new name followed by the original metric number. For example, you can rename a copy of OASSPI-0001 as CLIENT01-OASSPI-0001.

   The name you give to the new collector policy must also contain the identifying name. You must modify the scheduled collection to include the new group by inserting the -t parameter in the Command box. The Command box is in the policy window that appears when you double-click the collector policy. For example: `wasspi_ca -prod oas -m 1,12,16 -t CLIENT01-`

   a   Double-click the policy. The policy window opens.

   b   Click **File → Save As**. The Save As window opens.

   c   Type a new policy name and click **OK**.

3   Select the original policies within the new policy group and press **Delete** to delete all the original policies. The Confirm multiple item delete window opens.

4   Click **Yes** to confirm delete.

You can use the following variables when you create your own policies.

Table 3   Policy Variables

Name	Description
instancename	The instance for which the SPI reports the metric in case of multi-instance metrics. **Example**: `/oc4j/Petstore/EJBs/shoppingcartEjb.jar/ TheCart/ejbActivate`
node	The node on which the OC4J/OHS server is running. **Example**: `moo1.hp.com`
servername	The OC4J/OHS server name. This corresponds to the NAME configuration property. **Example**: `my server`
service_key	The service ID used to light up the nodes in the service map.

Restoring Default Oracle AS SPI Policies

To restore the default Oracle AS SPI policy groups on your HPOM management server, remove and then reinstall the Oracle AS SPI. For more information, see Removing Oracle AS SPI on page 67 and Installing Oracle AS SPI on page 15.

Viewing Text-Based Reports

Some policies have actions defined with threshold violations or error conditions. These actions automatically generate reports. The reports are snapshots of data values collected from the server around the time the alarm occurred.

➤   The reports discussed in this section are different from the HP Reporter reports that show consolidated data generated as Web pages in a management-ready presentation format. For more information, see Integrating with HP Reporter on page 50.

Automatic Command Reports

Many metrics generate Automatic Command reports. These reports are generated as soon as an alarm is triggered in the HPOM. Automatic Command reports are generated for a single Oracle Application Server instance with the exceeded threshold.

When an Automatic Command report is executed from HPOM, the server is queried for additional data. If you set the HPOM console message browser to display the SUIAON column, you can see an "S" under the "A" column (depicted in the following figure). This indicates that a generated report is available in the Annotations area of the Message Properties.

Severity	Duplicates	S	U	I	A	O	N	Received	Created	Service
Normal		-	-	X	-	-	-	8/14/2008 12:59:17 PM	2/21/2009 1:00:13 PM	WLSSPI_MSG_{...
Warning		-	-	X	S	-	X	8/14/2008 4:59:40 PM	2/21/2009 4:59:12 PM	WLS_Servlets_...
Warning		-	-	X	S	-	X	8/14/2008 4:59:40 PM	2/21/2009 4:59:18 PM	WLS_Servlets_...
Warning		-	-	X	S	-	X	8/14/2008 4:59:40 PM	2/21/2009 4:59:30 PM	WLS_Servlets_...
Warning		-	-	X	S	-	X	8/14/2008 4:59:40 PM	2/21/2009 4:59:32 PM	WLS_Servlets_...
Warning		-	-	X	S	-	X	8/14/2008 4:59:40 PM	2/21/2009 4:59:32 PM	WLS_Servlets_...
Normal		-	X	-	-	-	-	8/15/2008 2:01:20 AM	2/22/2009 2:00:54 AM	
Normal		-	X	-	-	-	-	8/16/2008 2:01:11 AM	2/23/2009 2:00:59 AM	
Normal		-	X	-	-	-	-	8/17/2008 2:01:12 AM	2/24/2009 2:01:01 AM	
Normal		-	X	-	-	-	-	8/18/2008 2:00:57 AM	2/25/2009 2:00:54 AM	
Normal		-	-	X	-	-	-	8/18/2008 8:24:34 AM	2/25/2009 8:25:01 AM	WLSSPI_MSG_{...
Major		-	-	-	-	-	-	8/18/2008 12:29:47 PM	2/25/2009 12:29:38 PM	
Critical	1	-	-	-	-	-	-	9/9/2008 12:26:36 PM	9/9/2008 12:24:58 PM	Server
Warning	1	-	-	-	-	-	-	11/9/2008 1:54:50 PM	9/9/2009 11:50:48 AM	Server
Warning	1	-	-	-	-	-	-	11/9/2008 1:55:06 PM	9/9/2009 11:56:42 AM	Server
Warning	2	-	-	-	-	-	-	11/9/2008 1:55:08 PM	8/19/2008 12:51:39 PM	Server
Warning	1	-	-	-	-	-	-	11/9/2008 1:55:26 PM	9/9/2009 12:01:02 PM	Server
Warning	1	-	-	-	-	-	-	11/9/2008 1:55:27 PM	9/9/2009 12:01:12 PM	Server
Warning	1	-	-	-	-	-	-	11/9/2008 1:55:31 PM	9/9/2009 12:01:22 PM	Server
Warning	1	-	-	-	-	-	-	11/9/2008 1:55:33 PM	9/9/2009 12:01:32 PM	Server
Warning	1	-	-	-	-	-	-	11/9/2008 1:55:33 PM	9/9/2009 12:01:43 PM	Server
Warning	1	-	-	-	-	-	-	11/9/2008 1:55:34 PM	9/9/2009 12:01:53 PM	Server
Warning	3	-	-	-	-	-	-	11/9/2008 1:55:35 PM	9/9/2009 12:00:57 PM	Server
Warning	1	-	-	-	-	-	-	11/9/2008 1:55:37 PM	9/9/2009 12:02:13 PM	Server
Warning	1	-	-	-	-	-	-	11/9/2008 1:55:39 PM	9/9/2009 12:02:23 PM	Server
Warning	1	-	-	-	-	-	-	11/9/2008 1:55:40 PM	9/9/2009 12:03:33 PM	Server
Warning	1	-	-	-	-	-	-	11/9/2008 1:55:40 PM	9/9/2009 12:02:33 PM	Server
Warning	1	-	-	-	-	-	-	11/9/2008 1:55:40 PM	9/9/2009 12:02:43 PM	Server

To view Automatic Command reports, do one of the following:

- Double-click a message in the HPOM message browser. The Message Properties window opens. Select the **Annotations** tab

  or

- Right-click a message and select **Annotations**. The Message Properties window opens.

The reports are available in the Message Properties window. These reports show data values of a single server. Column descriptions in the window provide further information.

Manually Generated Reports

Reports are generated for all Oracle Application Server instances configured on the managed node. In contrast to Automatic Command reports, generated for a single Oracle Application Server instance, Manually-generated reports reflect the current state of all Oracle Application Servers on the managed node.

To manually generate a report:

1 From the HPOM console, select **Operations Manager → Tools → SPI for Oracle AS → OASSPI Reports**.

2　Double-click the report you want to see. The Select where to launch this tool window opens.

3　Select the managed node for which you want to see reports and Click **Launch**. The Tool Status window opens.

4　View the report in the tool output field.

5　Click **Close** to close the window.

Sample Report

The following figure shows the format of a Oracle AS SPI report. This report is automatically generated (Automatic Command report).
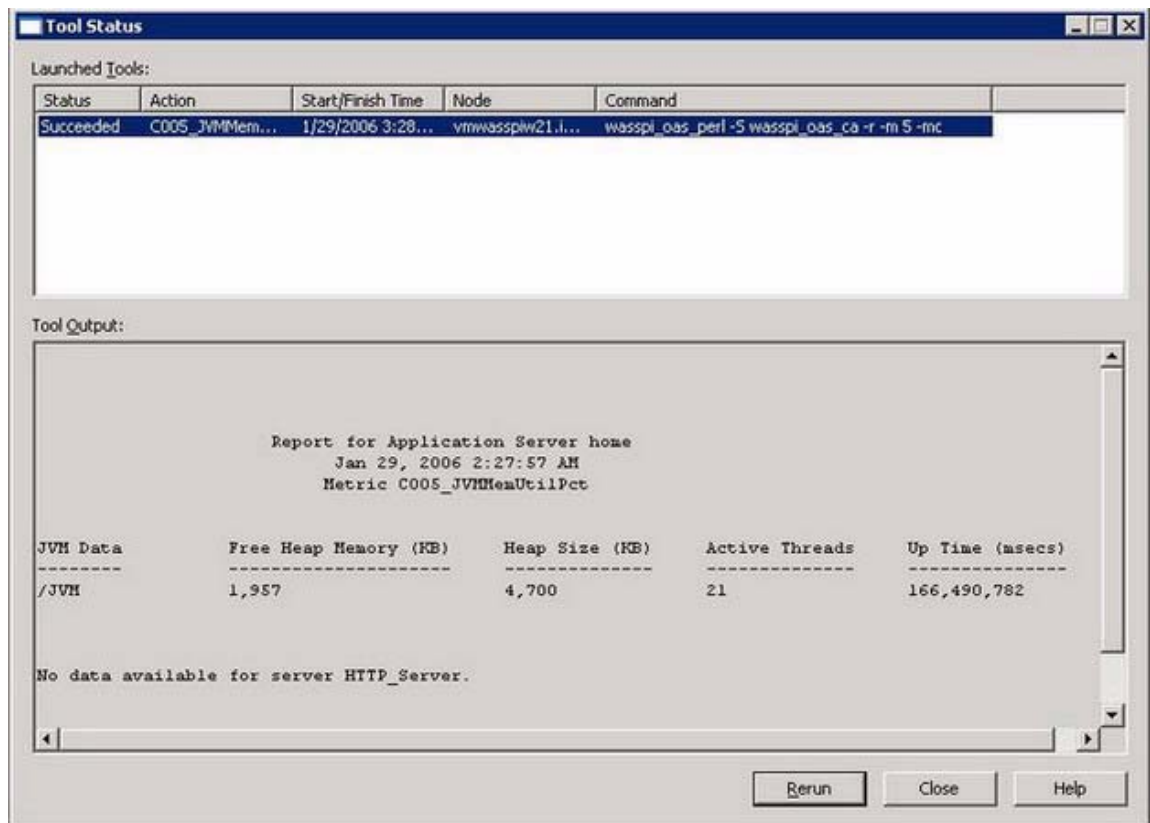
Oracle AS SPI Graphs

Some policies have operator actions associated with them that enable you to generate a graph. To view these graphs:

1　Double-click a message in the HPOM message browser. The Message Properties window opens.

2　Click the **Commands** tab. You can generate a graph if an operator-initiated command is configured and data is collected.

3　Click **Start** to generate the graph.

6 Integrating HPOM Reporting and Graphing Features with the Oracle AS SPI

The Oracle AS SPI can be integrated with the following HP products. These products must be purchased separately.

- **HP Reporter** - The HP Reporter produces management-ready Web page reports that show historical and trends-related information.

  Working in conjunction with Reporter, the Oracle AS SPI produces a variety of reports that show consolidated information on the Oracle Application Server availability and performance. For more information, see Integrating with HP Reporter on page 50.
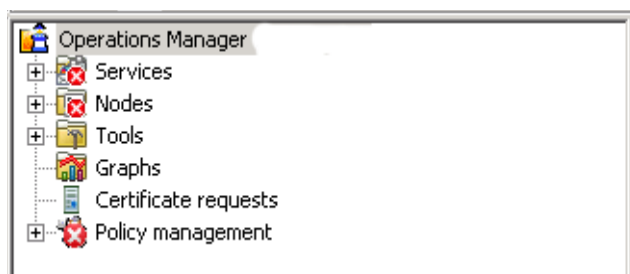
- **HP Performance Agent**. HP Performance Agent collects, summarizes, time stamps, and detects alarm conditions on current and historical resource data across your system. It provides performance, resource, and end-to-end transaction response time measurements, and supports network and database measurement information. For more information, see Integrating Oracle AS SPI with HP Performance Agent.

- **HP Performance Manager** - The HP Performance Manager provides graphing capability.

  You can view the graphs after integrating the Oracle AS SPI with HP Performance Manager. The graphs are available only if performance data is logged in the default performance subagent CODA or HP Performance Agent. CODA is automatically deployed on all HPOM managed nodes. For more information, see Integrating with HP Performance Manager on page 55.

Figure 2   The Management Server Console Tree

Integrating Oracle AS SPI with HP Performance Agent

If your IT environment requires you to generate graphs and reports from historical data or to store large volumes of performance data, you may want to use the HP Performance Agent 8.10 to collect and store performance data. HP Performance Agent must be purchased separately.

The data collected by HP Performance Agent is used by HP Reporter and HP Performance Manager.

To configure the Oracle AS SPI data collector, to use HP Performance Agent:

1   Create a `nocoda.opt` file on the managed node, in the following directory:

Operating System	File Location
HP-UX, Linux, Solaris	`/var/opt/OV/conf/dsi2ddf/`
AIX	`/usr/lpp/OV/conf/dsi2ddf/`
Windows (DCE)	`C:\Program Files\HP Openview\data\conf` `\dsi2ddf\`
Windows (HTTPS)	`C:\Documents and Settings\All Users\Application Data\HP\HP BTO Software\wasspi\oas\conf\dsi2ddf\`

If the directory `dsi2ddf` does not exist, create it.

2   Edit the `nocoda.opt` file to contain a single line: **ALL**

3   Save the file.

Integrating with HP Reporter

To integrate the Oracle AS SPI with HP Reporter, configure the Oracle AS SPI by deploying the software, configuring server connection, and assigning or deploying policies on target managed nodes.

To integrate the Oracle AS SPI with HP Reporter:

1   Install the Oracle AS SPI report package on the Windows system running HP Reporter:

   a   Insert the HP Operations Smart Plug-ins DVD into the DVD drive of the Windows system running Reporter. The HP Operations Manager InstallShield Wizard opens.

   b   Click **Next**. The Program Maintenance window opens. Click **Install Products**. The Product Selection window opens.

   c   From the options listed (there are three Product Selection windows), select the **Reporter** option of the Oracle AS SPI and click **Next**.

   d   Complete the installation by following the instructions that appear as you proceed.

   ▶   On Windows 2000 managed nodes, when installing the Oracle AS SPI report package, you may get an error message indicating that the installer has detected an older version of the installer on your system. You can safely ignore the message and continue.

2   To see the Reporter window, click **Start** → **All Programs** → **HP OpenView** → **Reporter** → **Reporter**.

3   Check the HP Reporter window (see the following illustration) to note changes made in the HP Reporter's configuration.

In the Reporter Status pane (at the bottom of the Reporter window), you can view information on programs that are running and any errors occurring on the managed nodes. You can check the status pane to see whether Reporter is updated with the Oracle AS SPI reports.
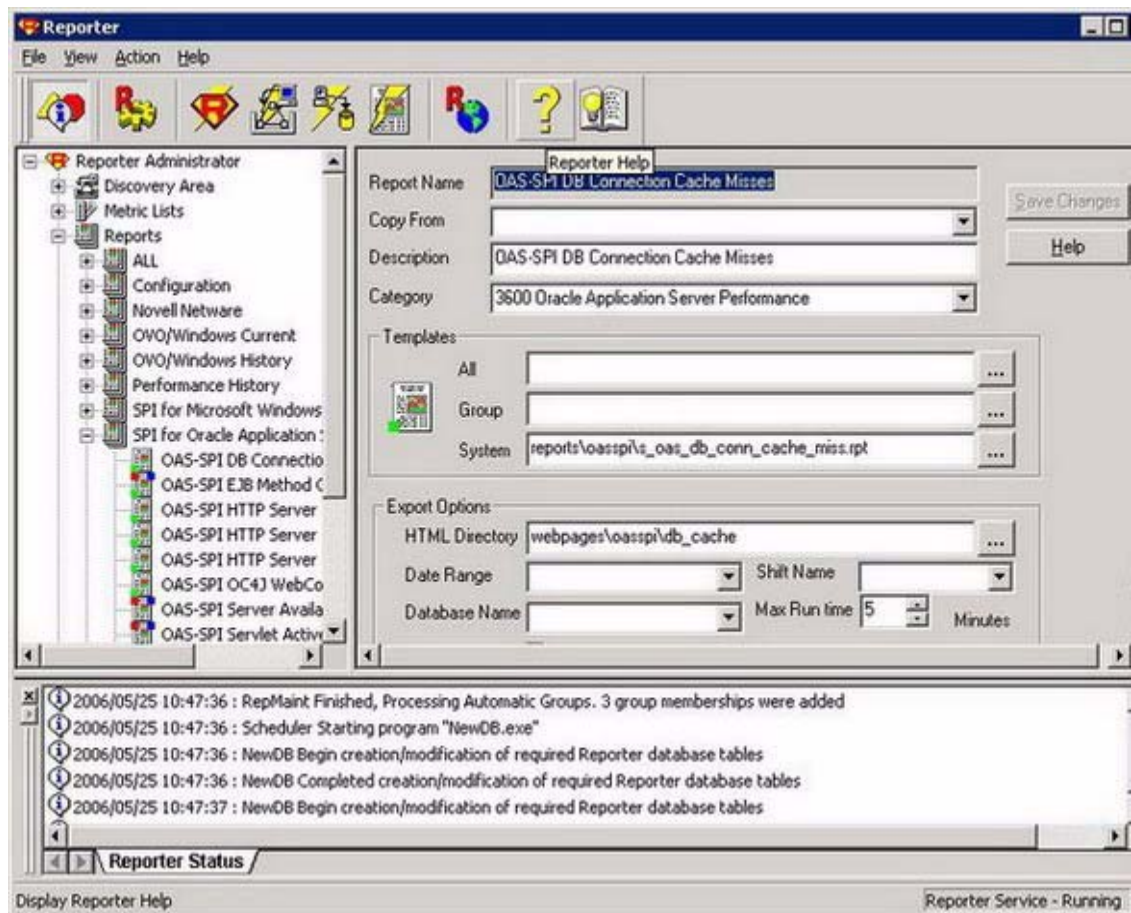
In the Reporter Help, you can find instructions for assigning the Oracle AS SPI reports to the target nodes. To access Help:

a Right-click **Reports or Discovered Systems** in the left panel of the HP Reporter main window.

b From the submenu, select Report Help or Discovered Systems Help.

c Read the topic, *To assign a report definition to a Discovered Systems Group.*

4 Add group and single system reports by assigning reports as desired. (For more information, see the HP Reporter Help and the online *Concepts Guide.*).

▶ Group and single system Oracle AS SPI reports require that you identify systems by their full name. For example, *abc.xyz.com* is acceptable while *abc* is not.

Viewing Reports from the HPOM Management Console

To view Oracle AS **Reports** from the HPOM Console:

1 Close the HPOM for Windows console (if it is open).

2   Open the HP Reporter window. Click **File** → **Configure** → **Options**. The Configure Reporter Options window opens.

3   In the HPOM for Windows Settings section, specify the name of the management server and user details. The user must be an HPOM administrator (a member of the HP-OVE-Admins group). Click **OK**.

4   From the menu bar, click **Action** → **Run** → **Run All**. This will discover the node data from HPOM and generate the reports. This may take some time.

5   When the HP Reporter tasks complete, open the HPOM console. **Reports** will be visible in the console tree.

The browser fails when the report is huge and the user hence is unable to view the report (in HTML). The workaround is the reports should be viewed in pdf.

Reports Generated by HP Reporter

The reports available through the integration of HP Reporter and the Oracle AS SPI show consolidated data on performance and availability of Oracle Application Server instances on the configured managed node.

These reports are usually available one day after you install the Oracle AS SPI report package on the Reporter Windows system. See Integrating with HP Reporter on page 50 if you have not completed the report package installation.

After you integrate the Oracle AS SPI with HP Reporter, you can see the list of reports under the "Reports" section in the HPOM console.

The following tables show all pre-defined reports for groups (one or more managed nodes on which an Oracle Application Server instance is installed) and single systems.

Table 4   Reports for All Systems - Oracle Application Server Performance

Title	Description	Oracle AS Version
EJB Method Calls Process Rate - Top 20	Shows the number of all EJB method calls per minute for the top 20 servers. The top 20 servers are selected based on the highest average method calls per minute over the reporting period.	9.04, 10.1.2, 10.1.3
Servlet Active Threads - Top 20	Shows the average number of active servlet threads for the top 20 OC4Js. The top 20 OC4Js for the group are selected based on the highest average number of active threads over the reporting period.	9.04, 10.1.2, 10.1.3
Servlet Average Execution Time - Top 20	Shows the average servlet execution time for the top 20 OC4Js. The top 20 OC4Js for the group are selected based on the highest average servlet execution time over the reporting period.	9.04, 10.1.2, 10.1.3

Table 5   Reports for All Systems - Oracle Application Server Availability

Title	Description	Oracle AS Version
Server Availability	Contains a daily histogram showing the percentage of uptime. In addition, a trendline provides the number of measurements performed, indicating how much data was available to determine availability. Uptime and downtime are measured by the Oracle AS SPI. A lower than expected trend line may indicate systems were unavailable or the data collection not running.	9.04, 10.1.2, 10.1.3

Table 6   Reports for Single Systems

Title	Description	Oracle AS Version
HTTP Server and OC4J Availability Details	Contains spectrum graphs showing minutes of uptime by day and hour for the system. Uptime and downtime are measured by the Oracle AS SPI. "No Data" may include system downtime or data collection not running. Graphs are based on measured uptime and downtime only (that is, standby = down). The spectrum graphs use color to indicate the uptime percentage during each hour of each day.	9.04, 10.1.2, 10.1.3
HTTP Server and OC4J System Resource Utilization	Contains spectrum graphs showing CPU and system memory utilization day and hour for the system. Uptime and downtime are measured by the Oracle AS SPI. "No Data" may include system downtime or data collection not running. Graphs are based on measured uptime and downtime only (that is, standby = down). The spectrum graphs use color to indicate the uptime percentage during each hour of each day.	9.04, 10.1.2, 10.1.3
HTTP Server Connections	Shows the average number of HTTP connections for each application server on the system	9.04, 10.1.2, 10.1.3
DB Connection Cache Utilization	Contains spectrum graphs showing the percent DB connection cache utilization by day and hour for a system. "No Data" may include system downtime or data collection not running.	9.04, 10.1.2, 10.1.3
OC4J WebContext Sessions	Shows the average number of WebContext sessions for each OC4J instance on the system.	9.04, 10.1.2, 10.1.3
EJB Method Calls Process Rate - Top 20	Shows the number of all EJB method calls per minute for the top 20 servers. The top 20 servers for the system are selected based on the highest average method calls per minute over the reporting period.	9.04, 10.1.2, 10.1.3
Servlet Average Execution Time - Top 20	Shows the average servlet execution time for the top 20 OC4Js. The top 20 OC4Js for the system are selected based on the highest average servlet execution time over the reporting period.	9.04, 10.1.2, 10.1.3

Removing Oracle AS SPI Reporter Package

To remove the Oracle AS SPI Reporter Package:

1   Insert the HP Operations Smart Plug-ins DVD into the DVD drive of the Windows system running HP Reporter. The HP Operations Manager InstallShield Wizard opens.

2   Click **Next**. The Program Maintenance window opens.

3   Click **Remove Products**. The Product Selection window opens.

4   From the options listed (there are three Product Selection windows) select the **Reports** option of the Oracle AS SPI and click **Next** till the Remove the Selected Products window opens.

5   Click **Remove**.

Integrating with HP Performance Manager

You must purchase and install HP Performance Manager separately. To integrate the Oracle AS SPI with HP Performance Manager:

1   Install the Oracle AS SPI graph package on the Windows system running HP Performance Manager:

  a   Insert the HP Operations Smart Plug-ins DVD into the DVD drive of the Windows system running Reporter. The HP Operations Manager InstallShield Wizard opens.

  b   Click **Next**. The Program Maintenance window opens. Click **Install Products**. The Product Selection window opens.

  c   From the options listed (there are three Product Selection windows), select the **Graph** option of the Oracle AS SPI and click **Next**.

  d   Complete the installation by following the instructions as you proceed.

2   To graph any Oracle Application Server metric, use the data source name—
     OASSPI_METRICS.
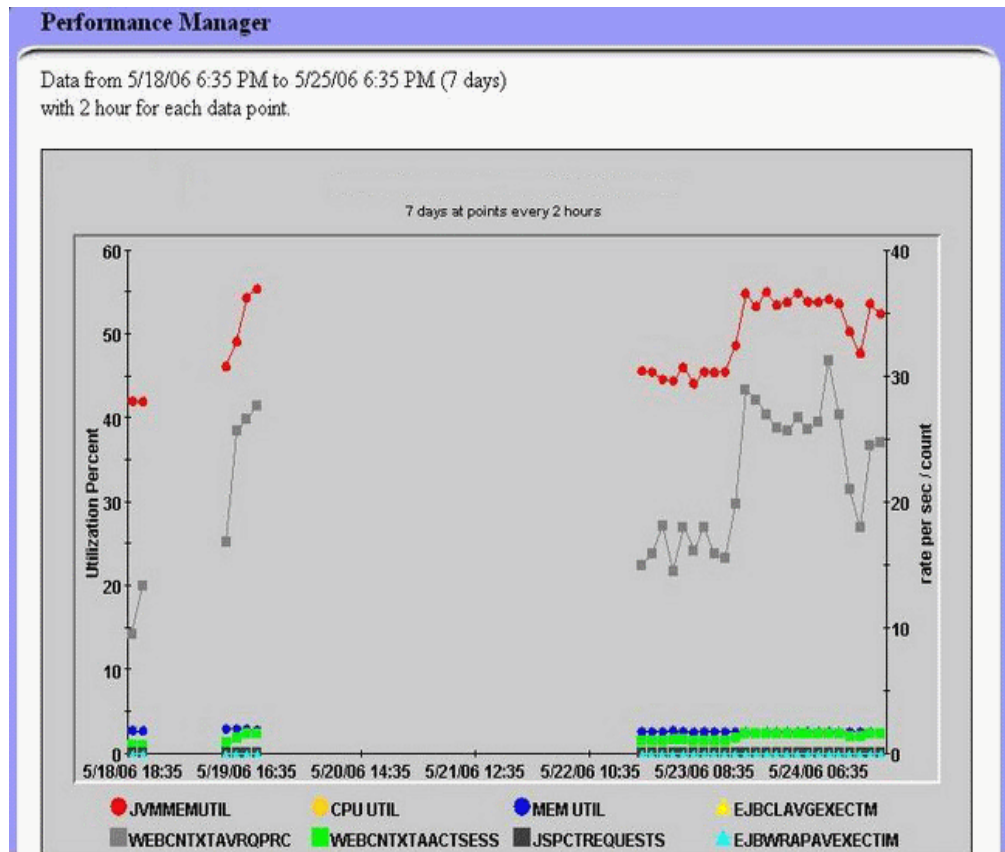
Viewing Graphs Associated with Alarm Conditions

For graphing purposes, the Oracle AS SPI organizes metrics according to type. When a message is generated for any metric, you can view a graph of that metric value along with related metric values.

To view a graph associated with an alarm condition (operator-initiated action must be defined with the Oracle AS SPI policy):

1   In the HPOM Message Browser, double-click the message for which you want to view the graph. The Message Properties window opens.

2   Click the **Commands** tab.

3   Click **Start** in the section Operator Initiated to start the operator-initiated command. The operator action launches your Web browser, where you can view the graph.

Viewing Graphs that Show Past or Current Conditions

To generate an available graph manually:

1   From the HPOM console, select **Operations Manager** → **Graphs** → **SPI for Oracle AS**.

2   Double-click the graph you want to generate. A new window opens.

3   Select the nodes from which you want to retrieve data. Select the date range and the granularity for the graph.

4   Click **Finish**.

▶   **Graphs** appears in the HPOM console tree only if you install HP Performance Manager on the same system as the HPOM management server.

Viewing Graphs from the HP Performance Manager Console

If you have not installed HP Performance Manager on the same system as the HPOM management server, you can view the Oracle Application Server SPI Graphs from the HP Performance Manager console.

To view graphs from the HP Performance Manager console:

1   Click **Start** → **All Programs** → **HP** → **HP BTO Software** → **Performance Manager** → **Performance Manager**. The Performance Manager console opens.

2   From the Select Nodes pane, select the node for which you want to see graph. If the node is not listed in the list, add the node:

a   Click **Admin** in the menu bar. The Manage Nodes window opens.

b   Click the **Add a Node** icon. The Add a Node Window opens.

c   Type the node name and click **Add**.

d   Click **Home** on the menu bar.

3   From the Select a Graph pane, select **SPI for Oracle AS**.

4   Select the graph you want to see and click **Draw**.

▶   If you have installed HP Performance Agent to collect performance data, you must select the **SPI for Oracle AS- OVPA** *<version>* from the list in the Select a Graph pane.

Removing Oracle AS SPI Graph Package

To remove the Oracle AS SPI Graph package:

1   Insert the HP Operations Smart Plug-ins DVD into the DVD drive of the Windows system running Performance Manager. The HP Operations Manager InstallShield Wizard opens.

2   Click **Next**. The Program Maintenance window opens.

3   Click **Remove Products**. The Product Selection window opens.

4   From the options listed (there are three Product Selection windows), select the **Graphs** option of the Oracle AS SPI and click **Next** till the Remove the Selected Products window opens.

5   Click **Remove**.

7 Troubleshooting Oracle AS SPI

This chapter covers basic troubleshooting for the Oracle AS SPI. The Error messages section of the *Oracle AS SPI Online Help* lists error messages by number.

Self-Healing Info Tool

The Self-Healing Info tool gathers troubleshooting information about the SPI and stores it in a file that you can submit to HP support for assistance. For more information on this tool, see the OASSPI Admin tools section under Tools in the *Oracle AS SPI Online Help*.

> The file created by the Self-Healing Info tool may be hidden on some Windows managed nodes. If you do not see the file, open Windows Explorer and from the **Tools** menu, select **Folder Options**. Click the **View** tab. Under Hidden files and folders, select **Show hidden files and folders**.

Logging

The files for logging are maintained on the managed nodes. You can gather troubleshooting information on the Oracle AS SPI from the data logged in these log and trace files.

Managed Nodes

The following files are found on the managed nodes running on UNIX and Windows (typically, *<OvAgentDir>*/ is `/var/opt/OV/` for Unix and `\Documents and Settings\All Users\Application Data\HP\HP BTO Software\` for Windows):

Directory   *<OvAgentDir>*`/wasspi/oas/log/wasspi_perl.log` (archived files have a one digit number appended to the filename)

Description   File used by your HP support representative for debugging. This file gives you information about the Perl logging, it covers configuration, discovery, and collection. By default, you can only view the error messages. To view all types of messages namely information, warning, and error, run the Start Tracing tool. To stop the tracing, run the Stop Tracing tool. For more information on how to run these tools, see the Online Help or Online Help PDF. Three archived versions of the size 10 MB are maintained.

Directory	*<OvAgentDir>*/wasspi/oas/log/discovery.log (archived files have a one digit number appended to the filename)
Description	File used by your HP support representative for debugging. This file gives you information about the Java discovery logging. By default, you can only view the error messages. To view all types of messages namely information, warning, and error, run the Start Tracing tool. To stop the tracing, run the Stop Tracing tool. For more information on how to run these tools, see Online Help or Online Help PDF. Three archived versions of the size 10 MB are maintained.

Directory	*<OvAgentDir>*/wasspi/oas/log/collector.log (archived files have a one digit number appended to the filename)
Description	File used by your HP support representative for debugging. This file gives you information about the Java Collector logging for the CollectorServer. By default, you can only view the error messages. To view all types of messages namely information, warning, and error, run the Start Tracing tool. To stop the tracing, run the Stop Tracing tool. For more information on how to run these tools, see Online Help or Online Help PDF. Three archived versions of the size 10 MB are maintained.

Directory	*<OvAgentDir>*/wasspi/oas/log/collectorclient.log (archived files have a one digit number appended to the filename)
Description	File used by your HP support representative for debugging. This file gives you information about the Java Collector logging for the CollectorClient. By default, you can only view the error messages. To view all types of messages namely information, warning, and error, run the Start Tracing tool. To stop the tracing, run the Stop Tracing tool. For more information on how to run these tools, see Online Help or Online Help PDF. Three archived versions of the size 10 MB are maintained.

Discovery

Problem: The OASSPI Discovery policy does not automatically discover and update the Oracle AS SPI configuration.

Solution: To troubleshoot the discovery process, do one or more of the following (as applicable):

- Check if there are any messages, in the message browser about managed nodes not being discovered. If there are any messages, follow the instruction text related to that error message.

- Check for errors in the *<OvAgentDir>*/wasspi/oas/log/wasspi_perl.log and *<OvAgentDir>*/wasspi/oas/log/discovery.log file on the managed node.

- Ensure that the OASSPI Discovery policies are being deployed:

From the HPOM console, select **Operations Manager → Policy management → Deployment jobs**.

- If the state of a OASSPI Discovery policy is `Active`, the policy is still being deployed. Wait until the policy is deployed.

- If the state of a OASSPI Discovery policy is `Suspended` or `Error`, check for related error messages in the message browser and troubleshoot the problem by following the information given in the rest of this section.

- If the OASSPI Discovery policies are not listed, check the message browser for the following messages:

  ```
  WASSPI-602: Updating OAS-SPI configuration in HPOM server
  WASSPI-603: Updated OracleAS spi configuration in HPOM server
  ```

  These messages will appear after the OASSPI Discovery policies are deployed successfully.

  Follow the steps given in the rest of this section to continue troubleshooting.

- Check if an Oracle OC4J/OHS server is installed on the managed node. If no OC4J/OHS server is installed, install an OC4J/OHS server, and complete the configuration tasks listed in Chapter 3, Configuring Oracle AS SPI.

- Ensure that the Oracle Application Server is running. See Verify the Application Server Status on page 19.

- Verify the Java home directory. See Verifying the Java Home Directory on page 63.

- Ensure that the discovery agent is running on the managed node:

  Run the command **opcagt -status**. The following message appears:

  ```
  Service Discovery Agent OvSvcDiscAgent.cmd (1084) is running.
  ```

  If this message does not appear, the agent is not running. Run the following command to start the agent:

  opcagt -start -id 13

- Remove and redeploy the discovery policies:

  a From the HPOM console tree, select **Operations Manager → Policy management → Policy groups → SPI for Oracle AS → en**.

  b Right-click **OASSPI Discovery** and select **All Tasks → Uninstall from...** The Uninstall policies on... window opens.

  c Select the nodes from which you want to remove the policies and click **OK**.

  d Follow the steps given in the section Manually Deploying the Discovery Policies on page 63 to redeploy the discovery policies. Deploy the policies in the order mentioned and not as a group. If you deploy the policies as a group, the policies may not be deployed in the correct order.

- Ensure that the Discover or Configure OASSPI tool is not running or a configuration is not open in an editor. Because only one process can access a configuration at a time, if a configuration is open, other processes that must access the configuration (like the discovery policy) hang until the file becomes available.

Other Discovery Related Problems

Problem	The OASSPI Discovery policies add inaccurate information to the configuration.
Solution	Verify the Java home directory. For more information, see Verifying the Java Home Directory.

Problem	The following error message appears: (PMD51) Error: Unable to deploy instrumentation files from directory <directory_name>: (NUL16389E) Unspecified error (0x80004005). Please check the wasspi_perl.log on the managed node.
Solution	To troubleshoot, follow these steps: 1 From the HPOM console, select **Operations Manager** → **Policy management** → **Deployment jobs**. 2 Find the jobs that are in the Error state. 3 Right-click each job you want to restart and select **All Tasks** →**Restart job**.

Problem	The property of critical error messages in the HPOM console is: Errors occurred during the distribution of the monitors. Solve the problems and distribute the monitors again. (OpC30-1030).
Solution	To troubleshoot, follow these steps: 1 From the HPOM console, select **Operations Manager** → **Policy management** → **Deployment jobs**. 2 Find the jobs that are in the Error state. 3 Right-click each job you want to restart and select **All Tasks** →**Restart job**.

Problem	In the SiteConfig file for Windows managed nodes, the value for HOME and JAVA_HOME appears as: HOME=Cproduct10.1.3.1OracleAS_1 and JAVA_HOME=Cproduct10.1.3.1OracleAS_1jdk. The '\' character is removed from the path.
Solution	Replace the character '\' with '/' or '\\' in the path for HOME and JAVA_HOME. For example, HOME=C:/product/10.1.3.1/OracleAS_1 or HOME=C:\\product\\10.1.3.1\\OracleAS_1

Manually Deploying the Discovery Policies

If the OASSPI Discovery policies are not deployed successfully when you run the Discover or Configure OASSPI tool, manually deploy them. You can manually deploy the policies on the managed nodes on which the Oracle OC4J/OHS Servers are running (you *must* deploy the policies in the given order only):

1   From the HPOM console, select **Operations Manager** → **Policy management** → **Policy groups** → **SPI for Oracle AS** → **OASSPI Discovery**.

2   Right-click **OASSPI-Messages** and select **All Tasks** → **Deploy on...**The Deploy Policies on... window opens.

3   Select the nodes on which you want to deploy the auto-discovery policies and click **OK**.

4   Right-click **OASSPI Service Discovery** and select **All Tasks** → **Deploy on...**.The Deploy Policies on... window opens.

5   Select the nodes on which you want to deploy the auto-discovery policies and click **OK**.

Verifying the Java Home Directory

The Oracle AS SPI Collector is dependent on the Java home directory information. Collector will not work if the Java Home directory information is inaccurate or not available. The Java Home directory must, therefore, be configured properly on both Windows and UNIX managed nodes.

For the Collector to work properly, ensure one of the following:

•   JAVA_HOME is correctly defined in the configuration. To edit or view the configuration, run the Discover or Configure OASSPI tool:

   a   From the HPOM console, select **Operations Manager** → **Tools** → **SPI for Oracle AS** → **OASSPI Admin**.

   b   Double-click **Discover or Configure OASSPI**. The Edit Parameters window opens.

   c   Select the nodes to configure and click **Launch**. The Console Status window and then the configuration editor opens.

   d   In the configuration editor, set the JAVA_HOME property. For more information about setting the property, see the Configuring OASSPI section in the Oracle AS SPI online help.

   e   Run the Discover OracleAS tool on the managed nodes on which the JAVA_HOME property was added or edited. Running the Discover OracleAS tool updates the service map.

•   The JAVA_HOME system variable is correctly defined.

   On a Windows manage node:

   a   Select **Start** → **Settings** → **Control Panel**.

   b   Double-click **System**.

   c   Select the **Advanced** tab.

   d   Select **Environment Variables...**.

   e   Scroll through the System variables list. Verify the JAVA_HOME value. If JAVA_HOME does not exist, it is not defined.

   On a UNIX manage node, type: **`echo $JAVA_HOME`**.

Verify the output. If no output is returned, JAVA_HOME is not defined.

Collection

Problem	No alarms are received for a metric.
Solution	• Verify that the monitor policy corresponding to the metric is deployed on the node. • Verify that **alarm=yes** is specified in the *<OvAgentDir>*/wasspi/oas/ conf/MetricDefinitions.xml file for the metric.

Problem	On manually running the collector command on the managed node, the value of the metric is printed as No instance,No data on STDOUT.
Solution	Check the Admin Console for the presence of corresponding MBeans.

Problem	Data is not getting logged.
Solution	• Verify that the SPIDataCollector instrumentation category is deployed on the managed node. This is required to create the datasource OASSPI_METRICS. • Verify that the OASSPI-Performance policy is deployed on the node. • Check if the <servername>.dat file is created in *<OvAgentDir>*/ wasspi/oas/datalog. • Check if the datasource OASSPI_METRICS is created. • Verify that **graph=yes** is specified in the *<OvAgentDir>*/wasspi/ oas/conf/MetricDefinitions.xml for the metrics which are being monitored. Only the metrics which are specified as **graph=yes** in the MetricDefinitions.xml get logged. The default value is **no**.

Tools

Problem	When launching the tools, the tools hang or there is no output.
Solution	The tools will not work if the memory is low. Check the performance of the node and the management server. The physical memory available must be more than 500 MB.

Problem	Configuration variable SERVER*<n>*_START_CMD missing for the server-Default Server.
Solution	You must set the START_CMD and USER properties, before you can successfully run the Start Oracle AS tool. Set these properties using the Configure OASSPI tool. For more information on this tool, see the Tools group section in the Oracle AS SPI online help.

Problem	The Verify tool lists files and directories related to the management server as missing; for example:
	
	`/MGMT_SERVER/SPI-Share/wasspi/oas/bin/parseDefs.pl`
	`/MGMT_SERVER/SPI-Share/wasspi/oas/bin/`
	`processWASSPIDiscovMsg.pl`
	`/MGMT_SERVER/SPI-Share/wasspi/oas/conf`
	
	On manually running the collector command on the managed node, the value of the metric is printed as `No instance,No data` on `STDOUT`.

Solution	The Verify tool lists management server related files if you install the Oracle Application Server on the management server itself. This problem occurs if both the managed node and the management server are the same.

Problem	When launched, the Verify tool gives improper output.
Solution	Ensure that you have installed the latest version of Self-Healing Service (SHS) component from the SPI DVD, before you launch the Verify tool .

Problem	When launched, the Self-Healing Info tool gives improper output.
Solution	Ensure that you have installed the latest version of Self-Healing Service (SHS) component from the SPI DVD.

Problem	Configuration variable SERVER$<n>$_STOP_CMD missing for the server—Default Server.
Solution	You must set the STOP_CMD and USER properties, before you can successfully run the Stop Oracle AS tool. Set these properties using the Configure OASSPI tool. For more information on this tool, see the Tools group section in the *Oracle AS SPI Online Help*.

8 Removing Oracle SPI

This chapter provides details on how to remove the Oracle SPI components from different environments.

Removing Oracle AS SPI

To completely remove the Oracle AS SPI, delete all the Oracle AS SPI program components and policies, and then, complete these tasks in the following order:

1   Remove all Oracle AS SPI Policies from the Managed Nodes

2   Remove Oracle AS SPI Node Groups on the Management Server

3   Remove Oracle AS SPI Software from the Management Server

Remove all Oracle AS SPI Policies from the Managed Nodes

If you have customized policies (copies of the Oracle AS SPI default policies), remove them and then do the following:

1   From the HPOM console tree, select **Policy management** → **Policy groups**.

2   Right-click **SPI for Oracle AS** and select **All Tasks** → **Uninstall from...** A node selection window opens.

3   Select the nodes on which the policies are installed. Click **OK**.

4   Click **Deployment jobs** under Policy management to verify if all policies are removed. There must be no policies listed under Deployment jobs.

Remove all the Oracle AS SPI policies before you start the next task.

Remove Oracle AS SPI Node Groups on the Management Server

If you created the SPI for Oracle Application Server node groups (by running the Create OASSPI Node Groups tool or manually), remove this node group as follows:

1   In the HPOM console tree, select **Nodes** → **SPI for Oracle Application Server**.

2   Open the Node Configuration editor.

 a   Select the Nodes folder in the console tree.

 b   Click the node icon ⊞ in the Configuration toolbar to open the editor. A node list appears.

3   Right-click the node group you want to delete and select **Delete**. You can also select the node group and press the **Delete** key. The Confirm Delete window opens.

4   Click **Yes**.

5   Click **OK** to close Configure managed nodes window.

Remove Oracle AS SPI Software from the Management Server

You can remove the Oracle SPI software by one of the following ways:

1   Uninstall using the DVD

2   Using Windows Control Panel - Add/Remove Products

Uninstall using the DVD

To uninstall using the DVD:

1   Insert the HP Operations Smart Plug-ins DVD into the DVD drive of the management server. The HP Operations Manager InstallShield Wizard starts.

2   From the first screen, select **Next**.

3   Select **Next**. The Program Maintenance window opens.

4   Select **Remove products**. The Product Selection window opens.

5   Select the **Oracle Application Server** check box and click **Next**.

6   Complete the removal by following the instructions that appear as you proceed.

Using Windows Control Panel - Add/Remove Products

To use the Windows Control Panel:

1   From the **Start** menu, select **Settings → Control Panel**, and open **Add/Remove Programs**.

⚠   When you use the Windows Control Panel to uninstall any SPI, you have two uninstall options:

- Remove selected SPIs.
- Remove HPOM for Windows altogether

If you want to remove both HPOM and the SPIs, you must first remove all Smart Plug-ins from the managed nodes and then from the management server. You can then remove HPOM.

2   Select **HP Operations Smart Plug-ins** and click **Change**.

3   On the Welcome screen click **Next**.

4   Select **Remove Products** and select **Oracle Application Server**.

5   Complete the removal by following the instructions that appear as you proceed.

Removing Oracle AS SPI in a Cluster Environment

To remove the Oracle AS SPI in a cluster environment perform the following:

1   Remove SPI components from managed nodes

Remove SPI components from managed nodes

Follow the steps in the section, Remove all Oracle AS SPI Policies from the Managed Nodes on page 67.

Remove Oracle AS SPI from the cluster-aware management servers

To remove the product from each system in the cluster:

1   On the management console, select **Start → Settings → Add or Remove Programs** and select **HP Operations Smart Plug-ins** and select **Change**.

    or

    Insert the HP Operations Smart Plug-ins DVD in the DVD drive.

2   Whether using the Smart Plug-ins DVD or the Control Panel, proceed to product selection and select **Oracle Application Server** installed on the cluster-aware management server.

3   Click **Next**.

4   Click **Remove**.

    Read the complete uninstallation process before doing it. To cancel an uninstallation in a cluster after it has begun, could result in the need to manually remove program components later.

5   When you have finished the uninstallation on one management server, proceed to the next management server in the cluster. You can choose any management server in the cluster to begin the uninstallation. When the first uninstallation completes, you are prompted to proceed to each subsequent management server, until you reach the last.

6   Select the Oracle AS to remove from the first node in the cluster, and then complete the uninstallation on that node. You are prompted to proceed to the next node. Your initial selections on the first node are used for removing the identical Smart Plug-ins from the second.

9 User-Defined Metrics

The Oracle AS SPI can collect data on roughly 55 metrics. However, you can expand that number by adding your own. The advantage of defining the metrics is that you can monitor your applications.

You can register application MBeans with the Oracle AS MBean server and create User-Defined Metrics (UDMs) that instruct the Oracle AS SPI to gather data from these MBeans.

➤ A custom MBean must expose a "Name" attribute. The Oracle AS SPI uses this name as the identifying name for the MBean. If your custom MBean is a multi-instance MBean, each MBean instance must have a unique value in its "Name" attribute. For example, Oracle Application Server's ServletRuntime MBeans are multi-instance because a ServletRuntime MBean is instantiated by Oracle Application Server for each deployed servlet. The Name attribute of the MBean identifies the servlet that the MBean is monitoring.

See the JMX documentation for more information about creating MBeans. For more information on registering MBeans, see the Oracle documentation .

You must understand the metric definitions DTD before creating UDMs. The sections that follow, assume that you are familiar with Extensible Markup Language (XML) and Document Type Definitions (DTDs).

Metric Definitions DTD

The `MetricDefinitions.dtd` file provides the structure and syntax for the XML file that you create. The Oracle AS SPI uses this DTD file to parse and validate the XML file you create. The following sections describe the `MetricDefinitions.dtd` file and provide an example XML file.

On a managed node, the `MetricDefinitions.dtd` file is located in the following directory:

Operating System	Directory
UNIX	*<OvAgentDir>*`/conf/oasspi`
Windows	*<OvAgentDir>*`\wasspi\oas\conf\`

For HPOM for Windows 9.00, *<OvAgentDir>* is typically is:

On Windows: `C:\Program Files\HP\HP BTO Software\`

On UNIX: `/var/opt/OV/`

➤ You should not edit, rename, or move the `MetricDefinitions.dtd` file as it is used at runtime.

`MetricDefinitions.dtd` comprises:

• MetricDefinitions

- Metric
- MBean
- FromVersion/ToVersion
- Calculation/Formula

MetricDefinitions Element

The MetricDefinitions element is the top-level element within the `MetricDefinitions.dtd` file. It contains one collection of metrics, consisting of one or more metric definitions.

```
<!ELEMENT MetricDefinitions (Metrics)>
<!ELEMENT Metrics (Metric+)>
```

Example

```
<MetricDefinitions>

    <Metrics>
     .
     .
     .
    </Metrics>

</MetricDefinitions>
```

Metric Element

The metric element represents one metric. Each metric has a unique ID (for example, OASSPI_0108). If a user-defined metric is an alarming, graphing, or reporting metric, the metric ID must be "OASSPI_0XXX" where XXX must be a number from 700 through 799. Otherwise, if the metric is used only within the calculation of another metric, the metric ID must begin with a letter (case-sensitive), and can be followed by any combination of letters, numbers, and underscores (for example, "mbean1").

A metric element contains one or more elements that represent the metric data source. Two data sources are supported: Mbeans and Calculations. Each metric data source element is scanned for a FromVersion or ToVersion child element to determine which metric data source element to use for the version of the application server being monitored.

```
<!ELEMENT Metric (MBean+ | Calculation+)>
<!ATTLIST Metric id          ID          #REQUIRED
                 name        CDATA          ""
                 alarm      (yes | no)     "no"
                 report     (yes | no)     "no"
                 graph      (yes | no)     "no"
                 previous   (yes | no)     "yes"
                 description  CDATA      #IMPLIED >
```

The following table lists metric element attributes.

Attribute	Type	Required	Default	Description
id	ID	yes	--	The metric ID.
name	text	no	"no"	The metric name, used for graphing and reporting. The name can be up to 20 characters in length.
alarm	"yes" "no"	no	"no"	If yes, the metric value is sent to the agent through opcmon.
report	"yes" "no"	no	"no"	If yes, the metric value is logged for reporting.
previous	"yes" "no"	no	"yes"	If yes, the metric value is saved in a history file so that deltas can be calculated. If you are not calculating deltas on a metric, set this to "no" for better performance.
graph	"yes" "no"	no	"no"	If yes, the user-defined metric is graphed.
description	text	no	""	A description of the metric.

Example

```
<Metric id="OASSPI_0100" name="ThreadPoolWaitCnt" alarm="yes">
 .
 .
 .
</Metric>
```

MBean Element

The MBean element is used when the data source of the metric is an attribute of a JMX MBean. The MBean element contains the following elements:

- **ObjectName** - The JMX-compliant object name of the MBean. The object name can include JMX-compliant pattern matching.

- **Attribute** - The MBean attribute name.

- **AttributeValueMapping** (optional) - Numeric values that should be substituted for the values returned by the MBean attribute. This can be used to convert string attributes to numbers so they can be compared to a threshold. Each AttributeValueMapping contains one or more **Map** elements. Each Map element specifies one value to be mapped.

- **AttributeFilter** (optional) - Provides basic filtering of MBeans based on MBean attribute values.

- **FromVersion/ToVersion** (optional) - The versions of the Oracle AS Server for which the MBean element is valid. For more information, see FromVersion and ToVersion Elements on page 75.

```
<!ELEMENT MBean (FromVersion?, ToVersion?, ObjectName,
                 Attribute,AttributeValueMapping?,
                  AttributeFilter*)>
<!ATTLIST MBean instanceType  (single | multi) "single"
                dataType      (numeric | string) "numeric" >

<!ELEMENT ObjectName (#PCDATA)>

<!ELEMENT Attribute (#PCDATA)>

<!ELEMENT AttributeValueMapping (Map+)>
<!ELEMENT Map EMPTY>
<!ATTLIST Map from  CDATA #REQUIRED
              to    CDATA #REQUIRED >

<!ELEMENT AttributeFilter EMPTY>
<!ATTLIST AttributeFilter type  (include | exclude) "include"
                          name      CDATA #REQUIRED
                        operator (initialSubString |
                                    finalSubString |
                                    anySubString | match |
                                    gt | geq | lt | leq  | eq)
                                    #REQUIRED
                          value     CDATA #REQUIRED >
```

The following table lists MBean element attributes.

Attribute	Type	Required	Default	Description
instanceType	"single" "multi"	No	"single"	Indicates if there are multiple instances of this MBean.
dataType	"numeric" "string"	no	"numeric"	Indicates if the value returned from the MBean attribute is a string or a numeric value.

The following table lists Map element attributes.

Attribute	Type	Required	Default	Description
from	text	yes	no default	The value that is to be mapped.
to	text	yes	no default	The new metric value to be returned in place of the mapped value.

The following table lists AttributeFilter element attributes.

Attribute	Type	Required	Default	Description
type	"include" "exclude"	no	"include"	Specifies if an MBean that matches this filter should be included or excluded from consideration by the data collector.
name	text	yes	no default	Specifies the MBean attribute on which to apply the filter.
operator	"initialSubString" "finalSubString" "anySubString" "match" "gt" "geq" "lt" "leq" "eq"	yes	no default	Specifies the filter to apply. "initialSubString", "finalSubString", "anySubString", and "match" can be used with MBean attributes that return text values. "gt", "geq", "lt", "leq", "eq" can be used for MBean attributes that return numeric values. See the JMX documentation for more information about filtering MBeans.
value	text or number	yes	no default	Specifies the value to compare. The metric definition creator is responsible for making sure the value data type matches the data type of the corresponding MBean attribute.

Example

```
<MBean instanceType="multi">
  <FromVersion server="10.1" update="3"/>
  <ObjectName>*:*,j2eeType=ThreadPool</ObjectName>
  <Attribute>queueSize</Attribute>
</MBean>
```

The preceding example indicates that the collector collects metric data about the attribute queueSize of the Mbean *:*,j2eeType=ThreadPool. This data is collected only if the server version is 10.1 or later.

FromVersion and ToVersion Elements

The FromVersion and ToVersion elements are used to specify the version of the Oracle Application Server for which the data source element is valid.

The following algorithm is used for determining which application server version is supported by each metric data source element within the Metric element.

- If a FromVersion element is not present, no lower limit exists to the server versions supported by this metric.

- If a FromVersion element is present, the server attribute indicates the lowest server version supported by this metric. If an update attribute exists, it qualifies the lowest server version supported by specifying the lowest service pack or patch supported for that version.

- If a ToVersion element is not present, no upper limit exists to the server versions supported by this metric.

- If a ToVersion tag is present, the server attribute indicates the highest server version supported by this metric. If an update attribute exists, it qualifies the server version supported by specifying the highest service pack or patch supported for that version.

```
<!ELEMENT FromVersion (EMPTY)>
<!ELEMENT ToVersion (EMPTY)>

<!ATTLIST FromVersion   server CDATA #REQUIRED
                        update CDATA    "*">
<!ATTLIST ToVersion     server CDATA #REQUIRED
                        update CDATA    "*">
```

The following table lists FromVersion and ToVersion element attributes.

Attribute	Type	Required	Default	Description
server	numeric string	yes	none	Specifies a primary server version; for example, `<FromVersion server="6.0"/>`
update	numeric string	no	"*"	Specifies a secondary server version, such as "1" for service pack 1. A "*" indicates that the metric is valid for all secondary server versions.

Example

```
<FromVersion server="10.1"/>
<ToVersion server="10.3"/>
```

Calculation and Formula Elements

The Calculation element is used when the data source of the metric is a calculation using other defined metrics. The Calculation element contains a Formula element whose content is a string that specifies the mathematical manipulation of other metric values to obtain the final metric value. The metrics are referred to in the calculation expression by their metric ID. The result of the calculation is the metric value.

```
<!ELEMENT Calculation (FromVersion?, ToVersion?,Formula)>
<!ELEMENT Formula (#PCDATA)>
```

Syntax

Calculations must use the following syntax:

- Operators supported are +, -, /, *, and unary minus.

- Operator precedence and associativity follows the Java model.

- Parentheses can be used to override the default operator precedence.

- Allowable operands are metric IDs and literal doubles.

A metric ID can refer to either an MBean metric or another calculated metric. Literal doubles can be specified with or without the decimal notation. The metric ID refers to the `id` attribute of the Metric element in the metric definitions document.

Functions

The calculation parser also supports the following functions. All function names are lowercase and take a single parameter which must be a metric ID.

- `delta` - returns the result of subtracting the previous value of the metric from the current value.

- `interval` - returns the time in milliseconds that has elapsed, since the last time the metric was collected.

- `sum` - returns the summation of the values of all the instances of a multi-instance metric.

- `count` - returns the number of instances of a multi-instance metric.

Examples

```
<Formula>
    ((JVM_HeapSizeCurrent-JVM_HeapFreeCurrent)/JVM_HeapSizeCurrent)*100
</Formula>
```

Sample 1

```
<Metric id="OASSPI_0100" name="ThreadPoolWaitCnt" alarm="yes">
  <MBean instanceType="multi">
    <FromVersion server="10.1" update="3" />
    <ObjectName>*:*,j2eeType=ThreadPool</ObjectName>
    <Attribute>queueSize</Attribute>
  </MBean>
</Metric>
```

Sample 2

The first two metrics in the following sample metrics illustrate how the final metric OASSPI_100 is calculated using the "base" metrics – `JVM_HeapFreeCurrent` and `JVM_HeapSizeCurrent`.

```
<Metric "JVM_HeapFreeCurrent" alarm="no">
  <MBean instanceType="single">
    <FromVersion server="10.1" update="3" />
    <ObjectName>*:*,Type=JVM</ObjectName>
    <Attribute>freeMemory</Attribute>
  </MBean>
</Metric>

<Metric id=""JVM_HeapSizeCurrent" alarm="no">
  <MBean>
    <FromVersion server="10.1" update="3" />
    <ObjectName>*:*,Type=JVM</ObjectName>
```

```
        <Attribute>totalMemory</Attribute>
    </MBean>
  </Metric>

  <Metric id="OASSPI_0100" name="JVMMemUtilPct" alarm="yes" graph="yes">
    <Calculation>
      <FromVersion server="10.1" update="3" />
      <Formula>((JVM_HeapSizeCurrent-JVM_HeapFreeCurrent)/
      JVM_HeapSizeCurrent)*100
      </Formula>
    </Calculation>
  </Metric>
```

Sample 3: Metric Definitions File

The following sample metric definitions file illustrates how you may create your own user-defined metrics. This sample file also contains examples of calculated metrics.

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE MetricDefinitions SYSTEM "MetricDefinitions.dtd">
<!-- sample UDM metrics configuration File -->
<MetricDefinitions>
  <Metrics>
    <!-- The following metrics illustrate some of the options available
    when creating user-defined metrics.
    -->
    <!-- The following metric uses an MBean that can have multiple
    instances in the MBean server. Note that JMX-compliant pattern-
    matching can be used in the MBean ObjectName tag.
    -->
    <Metric id="OASSPI_0100" name="ThreadPoolWaitCnt" alarm="yes">
      <MBean instanceType="multi">
        <FromVersion server="10.1" update="3" />
        <ObjectName>*:*,j2eeType=ThreadPool</ObjectName>
        <Attribute>queueSize</Attribute>
      </MBean>
    </Metric>
    <!-- The following 2 metrics are "base" metrics.They are used in the
    calculation of a "final" metric and are not alarmed, reported, or
    graphed themselves. Base metrics may have an 'id' that begins with a
    letter (case-sensitive) followed by any combination of letters,
    numbers, and underscore.
    -->
    <Metric id="JVM_HeapFreeCurrent" alarm="no">
      <MBean instanceType="single">
        <FromVersion server="10.1" update="3" />
        <ObjectName>*:*,Type=JVM</ObjectName>
        <Attribute>freeMemory</Attribute>
      </MBean>
    </Metric>
    <Metric id="JVM_HeapSizeCurrent" alarm="no">
      <MBean instanceType="single">
        <FromVersion server="10.1" update="3" />
        <ObjectName>*:*,Type=JVM</ObjectName>
        <Attribute>totalMemory</Attribute>
```

```
      </MBean>
    </Metric>
    <!-- The following metric illustrates a calculated metric. The
    calculation is based on the previous 2 "base" metrics.
    -->
    <Metric id="OASSPI_0101" name="JVMMemUtilPct" alarm="yes" graph="yes">
      <Calculation>
        <FromVersion server="10.1" update="3" />
        <Formula>((JVM_HeapSizeCurrent-JVM_HeapFreeCurrent)/
JVM_HeapSizeCurrent)*100
        </Formula>
        </Calculation>
    </Metric>
    <!-- The following metric illustrates a mapping from the actual
    string value returned by the MBean attribute to a numeric value so
    that an alarming threshold can be specified in a monitor template.
    that the 'datatype' must be specified as 'string'.
    -->
    <Metric id="OASSPI_0102" name="State" alarm="yes" report="no">
      <MBean dataType="string">
        <ObjectName>*:*,Type=J2EEServer</ObjectName>
        <Attribute>eventProvider</Attribute>
        <AttributeValueMapping>
          <Map from="true" to="1" />
        <Map from="false" to="2" />
          </AttributeValueMapping>
      </MBean>
    </Metric>
    <!-- Metric IDs that are referenced from the collector command line
    must have a prefix followed by four digits. The default prefix is
    'OASSPI_'.  The 'prefix' option must be used on the command line for
    the following metric since this metric has a different prefix than
    'OASSPI_'. Example: wasspi_ca FIRST_CLIENT_OHS-05MIN -x
prefix=Testing_ -m 792 ...
    -->
    </Metric>
    <Metric id="Testing_0103" alarm="no">
      <MBean>
        <ObjectName>*:*,Type=J2EEServer</ObjectName>
        <Attribute>node</Attribute>
      </MBean>
    </Metric>
    <!-- This metric is used in a subsequent JMX action calculation.
    -->
    <Metric id="ThreadPool_poolSize">
      <MBean instanceType="multi">
        <ObjectName>*:*,Type=ThreadPool</ObjectName>
        <Attribute>poolSize</Attribute>
      </MBean>
    </Metric>
    <!-- The Following metric defines a JMX action which will modify
    maximum messages on all JMS server instances.A 'Get' element is
    defined only for validation.
    -->
    <Metric id="TestUDM_1000" alarm="yes">
```

```
                <MBean instanceType="multi">
                  <ObjectName>*:*,Type=ThreadPool</ObjectName>
                  <Attribute>queueCapacity</Attribute>
                </MBean>

                <JMXActions>
                  <JMXAction>
                    <JMXCalls>
                      <ObjectName>*:*,j2eeType=ThreadPool</ObjectName>
                      <!-- Set a new value.
                      ThreadPool_poolSize is defined in UDM file oas_UDMMetrics-
                      sample
                      Therefore, UDM configuration needs to specify oas_UDMMetrics-
                      sample
                      -->
                      <Set>
                        <Attribute>maxPoolSize</Attribute>
                          <Value>
                          <Numeric>
                            <Formula>ThreadPool_poolSize + (5)
                            </Formula>
                          </Numeric>
                          </Value>
                      </Set>
                      <Get>
                        <Attribute>maxPoolSize</Attribute>
                      </Get>
                    </JMXCalls>
                  </JMXAction>
                </JMXActions>
              </Metric>

              <!-- The Following metric defines a JMX action which demonstrates an
               operation invoke.
              -->
              <Metric id="TestUDM_1001" alarm="yes">
                <MBean instanceType="multi">
                  <ObjectName>*:*,Type=J2EEApplication</ObjectName>
                  <Attribute>applicationRootDirectoryPath</Attribute>
                </MBean>
                <JMXActions>
                  <JMXAction>
                    <JMXCalls>
                      <ObjectName>*:*,j2eeType=JVM</ObjectName>
                      <!-- Invoke an operation to set the value of a given system
                      property  : For demonstration only.
                      -->
                      <Invoke>
                        <Operation>setproperty</Operation>
                                <Parameters>
                                  <Parameter>
                                    <String key="TestVariable" />
                                  </Parameter>
                                  <Parameter>
                                    <String value="test1" />
```

```
                            </Parameter>
                          </Parameters>
                    </Invoke>
                  </JMXCalls>
              </JMXAction>
            </JMXActions>
         </Metric>
     <Metrics>

<MetricDefinitions>
```

Creating User-Defined Metrics

To create UDMs, complete the following tasks:

1   Disable Graphing (if Enabled)
2   Create a Metric Definitions File
3   Configure Metric Definitions File Name and Location
4   Create a UDM Policy Group and Policies
5   Deploy the Policy Group
6   Enable Graphing

Disable Graphing (if Enabled)

If graphing is enabled, disable it:

1   From the HPOM console, select **Operations Manager** → **Nodes**.
2   Right-click the node on which you want to disable UDM graphing, and select
    All Tasks → **Launch Tool** → **UDM Graph Disable**.

Create a Metric Definitions File

The metrics definition file you create must be an XML file that follows the format defined by
the metric definitions DTD file described in Metric Definitions DTD on page 71.

► Do not edit, rename, or move the `MetricDefinitions.dtd` file installed with the Oracle AS
SPI.

A sample metric definitions file is installed on the managed node:

UNIX   *<OvAgentDir>*`/conf/oasspi/UDMMetrics-sample.xml`

Windows   *<OvAgentDir>*`\wasspi\oas\conf\UDMMetrics-sample.xml`

For HPOM for Windows 9.00, *<OvAgentDir>* is typically is:

On Windows: `C:\Program Files\HP\HP BTO Software\` (for HTTPS managed nodes) or
`C:\Program Files\HP OpenView\Installed Packages\`
`{790C06B4-844E-11D2-972B-080009EF8C2A}` (for DCE managed nodes)

On UNIX: `/var/opt/OV/` or `/var/lpp/OV/`

Configure Metric Definitions File Name and Location

For the UDM data collection to occur, the Oracle AS SPI configuration must include the name and location of the metric definitions file, as shown below:

```
UDM_DEFINITIONS_FILE = <full path of user metric definitions file>
```

The path name should use only forward slashes ("/").

To add the UDM file name and its location to the Oracle AS SPI configuration:

1   From the HPOM console, select **Operations Manager → Tools → SPI for Oracle AS → OASSPI Admin**.

2   Double-click **Discover or Configure OASSPI**.

3   Select the managed nodes on which the metrics definition file exists and click **Launch**. The Console Status window opens.

The Introduction window opens. Read the information and click **Next**. The configuration editor opens.

4   If the metrics definition file uses the same name and location on all managed nodes, configure the UDM_DEFINITIONS_FILE property at the Default (global properties) level. Otherwise, set the property for each managed node selected in step 3:

   a   Click **Default Properties** at the Defaults level or for a node.

   b   Click the **Set Configuration Properties** tab.

   c   From the Select a Property to Add dropdown menu, select **UDM_DEFINITONS_FILE** and click **Add Property**.

   d   Type the value (metric definitions file name and its absolute path name, using forward slashes in only the path name).

   e   Click **Save** to save the changes.

   f   Click **Next**. The Confirm Operation window opens.

   g   Click **OK** to save changes and exit the configuration editor.

The changes you made to managed nodes that were not selected are saved to the configuration on the management server. However, to configure those managed nodes, you must deploy the OASSPI Service Discovery policy on these nodes.

Create a UDM Policy Group and Policies

To run the UDM data collection and establish thresholds for alarming, create a UDM policy group and policies:

1   Copy an existing Oracle AS SPI policy group:

   a   From the HPOM console, select **Operations Manager → Policy management → Policy groups → SPI for Oracle AS → en → OASSPI**.

   b   Right-click the policy group you want to use as a starting point, and select **Copy**.

   c   Right-click **OASSPI** and select **Paste**.

2   Rename the new policy group depending on how you want to identify the new metric and collector policies. For example, you could include UDM in the name to clearly indicate that the group consists of custom metric monitors.

   a   Right-click the policy group, and select **Rename**.

      b   Type the new name.

3   Edit and rename each policy in the new group:

      a   Double-click the policy you want to use.

      b   Configure the collector policy command line (in the Command text box) to include the policy name and UDM metric number. For more information, see Advanced Policy Customizations on page 40.

      c   Configure thresholds in the policy, as appropriate. For more information, see Advanced Policy Customizations on page 40.

      d   Click **File** → **Save As**, and rename the policy according to the naming scheme.

          The name you assign to the new metric policy in the group may contain each new UDM number. For example, a copy of OASSPI_0001 can be named OASSPI_0701.

          The name you assign to the new collector policy must also contain the identifying name.

4   Select all the original policies from the new group and press the **Delete** key.

Deploy the Policy Group

To deploy the policy group:

1   Right-click the new policy group, and select **All Tasks** → **Deploy on**.

2   Select the nodes on which you want to deploy the policy group.

3   Click **OK**.

Enable Graphing

If you are using the graphing product HP Performance Manager, enable data collecting for UDM graphing:

1   From the HPOM console, select **Operations Manager** → **Nodes**.

2   Right-click the node on which you want to enable UDM graphing, and select **All Tasks** → **Launch Tool** → **UDM Graph Enable**.

Enable sufficient collection intervals before attempting to view graphs.

Glossary

agent

A program or process running on a remote device or computer system that responds to management requests, performs management operations, or sends performance and event notification. An agent can provide access to managed objects and MIB variables, interpret policy for resources and configure resources.

application

Packaged software that provides functionality designed to accomplish a set of related tasks. An application is generally more complex than a tool.

ASCII

American Standard Code for Information Interchange.

assigned policy

A policy assigned to one or more resources in the computing environment but not yet deployed or installed on those resources.

automatic action

A pre-configured program or script executed in response to an event, message, or a change in information in the management database. without operator intervention.

client

When the context is network systems, a computer system on a network that accesses a service from another computer (server). When the context is software, a program or executable process that requests a service from a server.

client console

An instance of the user interface that appears on the client system while the application runs on a server.

command

An instruction to a computer program that causes a specified operation to be carried out. Commands are typically typed by users on a command line.

configuration

In a network context, the complete set of inter-related systems, devices and programs that make up the network. For example the components of a network may include computer systems, routers, switches, hubs, operating systems and network software. The configuration of the network determines the way that it works and the way that it is used. In a software context, the combination of settings of software parameters and attributes that determine the way the software works, the way it is used, and how it appears.

configuration file

A file that contains specifications or information that can be used for determining how a software program should look and operate.

connection

A representation of a logical or physical relationship between objects.

console

An instance of the user interface from which the user can control an application or set of applications.

customization

The process of designing, constructing or modifying software to meet the needs and preferences of a particular customer or user.

data type

A particular kind of data; for example database A repository of data that is electronically stored. Typically databases are organized so that data can be retrieved and updated.

deploy

To install and start software, hardware, capabilities, or services so that they work in the business environment.

deployed application

An application and its components that have been installed and started to work in the business environment.

deployed policy

A policy that is deployed on one or more resources in the computing environment.

deployment

The process of installing and activating software, hardware, capabilities or services so that they work in the business environment.

deployment package

A software package that can be deployed automatically and installed on a managed node.

error log

An output file containing error messages.

event

An unsolicited notification such as an SNMP trap or WMI notification generated by an agent or process in a managed object or by a user action. An event usually indicates a change in the state of a managed object or cause an action to occur.

Hypertext Transfer Protocol (HTTP).

The protocol that World Wide Web clients and servers use to communicate.

HTTPS

Hypertext Transfer Protocol Secure.

icon

An on-screen image that represents objects that can be monitored or manipulated by the user or actions that can be executed by the user.

managed object

A network, system, software or service object that is both monitored for performance, status and messages and is manipulated by means of actions in the management software.

management console

An instance of the user interface from which the user can control the management application or set of management applications. The console may be on the system that contains the management software or it may be on another system in the management domain.

management server

A server that provides management services, processes, or a management user interface to clients. A management server is a type of management station.

message

A structured, readable notification that is generated as a result of an event, the evaluation of one or more events relative to specified conditions, or a change in application, system, network, or service status.

message browser

A graphical user interface that presents notifications that are generated as a result of an event, the evaluation of one or more events relative to specified conditions or a change in application, system, network, or service status.

message description

Detailed information about an event or message.

message key

A message attribute that is a string used to identify messages that were triggered from particular events.The string summarizes the important characteristics of the event. Message keys can be used to enable messages to acknowledge other messages, and enables for the identification of duplicate messages.

message severity level

A property of a message indicating the level of impact of the event or notification that initiated the message. Also, see severity level.

metadata

Data that defines data.

metric

A measurement that defines a specific operational or performance characteristic.

module

A self-contained software component that performs a specific type of task or provides for the presentation of a specific type of data. Modules can interact with one another and with other software.

node

When the context is network, a computer system or device (for example, printer, router, bridge) in a network. When the context is a graphical point to point layout, a graphical element in a drawing that acts as a junction or connection point for other graphical elements.

parameter

A variable or attribute that may be given an arbitrary value for use during an execution of either a computer program or a procedure within a program.

parameter type

An abstraction or categorization of a parameter that determines the particular kind of data that is valid for the parameter. For example a parameter type could be IP Address which indicates that parameter values must have four numbers separated by decimals with the value for each number being in the range of 0 to 255.

parameter value

A value given to a variable.

policy

A set of one or more specifications rules and other information that help automate network, system, service, and process management. Policies can be deployed to various targets (for example, managed systems, devices, network interfaces) providing consistent, automated administration across the network.

policy management

The process of controlling policies (for example, creating, editing, tracking, deploying, deleting) for the purposes of network, system or service management.

policy type

An abstraction or categorization of policies based on the function of the policy or the services that the policy supports.

port

If the context is hardware, a location for passing information into and out of a network device. If the context is ECS, a location for passing information into and out of a correlation node.

server

If the context is hardware plus software, a computer system that provides a service (for example, management capabilities, file storage capabilities) to other computer systems (clients) on the network. If the context is a software component, a program or executable process that responds to and services requests issued by clients.

severity level

A property of an object indicating the status of the object. Severity level is based on the impact of events or messages associated with the object.

Smart Plug-in (SPI)

Prepackaged software that installs into a management console and provides management capabilities specific to a given type of business application, database, operating system, or service.

trace log

An output file containing records of the execution of application software.

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