



# Third Party System Management Integration Software

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## **Sun Servers Integration 1.1 for HP OpenView Operations for UNIX**

### **Servers supported:**

- Sun Fire x64 Servers
- Sun SPARC Enterprise Servers

A complete, current list of supported Sun servers, service processors, and service processor firmware is available at the following web site:

<http://www.sun.com/systemmanagement/tools.jsp>

Please consult this web site before installing or configuring the Sun Integration Pack.

Part No. 820-0811-11

Sun Microsystems, Inc.

[www.sun.com](http://www.sun.com)

March 2008, Revision 01

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# Introduction

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HP® OpenView Operations for UNIX (hereafter HP OVO for UNIX) is an enterprise management application that can use industry-standard protocols such as the Simple Network Management Protocol (SNMP) to monitor networked servers. Once you have installed and configured the Sun Servers Integration 1.1 for HP OpenView Operations for UNIX (hereafter Sun Integration Pack), you will be able to take advantage of the following Sun-specific features in HP OVO for UNIX.

- Asynchronous monitoring of supported Sun servers through SNMP v1- and v2c-protocol traps
- SNMP monitoring at both the operating system level and service processor level
- Compact and simple installation and uninstallation process via standard HP OpenView Software Distributor tools
- No dependencies for integration on HP OVO for UNIX agents. The Sun Integration Pack works with or without HP OVO for UNIX HTTPS or DCE agents installed on the managed nodes. In cases where no HP OVO for UNIX agent services are needed, the system may be considered as simple network device from the HP OVO for UNIX point view without loss of functionality provided by the Sun Integration Pack.
- Detailed information about sensor name and event severity for environmental events (temperature, voltage and current related)

The integration discussed in this paper has been tested with HP OpenView Operations 8.24 for UNIX running Solaris 9.

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## Categories of Sun Servers

The Sun Integration Pack is one of several Sun ISV System Management solutions that provide Sun-specific resources for monitoring Sun servers in enterprise or workgroup data centers.

All the Sun servers supported by these integration packs fall into four categories differentiated by architecture (x64 or SPARC) and by service processor type (ALOM, ILOM, or Embedded LOM). The integration pack that you are installing or the configuration that you are implementing may not support all categories of servers, so consult the following website to verify that a particular server in one of these categories is supported by Sun Integration Pack:

<http://www.sun.com/systemmanagement/tools.jsp>

Category	Supported	Description	Examples
x64 Servers with ILOM	Yes	<p>x64 servers and blade server modules with the Integrated Lights Out Manager (ILOM) service processor</p> <p>Hereafter referenced as x64/ILOM servers.</p> <p>These servers are monitored at the service processor level.</p>	<p>Sun Fire X4100 M2</p> <p>Sun Fire X4600 M2</p> <p>Sun Blade X6220 Server Module</p> <p>Sun Blade X8440 Server Module</p>
SPARC Servers with ILOM	Yes	<p>SPARC Solaris servers and blade server modules with the Integrated Lights Out Manager (ILOM) service processor</p> <p>Hereafter referenced as SPARC/ILOM servers.</p> <p>These servers can be monitored at either the service processor level or at the operating system level via the Sun SNMP Management Agent for Sun Fire and Netra Systems.</p>	<p>Sun SPARC Enterprise T5120</p> <p>Sun SPARC Enterprise T5220</p> <p>Sun Blade T6320 Server Module</p>
x64 Servers with Embedded LOM	No	<p>x64 servers and blade server modules with the Embedded Lights Out Manager (Embedded LOM) service processor</p> <p>Hereafter referenced as x64/EmbeddedLOM servers.</p> <p>These servers are monitored at the service processor level.</p>	<p>Sun Fire X2100 M2</p> <p>Sun Fire X2200 M2</p> <p>Sun Fire X4150</p> <p>Sun Fire X4450</p> <p>Sun Blade X6250 Server Module</p>
SPARC Servers with ALOM	Yes	<p>SPARC Solaris servers with the Advanced Lights Out Manager (ALOM) service processor</p> <p>Hereafter referenced as SPARC/ALOM servers.</p> <p>These servers are monitored at the operating system level via the Sun™ SNMP Management Agent for Sun Fire™ and Netra™ Systems.</p>	<p>Sun SPARC Enterprise T1000</p> <p>Sun SPARC Enterprise T2000</p> <p>Sun Blade T6300 Server Module</p>

The matrix of servers and service processors supported by Sun integration packs is expanding dynamically. A complete, current list of supported Sun servers, service processors, and service processor firmware is available at the following web site:

<http://www.sun.com/systemmanagement/tools.jsp>

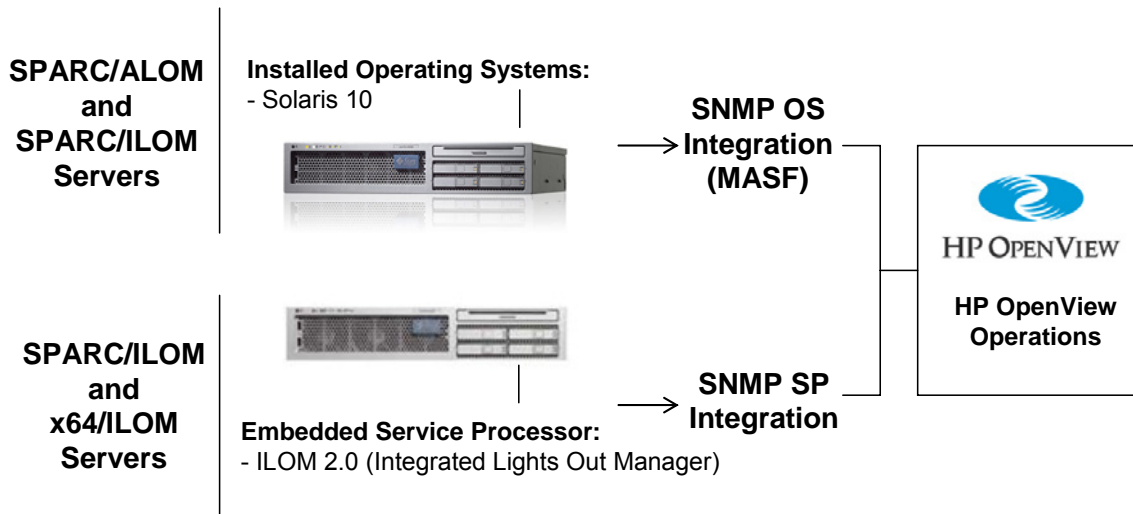
Please consult this web site before performing installation and/or configuration of the Sun Integration Pack.

## Levels of Integration with HP OVO for UNIX

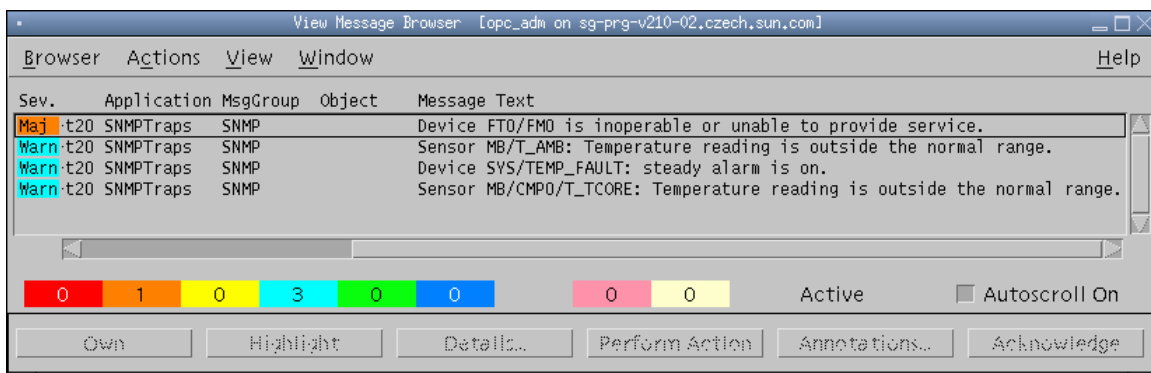
The Sun Integration Pack integrates supported Sun servers with HP OVO for UNIX via SNMP at the operating system and/or service processor levels.

Device type	Integration level
SPARC/ALOM and SPARC/ILOM servers	SNMP: operating system level
x64/ILOM and SPARC/ILOM service processors	SNMP: service processor level

For example, if your data center has both Sun SPARC Enterprise T1000/T2000 servers and T5x20 servers, you can monitor any of them at the operating system level and, for T5x20 servers (SPARC/ILOM servers), you can also monitor them at the service processor level.



The following screen shot depicts some of the detailed information that HP OVO for UNIX has received from a Sun SPARC Enterprise T2000 server.



HP OVO for UNIX can also receive SNMP traps from the Integrated Lights Out Manager (iLOM) service processor on SPARC/iLOM servers. Here are sample messages from a Sun SPARC Enterprise T5220 Server.

View Message Browser [opc_admin on sg-prg-v210-02.czech.sun.com]			
Browser Actions View Window Help			
Sev.	Application	Message	Text
Warn	SNMPTraps	Voltage sensor /SYS/MB/V_+3V3_MAIN:	Upper Non-critical going high
Maj	SNMPTraps	Voltage sensor /SYS/MB/V_+3V3_MAIN:	Upper Critical going high
Crit	SNMPTraps	Voltage sensor /SYS/MB/V_+3V3_MAIN:	Upper Non-recoverable going high
Maj	SNMPTraps	A power supply sensor /SYS/PS0/VOLT_FAULT	has detected an error.
Maj	SNMPTraps	A power supply sensor /SYS/PS0/FAN_FAULT	has detected an error.
Maj	SNMPTraps	A power supply sensor /SYS/PS0/TEMP_FAULT	has detected an error.
Maj	SNMPTraps	A power supply sensor /SYS/PS0/CUR_FAULT	has detected an error.
Maj	SNMPTraps	A power supply sensor /SYS/PS0/FAIL	has detected an error.
Norm	SNMPTraps	Temperature sensor /SYS/MB/T_AMB:	Upper Non-recoverable going low
Norm	SNMPTraps	Temperature sensor /SYS/MB/T_AMB:	Upper Critical going low
Norm	SNMPTraps	Temperature sensor /SYS/MB/T_AMB:	Reading returned within normal range
Norm	SNMPTraps	Voltage sensor /SYS/MB/V_VCORE:	Reading returned within normal range
Warn	SNMPTraps	Voltage sensor /SYS/MB/V_VCORE:	Upper Non-critical going high

1	6	0	2	4	0	0	0
---	---	---	---	---	---	---	---

With this new version of the Sun Integration Pack, you can monitor Sun Fire x64 servers that support iLOM 2.0. The following messages are from a Sun Fire X4100 M2 server.

View Message Browser [opc_admin on sg-prg-v210-02.czech.sun.com]			
Browser Actions View Window Help			
Sev.	Application	Message	Text
Norm	SNMPTraps	Voltage sensor /SYS/MB/V_+1V5CORE:	Upper Critical going low
Norm	SNMPTraps	Voltage sensor /SYS/MB/V_+1V5CORE:	Reading returned within normal range
Norm	SNMPTraps	Voltage sensor /SYS/MB/P1/V_VTT:	Lower Critical going high
Norm	SNMPTraps	Voltage sensor /SYS/MB/P1/V_VTT:	Reading returned within normal range
Norm	SNMPTraps	Temperature sensor /SYS/MB/P1/T_CORE:	Upper Non-recoverable going low
Norm	SNMPTraps	Temperature sensor /SYS/MB/P1/T_CORE:	Upper Critical going low
Norm	SNMPTraps	A hard drive sensor /SYS/SASBP/HDD3_FAULT	has returned to its normal state
Norm	SNMPTraps	Voltage sensor /SYS/MB/V_+3V3STBY:	Upper Non-recoverable going low
Norm	SNMPTraps	Voltage sensor /SYS/MB/V_+3V3STBY:	Upper Critical going low
Norm	SNMPTraps	Voltage sensor /SYS/MB/V_+3V3STBY:	Reading returned within normal range
Maj	SNMPTraps	A fan sensor /SYS/FT0/FM0_FAULT	has detected an error.
Warn	SNMPTraps	An intrusion sensor has detected that someone	may have physically tampered with
Norm	SNMPTraps	A power supply sensor /SYS/PS1/PWR0K	has returned to its normal state.

0	34	0	2	225	0	0	0
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# This Manual

This manual contains the following chapters:

- Chapter 1 “Introduction”
- Chapter 2 “Configuring Sun Devices to be Monitored by HP OVO for UNIX”
- Chapter 3 “Installing the Sun Integration Pack”
- Chapter 4 “Configuring HP OVO for UNIX to Monitor Sun Devices”
- Chapter 5 “Monitoring Sun Devices in HP OVO for UNIX”
- Chapter 6 “Troubleshooting”
- Appendices:
  - Appendix A “Sample Hardware Management Agent Configuration File”
  - Appendix B “Installed Directories and Files”
  - Appendix C “Sample `swinstall` Output”
  - Appendix D “Sun SNMP MIBs”
  - Appendix E “What’s New?”
  - Appendix F “Glossary”

This manual is intended for experienced HP OVO for UNIX administrators, field sales representatives, and support engineers.

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## Requirements

The managed devices (servers) and the HP OVO for UNIX server software have different software requirements.

### Managed Devices

Managed devices (servers) must have the following software installed and configured properly.

Device	Software Requirement
SPARC/ALOM and SPARC/ILOM servers	<i>Supported operating systems:</i> - Solaris 10 (see product documentation for versions)
	<i>OS-level SNMP integration:</i> - Sun SNMP Management Agent for Sun Fire and Netra Servers 1.5 (or higher)
x64/ILOM and SPARC/ILOM service	<i>SP-level SNMP integration:</i> - Integrated Lights Out Manager (ILOM 2.x) with the

Device	Software Requirement
processors	SUN-HW-TRAP-MIB

You may choose optionally to install and configure an HP OVO for UNIX agent on managed devices that you are monitoring at the operating system level, but these agents are not required for the Sun Integration Pack.

### HP OVO for UNIX Management Server

Integration between HP OVO for UNIX and Sun servers has been tested with the following versions of the HP OVO for UNIX.

HP OVO for UNIX Server	Software Requirement
Sun Solaris SPARC Servers	Supported operating systems: - Solaris 9 (see product documentation for update versions) - Solaris 10 (see product documentation for update versions)
	HP OVO for UNIX software: - HP OpenView Operations 8.24 for UNIX

For additional management server hardware and software requirements, see the *HP OpenView Operations 8.x for Unix Installation Guide*.

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## Related Documentation

Consult the following manuals from Sun Microsystems Inc. and HP for additional information about installing, configuring, and using HP OVO for UNIX and Sun solutions.

- *Sun™ SNMP Management Agent Administration Guide for Sun Fire™ and Netra™ Servers* (Part Number 819-7978-xx)
- *Sun Integrated Lights Out Manager 2.0 User's Guide* (820-1188)
- *HP OpenView Operations 8.x for Unix Installation Guide*
- *HP OpenView Operations Administrator's Reference*
- *HP OpenView Operations Concepts Guide*
- *HP OpenView Operations DCE Agent Concepts and Configuration Guide*
- *HP OpenView Operations HTTPS Agent Concepts and Configuration Guide*

## Configuring Sun Devices to be Monitored by HP OVO for UNIX

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This chapter describes how to configure your Sun devices to be monitored by HP OVO for UNIX. Which set of configuration tasks you perform on your managed nodes depends on your strategy for monitoring them in HP OVO for UNIX.

Integration Level	Sun-specific Tasks	OVO-specific Tasks
Operating system	<b>Required:</b> Install the Hardware Management Agent	<b>Optional:</b> Install and configure HP OVO for UNIX agent(s)  <b>Note:</b> The Sun Integration Pack operates independently of all HP OVO for UNIX agents.
Service processor	<b>Required:</b> Configure ILOM on each x64/ILOM and SPARC/ILOM server	

Although it is possible to use SNMP to monitor SPARC/ILOM systems such as the Sun SPARC Enterprise T5x20 servers at both the operating system and service processor levels, Sun recommends that you choose one method or the other.

This chapter contains the following sections:

- Configuring the Hardware Management Agent on servers to be monitored at the operating system level
- Installing HP OVO for UNIX agents on your supported Sun Servers
- Configuring Sun ILOM 2.x Service Processors to be Monitored by HP OVO for UNIX

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# Configuring the Hardware Management Agent

For HP OVO for UNIX to use SNMP to monitor supported servers at the operating system level, the Hardware Management Agent must be installed and configured on each of those servers.

## SPARC Solaris SNMP Configuration

If you want HP OVO for UNIX to use OS-based SNMP to monitor your SPARC Solaris servers, the Sun™ SNMP Management Agent for Sun Fire™ and Netra™ Systems (hereafter Hardware Management Agent) must be installed and configured on each of these SPARC Solaris nodes.

### Installation

To evaluate SNMP system requirements for your SPARC Solaris server and to learn how to install the Hardware Management Agent on it, consult the following Sun manual:

- *Sun™ SNMP Management Agent Administration Guide for Sun Fire™ and Netra™ Servers* (Part Number 819-7978). You can download this manual from <http://docs.sun.com>.

### Configuration

For integration between the Hardware Management Agent and HP OVO for UNIX to work correctly, you must verify that the Hardware Management Agent configuration file on your managed SPARC Solaris nodes contains the following entries. To update that configuration file, do the following:

1. **On the managed server, open the following configuration file in a text editor:**

`/etc/opt/SUNWmasf/conf/snmpd.conf`

2. **Add an entry to specify whether you want to send SNMP v1 or SNMP v2 traps.**

SNMP format	Entry
v1	<code>trapsink &lt;destination_hostname&gt;</code>
v2c	<code>trap2sink &lt;destination_hostname&gt;</code>

where `<destination_hostname>` specifies the name or IP address of the destination server receiving the SNMP v1 (trapsink) or v2c (trap2sink) traps from the Hardware Management Agent.

**Note:** Adding both lines will result in the Hardware Management Agent sending HP OVO for UNIX two traps for each alert and those redundant alerts appearing in the event console.

3. **(Optional and recommended) Uncomment (remove the # character) from the following line in the final section of the file.**

```
#####  
# SECTION: Trap compatibility mode  
.  
SUNW_alwaysIncludeEntPhysName    yes
```

Enabling this mode for the Hardware Management Agent adds more detailed sensor and device names to traps and eliminates the need for generic messages for some sensors such as “A device has been disabled.”

**4. Save the modified file.**

For these changes to take effect, you must force the Hardware Management Agent to re-read the configuration file.

**5. Enter the following commands in a terminal window to force the Hardware Management Agent to re-read its configuration file.**

```
# ps -ef | grep SUNWmasf | grep -v grep
```

This command returns the process ID of the Hardware Management Agent daemon running on your SPARC Solaris system.

```
# kill -HUP <snmpd_pid>
```

where <snmpd\_pid> is the process ID of the Hardware Management Agent obtained in the previous sub-step.

The Hardware Management Agent re-reads its configuration file automatically when it restarts.

Your managed SPARC Solaris servers are now ready to forward traps to HP OVO for UNIX.

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## Installing HP OVO for UNIX Agents on Supported Servers

It is not necessary to install an HP OVO for UNIX agent on each node that you plan to monitor at the operating system (versus service processor) level. If you do choose to install and configure the HTTPS or DCE Agents on each node, you must perform the following steps on the managed node.

**1. Launch the HP OVO for UNIX Administrator GUI.**

**2. Install and configure the HTTPS or DCE Agent on each node.**

Consult the following HP documentation for installation and configuration details:

- *HP OpenView Operations DCE Agent Concepts and Configuration Guide*
- *HP OpenView Operations HTTPS Agent Concepts and Configuration Guide*

## Configuring SNMP on ILOM Service Processors

SPARC/ILOM and x64/ILOM servers support the Integrated Lights Out Manager (ILOM) 2.x service processor and system management software. In addition to SNMP messages generated from the SUN-PLATFORM-MIB through the Hardware Management Agent on Solaris 10, ILOM 2.x can generate SNMP traps from the SUN-HW-TRAP-MIB.

### Configuring Sun ILOM 2.x Service Processors

To configure SNMP protocol settings on your Sun ILOM 2.x service processor, do the following:

1. **Launch the web GUI (ILOM) on the service processor to be configured and monitored.**
2. **Log in to the ILOM graphical interface as root.**
3. **Click the Configuration - Alert Management tab to display the Alert Settings screen.**


Sun <sup>™</sup> Microsystems, Inc.						
System Information	System Monitoring	Configuration	User Management	Remote Control	Maintenance	
System Management Access	Alert Management	Network	Serial Port	Clock Settings	Syslog	SMTP Client

### Alert Settings


This shows the table of configured alerts. To send a test alert to each of the configured alert destinations, click the *Send Test Alerts* button. IPMI Platform Event Traps (PETs), Email Alerts and SNMP Traps are supported. Select a radio button, then select Edit from the Actions drop down list to configure an alert. You can configure up to 15 alerts.

Send Test Alerts				
Alerts				
— Actions — ▾				
<input type="checkbox"/>	Alert ID	Level	Alert Type	Destination Summary
<input type="radio"/>	1	minor	snmptrap	129.157.18.81, snmp v1, community 'public'
<input type="radio"/>	2	minor	snmptrap	129.157.18.82, snmp v2c, community 'public'
<input type="radio"/>	3	disable	ipmipet	0.0.0.0

4. **Click one of checkboxes for an entry that has no value for the Destination Summary field.**

Alerts				
— Actions — ▾				
	Alert ID	Level	Alert Type	Destination Summary
<input type="radio"/>	1	minor	snmptrap	129.157.18.81, snmp v1, community 'public'
<input type="radio"/>	2	minor	snmptrap	129.157.18.82, snmp v2c, community 'public'
<input checked="" type="radio"/>	3	disable	ipmipet	0.0.0.0

5. Click the Actions drop-down box and choose Edit.

Alerts				
— Actions — ▾				
— Actions — ▾				
Edit				
	Alert ID	Level	Alert Type	Destination Summary
<input type="radio"/>	1	minor	snmptrap	129.157.18.81, snmp v1, community 'public'
<input type="radio"/>	2	minor	snmptrap	129.157.18.82, snmp v2c, community 'public'
<input checked="" type="radio"/>	3	disable	ipmipet	0.0.0.0

ILOM 2.x displays the following screen.

## Sun™ Integrated Lights Out Manager

To create or modify an Alert, select the alert level and type, then fill in the destination information for the alert type selected.

Level: Disable ▾

Type: IPMI PET ▾

Fill in the IP address of the PET destination. Click Save to complete your action.

IP Address:

Save Close

6. Set (or verify) the following configuration settings.

Field	Value
Level:	Minor (to view the maximum number of traps at all severity levels)

Field	Value
Type:	SNMP Trap (for the SUN-HW-TRAP-MIB) <b>Note:</b> Although ILOM 2.0 continues to support the SUN-ILOM-PET-EVENTS MIB, Sun strongly recommends configuring your service processors to use the more robust SUN-HW-TRAP-MIB MIB.
IP Address:	<i>IP_address_of_destination_server</i>
SNMP Version:	v1, v2c, or v3 (if supported) for your management configuration

The screenshot shows the 'Sun™ Integrated Lights Out Manager' window. At the top, it says 'To create or modify an Alert, select the alert level and type, then fill in the destination information for the alert type selected.' Below this, there are two dropdown menus: 'Level:' set to 'Minor' and 'Type:' set to 'SNMP Trap'. A horizontal line separates this from the next section, which says 'Specify the SNMP trap destination IP address, version, and community or user name. Click Save to complete your action.' Below this are three input fields: 'IP Address:' (empty), 'SNMP Version:' (set to 'v1'), and 'Community Name:' (empty). At the bottom right are 'Save' and 'Close' buttons. The status bar at the very bottom shows 'Done' on the left and '10.18.141.137' on the right.

**7. Click the Save button to submit the change.**

**Tip:** Verify that the information that you just entered in the dialog box appears in the updated Alert Management table.

Your Sun ILOM 2.x service processor is now configured to send SUN-HW-TRAP-MIB SNMP traps to all trap destinations.



# Installing the Sun Integration Pack

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This chapter describes how to perform the following tasks:

- Downloading the Sun Integration Pack
  - Preparing to install the Sun Integration Pack to a local directory for installation
  - Installing the Sun Integration Pack on your HP OVO for UNIX management server
  - Verifying successful installation of the Sun Integration Pack
  - Uninstalling the Sun Integration Pack from your HP OVO for UNIX management server
- 

## Pre-installation Checklist

Before you download and install the Sun Integration Pack, collect the following information.

- ☐ **HP OVO for UNIX installation and configuration:** Verify that your HP OVO for UNIX software is installed and configured properly. \_\_\_\_\_
- ☐ **HP OVO for UNIX version:** Release 8.24 for UNIX is currently supported. \_\_\_\_\_
- ☐ **HP OVO for UNIX server host name:** The name of the host server onto which you plan to install the Sun Integration Pack. \_\_\_\_\_
- ☐ **HP OVO for UNIX administrator login information:** User login and user password information for the HP OVO for UNIX administrator account. \_\_\_\_\_
- ☐ **HP OVO for UNIX server root password:** To install Sun Integration Pack, you will need to have root permissions. \_\_\_\_\_
- ☐ **Management server IP address:** The IP address of the server hosting HP OVO for UNIX. \_\_\_\_\_
- ☐ **Management port availability:** Verify that the `ovtrapd` daemon is running. This daemon listens on port 162 for incoming SNMP traps. To verify that `ovtrapd` is running, enter the following command:  
`# /opt/OV/bin/ovstatus -c ovtrapd` \_\_\_\_\_

---

## Downloading the Sun Integration Pack

To install the most current version of the Sun Integration Pack, download it from the following URL:

```
http://www.sun.com/systemmanagement/tools.jsp
```

**Note:** As updated versions of the Sun Management Pack get posted to the web, the name of the compressed archive to download will change. For this release, download the following:

```
Sun_Servers_integration-1.1.depot.gz
```

Save the Sun Integration Pack to a working directory on the local system from which you plan to perform the installation and uncompress it.

---

## Preparing to Install the Sun Integration Pack

Before you can install files in the Sun Integration Pack to your HP OVO for UNIX server, you must first unpack the distribution archive that you downloaded earlier in this chapter.

To unpack the distribution archive, do the following:

1. **Download the distribution archive to a local temp directory on the server that hosts the HP OVO for UNIX management server.**

Suppose that the local directory and the most current distribution package are named the following:

```
/tmp/sun/Sun_Servers_Integration-1.1.depot.gz
```

2. **Unpack the downloaded distribution archive:**

For example, to unpack the distribution archive to a temporary directory on Solaris, enter the following commands:

```
# cd /tmp/sun/
```

```
# gunzip Sun_Servers_Integration-1.1.depot.gz
```

The unpacked distribution archive contains the following distribution file.

Distribution File(s)	Description
Sun_Servers_Integration-1.1.depot	The Sun integration pack that you will install on your HP OVO for UNIX management server as the HP OpenView Smart Plug-in SPI-SUNSI-OVO.

The following sections explain how to install and configure the Sun Integration Pack.

## Installing the Sun Integration Pack

The installation process involves the following steps:

- Use `swinstall(1M)` to install the Sun Integration Pack.
- Verify that the Sun-specific template groups and trap templates appear in the HP OVO for UNIX Message source templates window.
- Assign the Sun-specific templates to the HP OVO for UNIX management server in the Administrator GUI.
- Update the management server configuration.

You must also install and configure the Hardware Management Agent on each server that you plan to monitor at the operating system level. See Chapter 2 for details.

To install the Sun Integration Pack, do the following:

1. **Log in to the HP OVO for UNIX management server as root and open a terminal window.**
2. **Enter the following command to install the Sun Integration Pack that you downloaded and unpacked in previous section of this chapter.**

```
# swinstall -s <path2unpacked>/Sun_Servers_\
Integration-1.1.depot SPI-SUNSI-OVO
```

where `<path2unpacked>` is the full path to the directory containing the unpacked `Sun_Servers_Integration-1.1.depot` SD file and `SPI-SUNSI-OVO` is the name of the product being installed.

For example, if you unpacked the distribution archive to the `/tmp/sun/` directory, enter the following:

```
# swinstall -s /tmp/sun/Sun_Servers_\
Integration-1.1.depot SPI-SUNSI-OVO
```

The `swinstall` utility uploads the Sun-specific template groups, trap templates, and Sun Platform MIB to the HP OVO for UNIX database.

3. **(Optional) Check the following installation log file if any errors or warnings were reported during the installation process.**

```
/var/adm/sw/swagent.log
```

If errors have occurred, correct them and run the `swinstall` utility again. Appendix C contains a sample output from `swinstall`.

Although the Sun Integration Pack has been installed on your HP OVO for UNIX management server, you must perform additional configuration on the management server. See the next chapter for these configuration tasks.

---

## Verifying Successful Installation

There are three ways to verify that the Sun Integration Pack has been installed correctly on your HP OVO for UNIX management server:

- The `swlist` utility
- The presence of correct installed directories and files
- The presence of Sun Integration Pack templates and Sun-specific MIBs in the HP OVO for UNIX Administrator GUI

### Using `swlist (1M)` to Verify Installation

The utility `swlist (1M)` provides a way to test whether a package, in this case SPI-SUNSI-OVO, has been installed on your management server.

Command	Description
<code># swlist SPI-SUNSI-OVO</code>	Returns a file set list and a one-line description of installed package.
<code># swlist -a copyright -l \</code> <code>product SPI-SUNSI-OVO</code>	(Optional) Returns copyright information for the installed package.
<code># swlist -a description -l \</code> <code>product SPI-SUNSI-OVO</code>	(Optional) Returns a product description for the installed package.

### Verifying the Presence of Installed Directories and Files

If `swinstall` correctly installs all the files in the Sun Integration Pack, you should be able to verify the existence of those installed directories and files. See Appendix B for a complete listing of the directories and files created by `swinstall`.

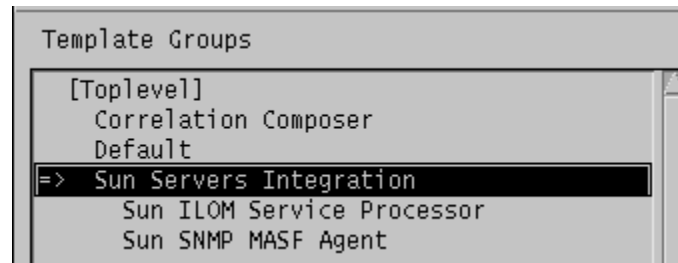
### Using the HP OVO for UNIX Administrator GUI to Verify Installation

The HP OVO for UNIX Administrator GUI displays all installed templates and allows you to manage those templates (creation, deletion, renaming). To verify that the Sun Integration Pack package named SPI-SUNSI-OVO has been installed correctly, do the following:

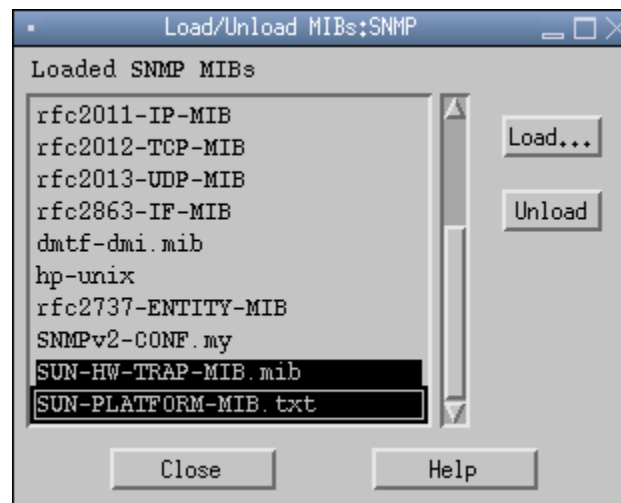
1. **Launch the HP OVO for UNIX Administrator GUI.**
2. **(Optional) Choose Map - Restart Session to restart the Administrator session (if it had been running when you installed the Sun Integration Pack).**
3. **Choose Window - Message Source Templates to display the Message Source Templates window.**

4. Verify that the SPI-SUNSI-OVO package is available under the Sun Servers Integration Template Group.

Sun Servers Integration Template Groups	SNMP Trap Templates
Sun ILOM Service Processor	Sun-ILOM-HWTraps
Sun SNMP MASF Agent	Sun-MASF-AgentStatus Sun-MASF-AlarmEvents Sun-MASF-DeviceEvents



5. From the OVO Administrator GUI, choose Options – Load/Unload MIBs: SNMP to open the Load/Unload MIBs:SNMP window.
6. Verify that the SUN-HW-TRAP-MIB and SUN-PLATFORM-MIB are available.



If both the template structure and the Sun-specific MIBs are available, the Sun Integration Pack has been installed correctly.

---

# Uninstalling the Sun Servers Integration 1.1 for HP OpenView Operations for UNIX

Uninstalling the Sun Integration Pack involves two procedures:

- Removing Sun Integration Pack from the file system of your HP OVO for UNIX management server.
- Removing templates from the HP OVO for UNIX database.

## Removing HP OVO for UNIX From the File System of Your HP OVO for UNIX Management Server

To remove the Sun Integration Pack file from the file system of your HP OVO for UNIX management server, do the following:

1. **Log in to the HP OVO for UNIX management server as root.**
2. **Open a terminal window.**
3. **Enter the following command to remove all the files installed with the Sun Integration Pack from the file system:**

```
# swremove SPI-SUNSI-OVO
```

4. **(Optional) If no other integration plug-ins are using the Sun-specific MIBs, enter the following commands to delete them from your file system as well:**

```
# rm /var/opt/OV/share/snmp_mibs/Vendor/Sun/SUN-\  
PLATFORM-MIB.txt
```

```
# rm /var/opt/OV/share/snmp_mibs/Vendor/Sun/SUN-\  
HW-TRAP-MIB.mib
```

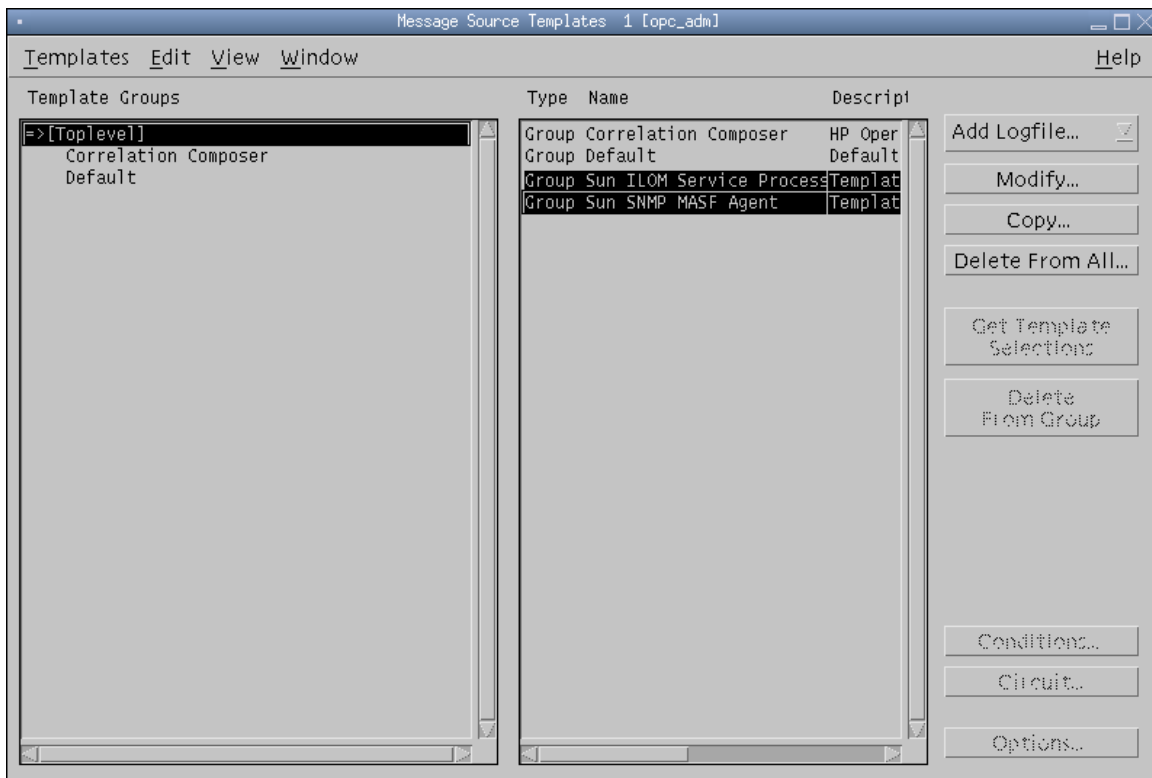
## Removing Templates From the HP OVO for UNIX Database

If you remove the Sun Integration Pack files from the file system, you must also remove the Sun Integration Pack templates from the HP OVO for UNIX database. To remove these templates, do the following:

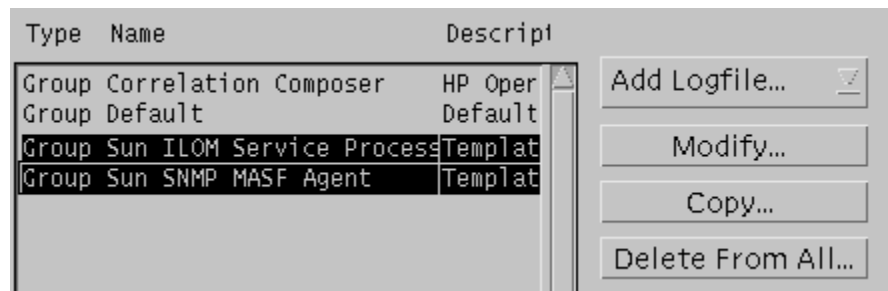
1. **Launch the HP OVO for UNIX Administrator GUI.**
2. **Choose Window - Message Source Templates to display the Message Source Templates window.**
3. **Select the template group named Sun Servers Integration and click the Delete From All ... button.**
4. **Click the Yes button to confirm removing the templates.**

The subordinate template groups named Sun SNMP MASF Agent and Sun ILOM Service Processor are then moved to the [Toplevel] group in the Template Groups list.

5. **Click Template Groups – [Toplevel] to display the contents of items in the top level.**



6. Select the entries named Group Sun ILOM Service Processor and Group Sun SNMP MASF Agent under [Toplevel].

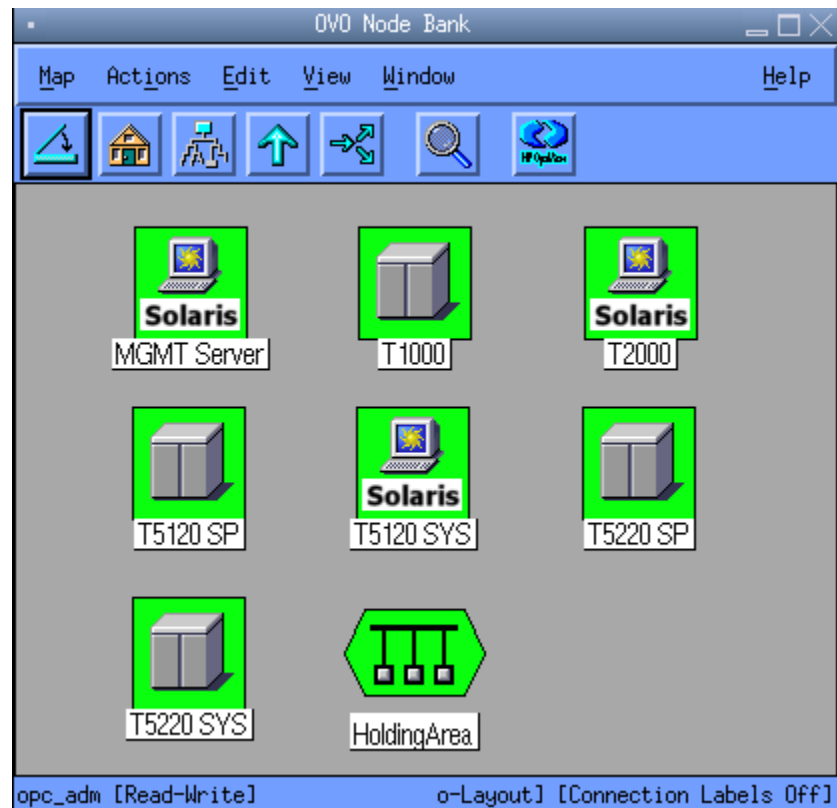


7. Click the Delete From All ... button to move all trap templates in that group to the [Toplevel] group in the Template Groups list.
8. Click the Yes button to confirm removing the trap templates.  
The trap template entries named Sun-ILOM-HWTraps and Sun-MASF-\* are then moved to the [Toplevel] group.
9. Click the [Toplevel] Template Group to select it.
10. Control-click each Sun-MASF trap template to select it for deletion.

Type	Name	Description	
Group	Correlation Composer	HP OpenView Correlation Composer	Add Logfile... Modify... Copy... Delete From All...
Group	Default	Default templates delivered with	
Trap	Sun-ILOM-HWTraps	Intercept Sun Hardware Trap MIB	
Trap	Sun-MASF-AgentStatus	Intercept and suppress Sun SNMP	
Trap	Sun-MASF-AlarmEvents	Intercept Sun Platform MIB ala	
Trap	Sun-MASF-DeviceEvents	Intercept Sun Platform MIB dev	

**Tip:** You can also Shift-click the first and last entries to select them as a group.

11. Click the **Delete From All ...** button to delete all templates installed by the Sun Integration Pack.
12. Click the **Yes** button to confirm removing the trap templates.
13. Close the **Message Source Templates** window.
14. From the OVO Administrator GUI, choose **Window – Node Bank** to open the OVO Node Bank window.

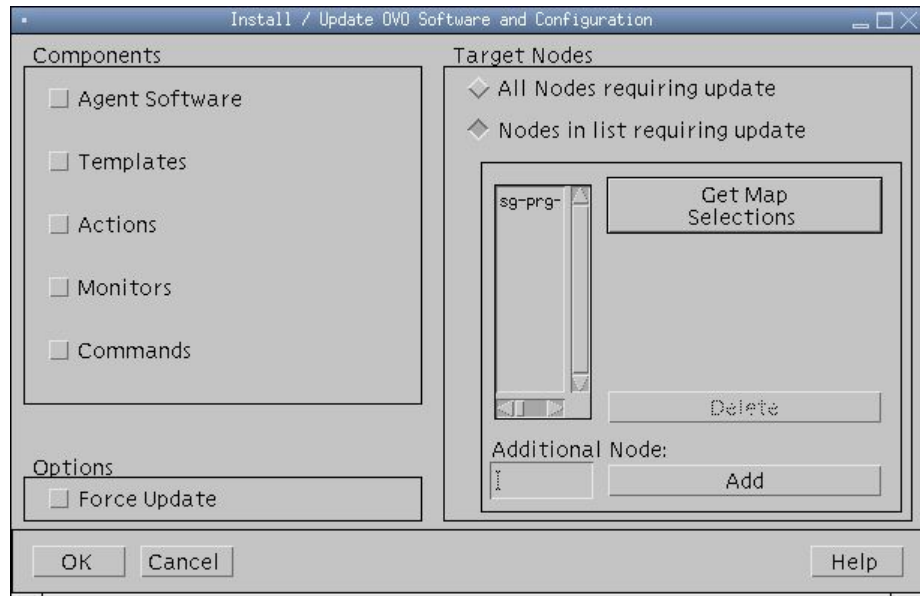


15. Click the **HP OVO for UNIX Management Server** icon.





16. Choose **Actions – Agents – Install / Update SW & Config** to open the **Install/Update Software and Configuration** window.



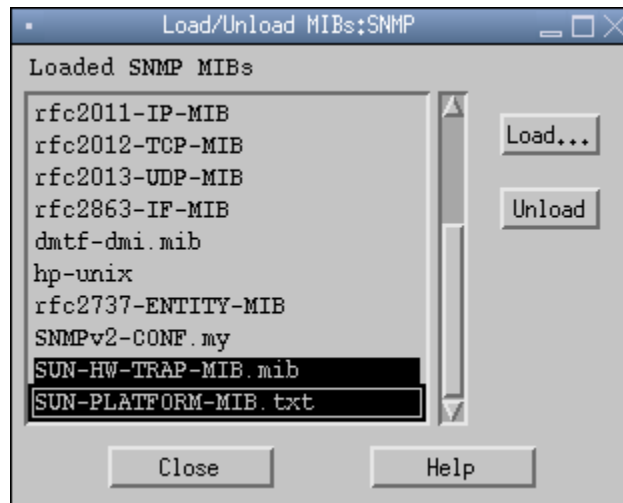
17. Select the **Templates** checkbox in the **Components** frame and click the **OK** button.

After successful distribution of the configuration change, HP OVO for UNIX reports the following message:

The following configuration information was successfully distributed: Template (OpC30-814)

**Note:** If the Sun Platform MIB or Sun Hardware Trap MIB are no longer needed, perform the following steps.

18. (Optional) From the OVO Administrator GUI, choose **Options – Load/Unload MIBs: SNMP** to open the **Load/Unload MIBs:SNMP** window.
19. Select the MIBs named **SUN-HW-TRAP-MIB.mib** and **SUN-PLATFORM-MIB.txt**.



20. Click the **Unload** button.

**Note:** For those systems which you are managing at the operating system level, reconfigure the Hardware Management Agent on those systems to stop sending traps to the HP OVO for UNIX management server.

## Configuring HP OVO for UNIX to Monitor Sun Devices

---

This chapter describes how to configure HP OVO for UNIX to monitor supported Sun servers. It contains the following sections:

- Configuring the Sun Integration Pack on HP OVO for UNIX
- Configuring HP OVO for UNIX to monitor Sun servers without installed HP OVO for UNIX agents
- Configuring HP OVO for UNIX to Monitor Sun servers with installed HP OVO for UNIX agents
- Verifying Successful Configuration

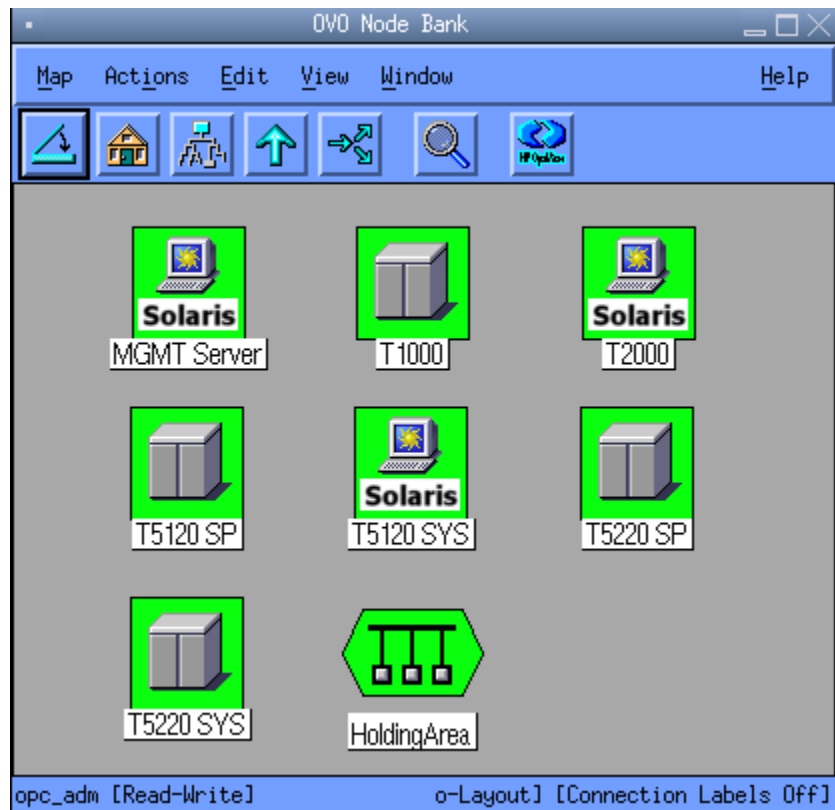
Once you have installed the Sun Integration Pack and configured the HP OVO for UNIX management server, you must then configure each of the managed nodes. For more information on configuring managed nodes, see Chapter 2 “Configuring Sun Devices to be Monitored by HP OVO for UNIX.”

---

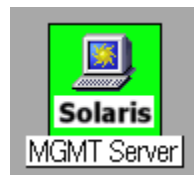
### Configuring the Sun Integration Pack on HP OVO for UNIX

Configuring the Sun Integration Pack on your HP OVO for UNIX management server involves distributing Sun-specific templates to the management server.

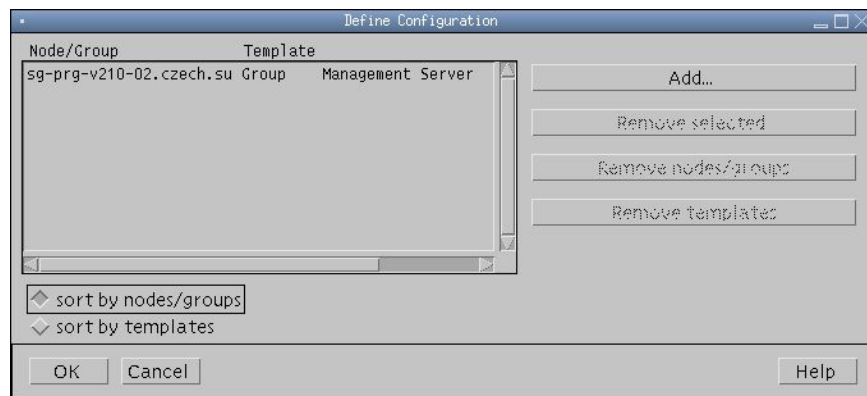
1. **Launch the OVO Administrator GUI.**
2. **From the OVO Administrator GUI, choose *Window – Node Bank* to open the OVO Node Bank window.**



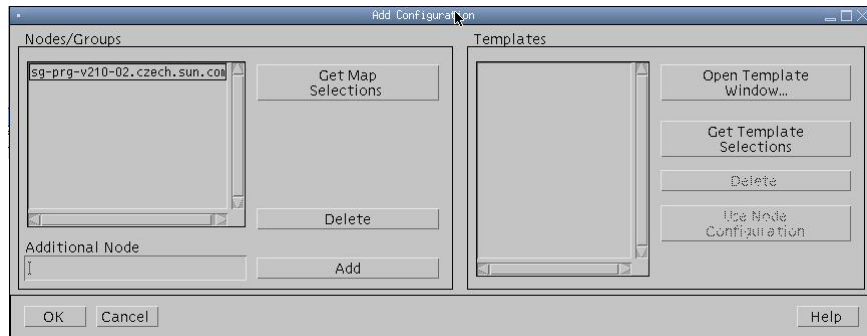
3. Click the HP OVO for UNIX Management Server icon to select it.



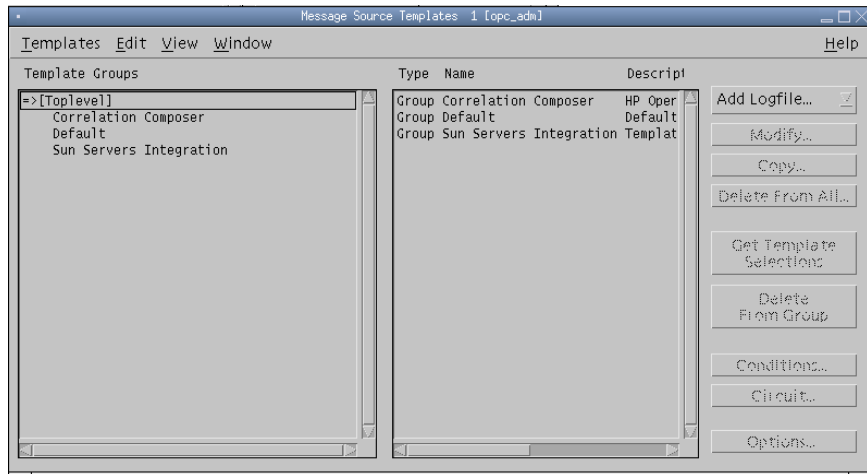
4. Choose Actions – Agents – Assign Templates ... to display the Define Configuration window.



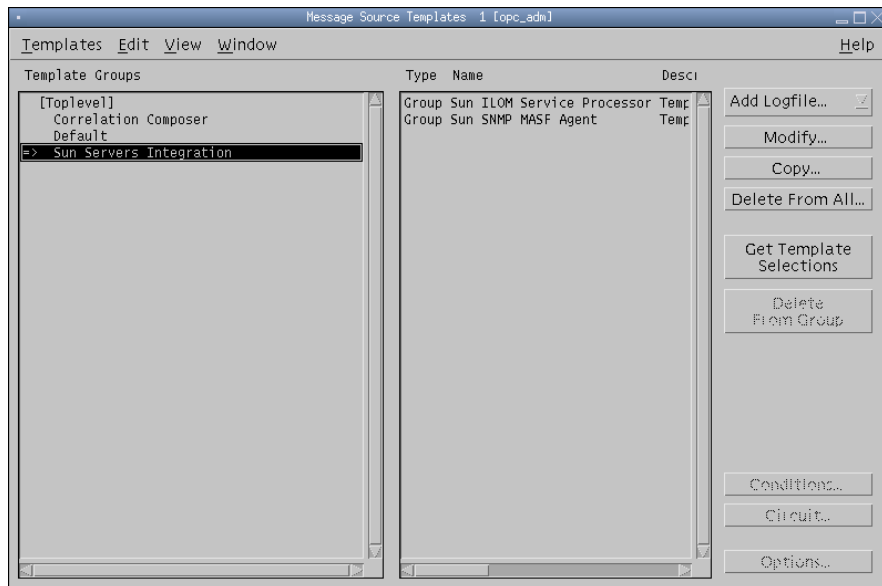
5. Click the Add button to display the Add Configuration window.



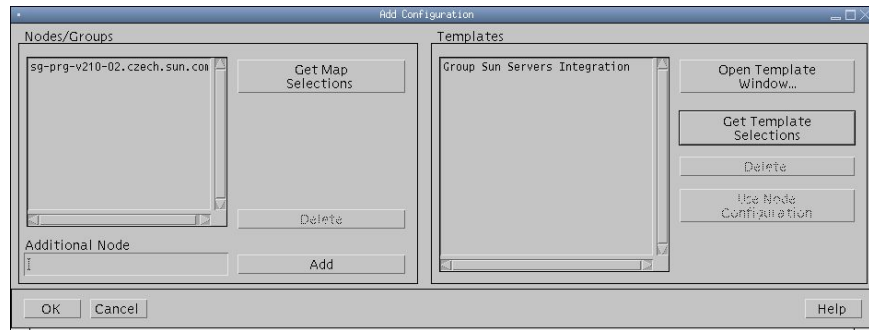
6. In the OVO Node Bank window, choose **Window – Message Source Templates** to open the Message Source Templates window.



7. Click the template group item named **Sun Servers Integration**.



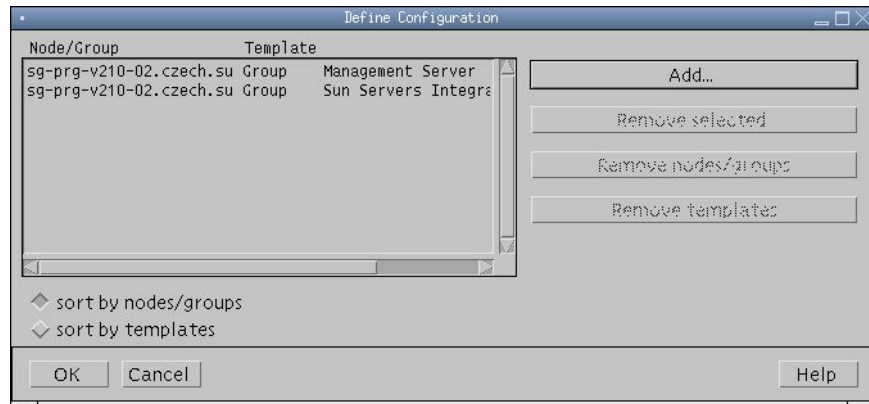
8. In the Add Configuration window, click the **Get Template Selections** button to add the Sun Servers Integration to the Templates configuration.



HP OVO for UNIX should display the template group named Group Sun Servers Integration in the Templates listing.

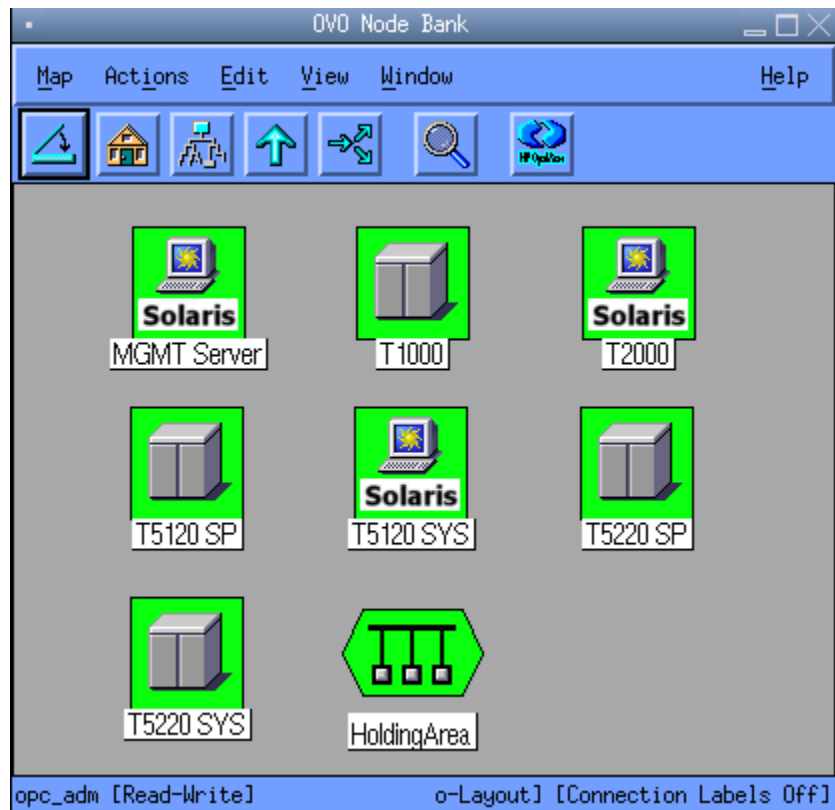
**9. Click OK to close the Add Configuration window.**

The new template configuration for Hardware Management Agent should appear in the Template list of the Define Configuration window.



**10. Click OK to close the Define Configuration window.**

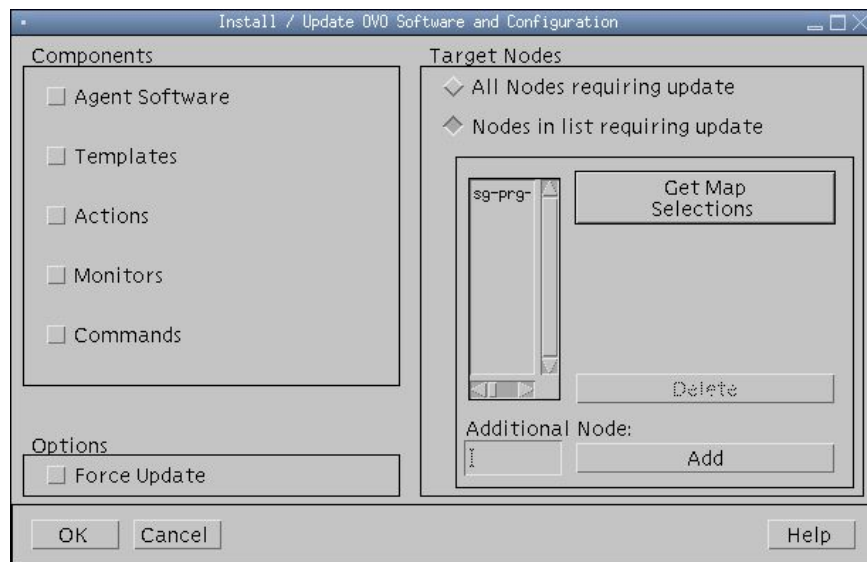
**11. Verify that the name of the HP OVO for UNIX management server node is still selected in the OVO Node Bank window.**



If the management server is not still selected, select it.

### 12. Choose Actions – Agents - Install / Update SW & Config ... .

HP OVO for UNIX displays the Install / Update OVO Software and Configuration window.



### 13. Check the Templates checkbox and click OK.

If the distribution is successful, you receive the following message in the OVO message browser.



The following configuration information was successfully distributed: Template (Opc30-814).

Once you have distributed the Sun-specific templates to the HP OVO for UNIX management server, you must add each managed Sun device (server/OS or service processor) to the OVO node bank. For detailed information about adding devices to an OVO node bank, consult your HP OVO for UNIX administrator's documentation.

---

## Configuring HP OVO for UNIX to Monitor Sun Servers Without Installed HP OVO for UNIX Agents

To monitor Sun service processors and supported servers, you do not need to install and configure an HP OVO for UNIX agent on each node. Service processors, moreover, do not support the installation of agents. Use this procedure to enable HP OVO for UNIX to receive messages from these agentless nodes (server/OS or SP).

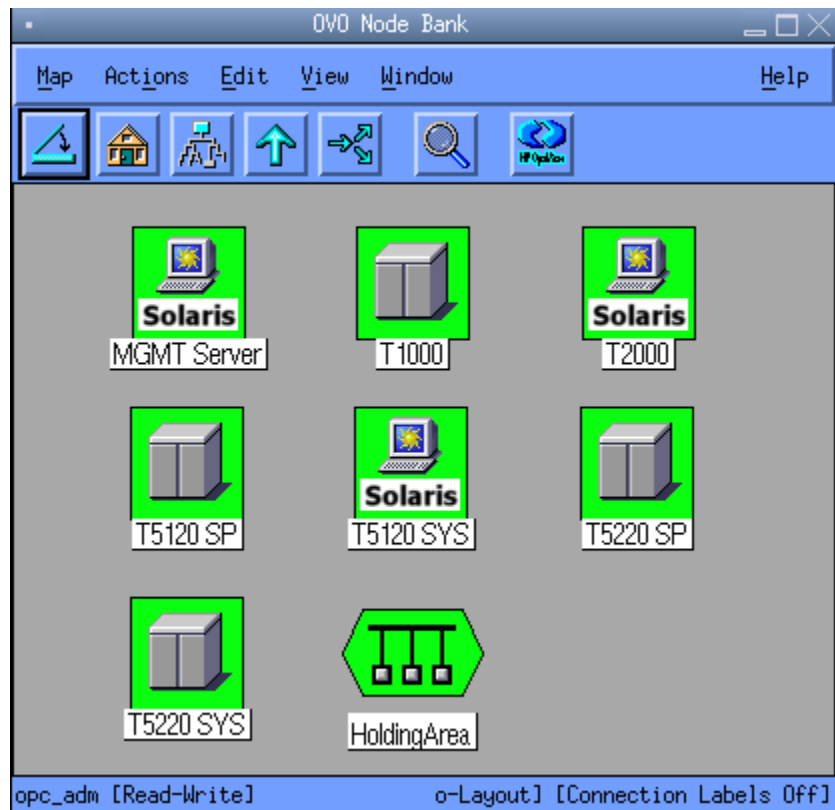
Sun Device	OVO Node
Server (operating system)	
ILOM service processor	

To configure nodes to be agentless, do the following.

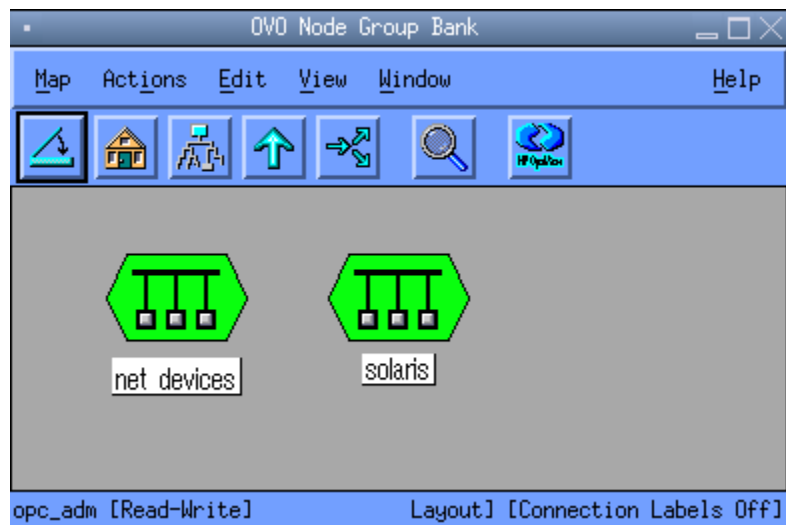
1. **Launch the OVO Administrator GUI.**
2. **Choose Window – Node Bank to open the OVO Node Bank window.**

In the following example, the node that we want HP OVO for UNIX to manage without an agent is a Sun SPARC Enterprise T1000 server (OS node).

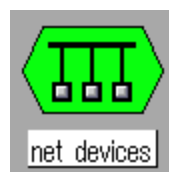




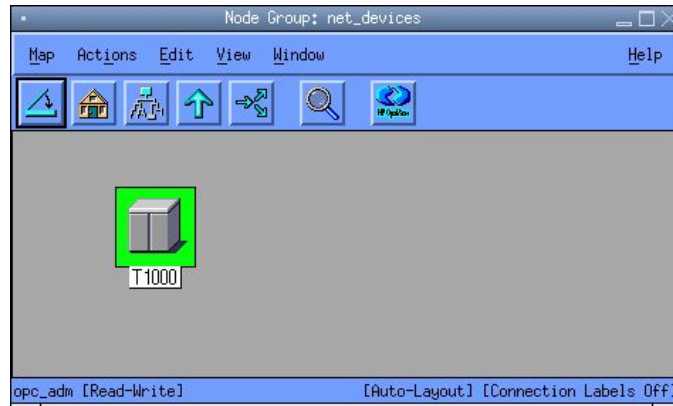
3. Choose Window - Node Group Bank to open the OVO Node Group Bank window.



4. Double-click the net\_devices icon to open the Node Group: net\_devices window.



5. **Drag and drop the node that you want to manage without an HP OVO for UNIX agent from the OVO Node Bank window to the Node Group: net\_devices window.**



The new node should belong into the net\_devices node group from now.

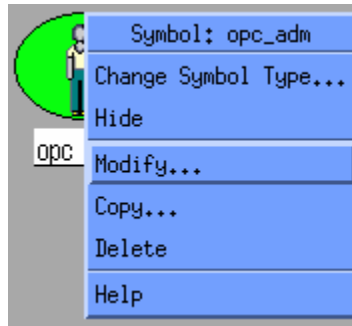
In order to display messages corresponding to the SNMP traps produced by the Hardware Management Agent on such node, add the responsibility for the SNMP Message group for the net\_devices Node group to all users that are supposed to manage these nodes.

**Note:** At least OVO Administrator (opc\_adm) and OVO Operator (opc\_op) should be able to monitor these nodes.

6. **From the OVO Administrator GUI, choose Window – User Bank to open the OVO User Bank window.**

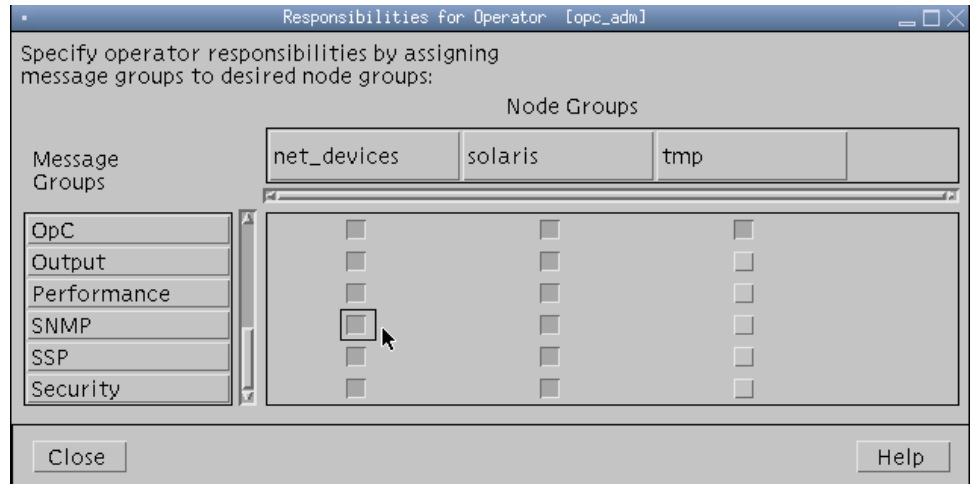


7. **Right-click the opc\_adm user icon.**



8. Choose **Modify ...** to display the **Modify User: opc\_adm** window.

9. Click the **Responsibilities ...** button and verify that the checkbox on the intersection of the **SNMP Message Group** row and **net\_devices Node Group** column.



**10. Click the Close button.**

**11. Click the OK button in the Modify User window.**

In order to allow the default HP OVO for UNIX operator (opc\_op) to view the messages triggered by intercepting SNMP traps sent by the Hardware Management Agent from the agentless nodes, you must perform the previous steps for that user (opc\_op) as well.

**12. Repeat the previous five steps for the opc\_op user.**

## Configuring HP OVO for UNIX to Monitor Sun Servers With Installed HP OVO for UNIX Agents

It is not necessary to install an HP OVO for UNIX agent on each managed node. If you do choose to install and configure the HTTPS or DCE Agents on each node, you must perform steps on both the managed node and on the HP OVO for UNIX management server.

For Sun servers that you choose to manage at the operating system level with HP OVO for UNIX agents, follow this procedure to be able to receive messages from these nodes. For SPARC/ILOM servers such as the Sun SPARC Enterprise T5x20, you cannot install HP OVO for UNIX agents on those service processors and should not add those ILOM service processor devices to the OVO Node Bank as OS devices.

**1. Launch the HP OVO for UNIX Administrator GUI.**

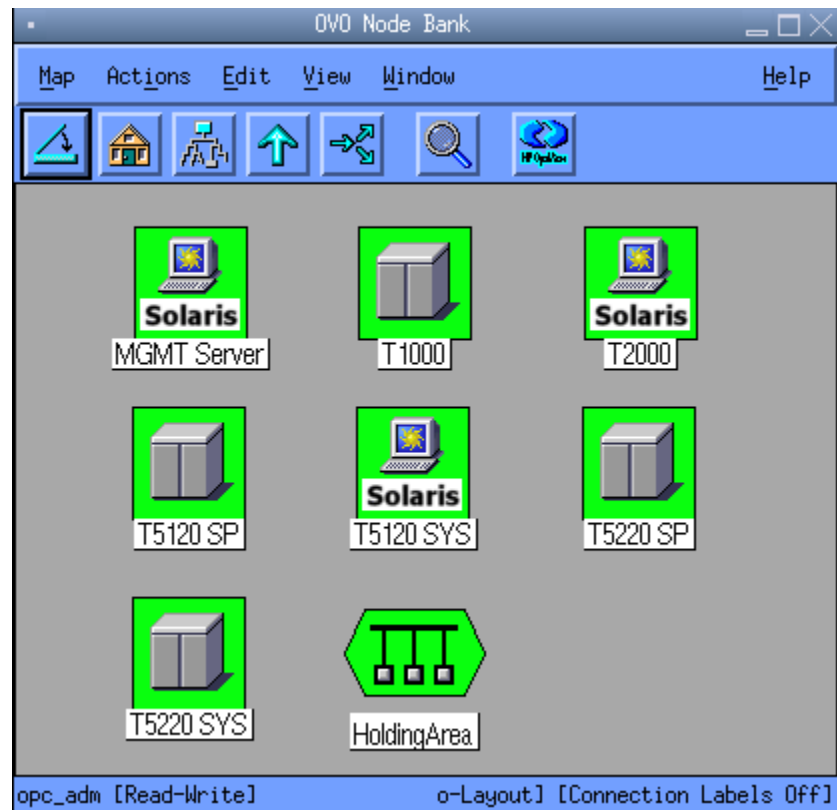
**2. Install and configure the HTTPS or DCE Agent on each node.**

Consult the following HP documentation for installation and configuration details:

- *HP OpenView Operations DCE Agent Concepts and Configuration Guide*
- *HP OpenView Operations HTTPS Agent Concepts and Configuration Guide*

3. From the OVO Administrator GUI, choose **Window – Node Bank** to open the OVO Node Bank window.

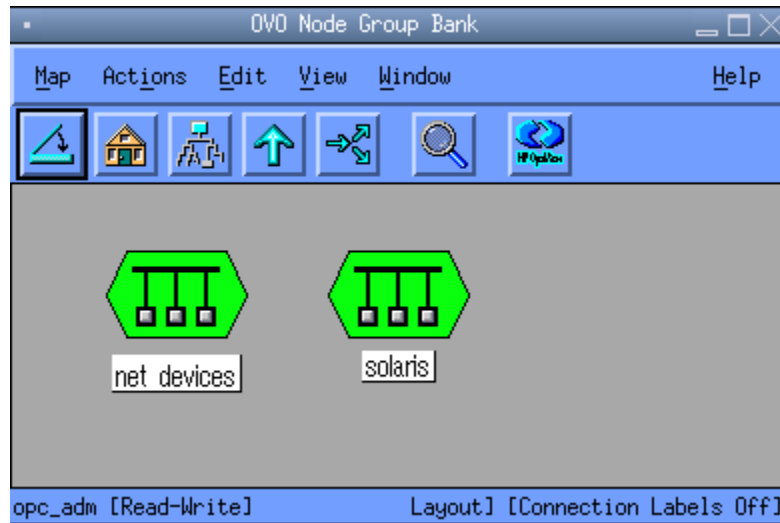
In the following example, the node that we want to configure to be managed by the OVO agent is a Sun SPARC Enterprise T2000 server.



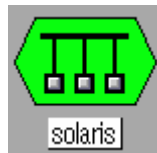
4. Click the name of the node that you want to be managed by an OVO agent.



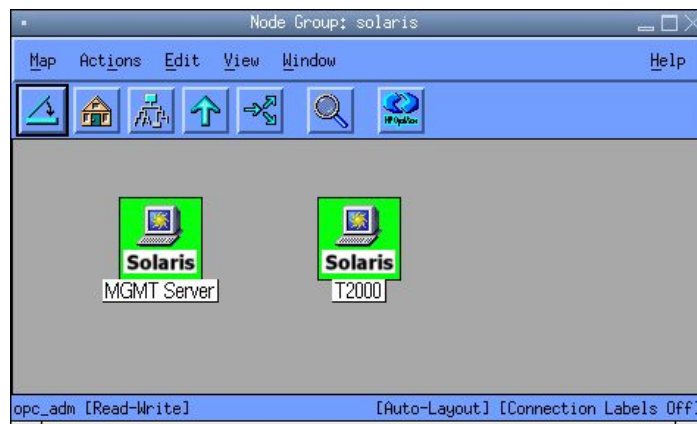
5. Choose **Window – Node Group Bank** to open the OVO Node Group Bank window.



6. Double-click the solaris icon to open the Node Group:solaris window.



7. Drag and drop the node that you want to manage with an OVO agent from the OVO Node Bank window into the Node Group:solaris window.



**Note:** Both the OVO Administrator (opc\_admin) and OVO Operator (opc\_op) users have permissions to collect events of the solaris node group through SNMP by default.

8. Click OK to confirm changes.

All the SNMP traps sent from the Hardware Management Agent should appear in proper message browser window. As all SNMP traps are sent directly to the management server, no configuration needs to be propagated to the managed nodes.

---

## Verifying Successful Configuration for HP OVO for UNIX

To the extent that the Sun Integration Pack employs a variety of system management technologies to monitor different types of Sun servers, there is no one procedure that exercises every interface on each monitored system in order to verify that the entire integration has been installed and configured properly. If you are physically located with your monitored systems, you could always manually remove and re-insert a non-critical component on one Sun server after another. See the topic “Verifying Configuration Manually” below for more information on manual verification. This manual procedure becomes impractical at large installations and impossible at remote locations. Performing remote verification is more convenient, but requires different procedures for OS-level or SP-level integrations and for different types of Sun servers (x64 or SPARC).

To determine which remote procedures are appropriate for your test plan and for the types of Sun servers supported by your management application, consult the following table.

CPU Type	SP Type	OS-level Procedure(s)	SP-level Procedure(s)
x64	ILOM	Not supported	See “Verifying Configuration Remotely Using IPMItool”
	Embedded LOM	Not supported	See “Verifying Configuration Remotely Using IPMItool”
SPARC	ILOM	See “Verifying Configuration Remotely Using <code>psradm</code> ”	See “Verifying Configuration Remotely Using IPMItool”
	ALOM	See “Verifying Configuration Remotely Using ALOM”	Not supported

The following sections describe how to perform each of these procedures.

### Verifying Configuration Manually

If you are located physically near one or more of your Sun servers, you can always verify configuration by generating a physical event. The most reliable way to accomplish this is to remove and re-insert a non-critical component.

To test your configuration manually, do the following:

- 1. Locate the Sun server or blade module in your data center.**
- 2. Identify a component on that system that is non-critical and hot-pluggable (for example, a redundant power supply or fan tray).**

**Note:** Be certain that removal and re-insertion of this component will not affect the normal and routine operation of the server. Verify that the redundant component is, in fact, not critical to the current state of the system.

- 3. Remove that non-critical component.**

**Note:** Be certain to follow all required software and firmware procedures required for the safe removal of any hot-pluggable component. Consult the Sun manual or online information system that ships with your Sun server for specific procedures related to removing that hot-pluggable component.

4. **After an appropriate amount of time, re-insert the non-critical component.**
5. **In the message or event console of your management package, verify that removing/re-inserting the non-critical component has generated one or more traps with the appropriate event summary and severity.**

If you do not see these traps in the console, review this manual for required configuration steps or consult the Troubleshooting section of this manual.

### **Verifying Configuration Remotely Using ALOM**

To verify that a remote ALOM-based SPARC Solaris system is configured correctly, do the following:

1. **Identify the name and/or IP address of the ALOM-based SPARC Solaris server that you want to test.**
2. **Log in to the ALOM CMT command shell on that remote system via an Ethernet or serial connection.**
3. **Enter the following command to determine the current state of the system locator LED.**

```
sc> showlocator
```

ALOM returns one of the following messages:

- Locator led is ON
- Locator led is OFF

The following example assumes that the locator LED is currently OFF.

4. **Enter the following command to turn the locator LED on.**
- ```
sc> setlocator on
```
5. **In the message or event console of your management package, verify that it has received an event from ALOM indicating that the locator LED is on.**
  6. **Enter the following command to restore the locator LED to off.**
- ```
sc> setlocator off
```
7. **(Optional) In the message or event console of your management package, verify that it has received an event from ALOM indicating that the locator LED is off.**

If you do not see these messages in the console, review this manual for required configuration steps or consult the Troubleshooting section of this manual.

### **Verifying Configuration Remotely Using IPMITool**

Recent Sun servers support either an Integrated Lights Out Manager (ILOM) service processor or an Embedded LOM service processor. You can communicate with these ILOM and Embedded LOM service processors via their IPMI interfaces to have them generate non-critical, simulated events. If HP OVO for UNIX receives these



non-critical, simulated events from ILOM or from Embedded LOM, it is configured properly for actual events.

IPMITool is an open-source utility for managing and configuring devices that support the Intelligent Platform Management Interface (IPMI) version 1.5 and version 2.0 specifications. Versions of IPMITool are available for the Solaris, Linux, and Windows operating systems.

Operating System	IPMITool Distribution(s)
Solaris	<a href="http://ipmitool.sourceforge.net/">http://ipmitool.sourceforge.net/</a> Many software resource CDs distributed with Sun servers.
Linux	<a href="http://ipmitool.sourceforge.net/">http://ipmitool.sourceforge.net/</a> Many software resource CDs distributed with Sun servers.
Windows	<a href="http://www.sun.com/systemmanagement/tools.jsp">http://www.sun.com/systemmanagement/tools.jsp</a> Many software resource CDs distributed with Sun servers.

To verify that your management program is configured to receive traps from a supported service processor, do the following:

1. **Collect the following information about the remote service processor that you want to test.**

Field	Description
<SPname>	The name or IP address of the service processor Example: 192.168.1.1
<SPadminname>	The administrator login name for the service processor Example: root
<SPadminpassword>	The administrator password for the service processor Example: changeme

2. **Open a command shell on the system that has IPMITool installed.**
3. **Enter the following IPMITool command to generate a list of all available sensors on that remote Sun server.**

```
# ipmitool -U <SPadminname> -P <SPadminpassword> \
-H <SPname> -v sdr list
```

For example, to get the list of available sensors on a Sun SPARC Enterprise T5120 server at IP address 192.168.1.1 with ILOM SP login/password root/changeme, you would enter the following command:

```
# ipmitool -U root -P changeme -H 192.168.1.1 -v sdr list
```

4. **In the output from IPMITool, identify the Sensor ID name of a sensor that has at least one entry in the Assertions Enabled or Deassertions Enabled fields.**

In the following example, IPMITool returns the following information about the sensor named /MB/T\_AMB.

```
Sensor ID           : /MB/T_AMB (0x9)
Entity ID           : 7.0 (System Board)
Sensor Type (Analog) : Temperature
. . .
Upper critical       : 55.000
. . .
Assertions Enabled   : lnc- lcr- lnr- unc+ ucr+ unr+
Deassertions Enabled : lnc- lcr- lnr- unc+ ucr+ unr+
```

This sensor monitors ambient temperature on the motherboard of servers.

**Note:** Exercise caution in choosing a sensor to use for a simulated event. Simulating unrecoverably high or low temperature for some sensors may cause the server to shut down.

**5. Enter the following IPMI command to generate a simulated event**

```
# ipmitool -U <SPadminname> -P <SPadminpassword> \
-H <SPname> event <sensorname> <option>
```

For example, to generate a simulated event for exceeding the upper critical (ucr) ambient temperature on a Sun SPARC Enterprise T5120 server at IP address 192.168.1.1 with ILOM SP login/password root/changeme, you would enter the following command:

```
# ipmitool -U root -P changeme -H 192.168.1.1 \
event /MB/T_AMB ucr assert
```

In the command shell, IPMITool returns information like the following:

```
Finding sensor /MB/T_AMB ... ok
0 | Pre-Init Time-stamp | Temperature /MB/T_AMB | \
Upper Critical going high | Reading 56 > Threshold \
55 degrees C
```

**6. In the message or event console of your management package, verify that it has received an event from ILOM or from Embedded LOM relevant to the sensor that you specified in your IPMITool command.**

If you do not see these messages in the console, review this manual for required configuration steps or consult the Troubleshooting section of this manual.

**7. (Recommended) Clear the simulated event with the following syntax:**

```
# ipmitool -U <SPadminname> -P <SPadminpassword> \
-H <SPname> event <sensorname> <option>
```

To clear (deassert) the simulated event in the previous example, enter the following command:

```
# ipmitool -U root -P changeme -H 192.168.1.1 \
event /MB/T_AMB ucr deassert
```

If you do not see these messages in the console, review this manual for required configuration steps or consult the Troubleshooting section of this manual.

## Verifying Configuration Remotely Using psradm

The Solaris utility psradm(1M) performs configuration on multiprocessor CPUs. When you use psradm to disable or to re-enable a CPU core, it generates a trap that should appear in the HP OVO for UNIX event console. This procedure is appropriate if you are verifying configuration for a Sun SPARC Enterprise server supporting the ILOM service processor such as the SPARC Enterprise T5120 or T5220 server.

To use `psradm` to generate a trap for one of these supported systems, do the following:

1. **Identify the name and/or IP address of the server that you want to test.**
2. **Log in to that server as root or with administrator privileges.**
3. **Enter the following command to disable a specific CPU core on that remote server.**

```
# psradm -f <CPU_Core_ID>
```

where `<CPU_Core_ID>` is the ID for one CPUcore. For example, to disable core 0 on a Sun SPARC Enterprise T5120, you would enter the following command:

```
# psradm -f 0
```

The trap generated by the T5120 should appear in the HP OVO for UNIX event console in a format like the following:

```
CH/MB/CMP0/P0/CPU Device has been removed
```

4. **(Recommended) Enter the following command to re-enable that same CPU core on that remote server.**

```
# psradm -n <CPU_Core_ID>
```

If you do not see these messages in the console, review this manual for required configuration steps or consult the Troubleshooting section of this manual.

## Monitoring Sun Devices in HP OVO for UNIX

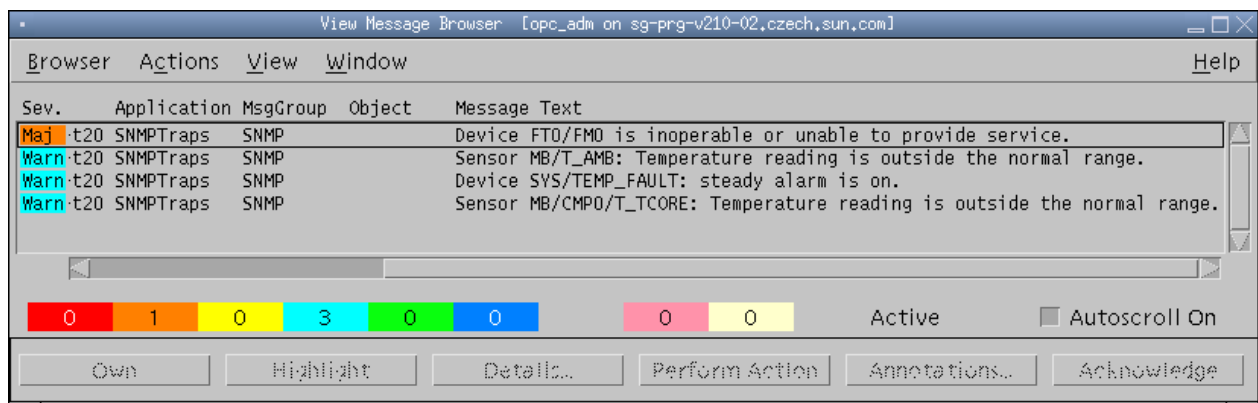
HP OVO for UNIX offers many useful views of the SNMP trap information that it receives from the Hardware Management Agent (operating system integration) and SUN-HW-TRAP-MIB (via the ILOM service processor).

This chapter contains the following sections:

- Browsing Messages Received From Sun Devices
- Interpreting Messages Received From Sun Devices

### Browsing Messages Received From Sun Devices

Once you have configured HP OVO for UNIX and HP OVO for UNIX trap templates to receive and interpret messages from the Hardware Management Agent or from the ILOM service processor, those messages appear in the HP OVO for UNIX Message Browser.



The Message Browser provides high-level information about each trap, for example its severity, node, template message group, and short text description. To examine individual messages in greater detail, you can drill down into a more detailed view in HP OVO for UNIX.

## Viewing Detailed Information In the HP OVO for UNIX Message Details Window

To view more detailed information about a particular message displayed in the HP OVO for UNIX Message Browser, select that message and click the Details ... button. HP OVO for UNIX displays a window with detailed information about the selected message.

The screenshot shows the 'Message Details' window with the following information:

- Node:** sg-prg-t1000-01.czech.sun.com
- Application:** \$SNMPTraps
- Message Group:** \$SNMP
- Object:** \$
- Source:** \$snmpTrap:Sun-MASF-AlarmEvents:sui
- Annotations:** \$0
- Attributes:** \$
- Message ID:** \$bd2f44e0-1997-71dc-1101-0a128d14f
- Forwarding Manager:** \$
- Severity:** Warning
- Service Name:** \$
- Message Key:** \$sunPlatEquipmentAlarm:sg-prg-t1000-01.czech.sun.com
- Message Type:** \$
- Time First Created on Managed Node:** 06/13/07 12:20:41
- Time First Received on Mgmt. Server:** 06/13/07 12:20:43
- Number of Duplicates:** 0
- Time Last Received on Mgmt. Server:** 06/13/07 12:20:43
- Owned by:** \$ at \$
- Message Text:** \$Sensor MB/V\_VMEM: Voltage reading is outside the normal range.
- Actions:**

	Status	Node	Command	Anno.	Ackn.
Automatic	\$	\$	\$	No	No
Operator Initiated	\$	\$	\$	No	No
Notification	\$				
Trouble Ticket	No				No
- Escalations:**

Escalated to	by	at
\$	\$	\$
- Buttons:** Show Original Message..., Own, Modify..., Close, Highlight, Annotations..., Acknowledge, Help

## Viewing Detailed Information in ALOM Log Files

If the Sun server that you are monitoring has an ALOM service processor and you have *not* enabled trap compatibility mode in the Hardware Management Agent configuration file (`snmpd.conf`), you can examine event messages as they appear in the ALOM service processor log file *before* the HP OVO for UNIX template classifies them in its Message Browser. To view these unclassified messages in ALOM, log in to the ALOM CMT and enter the following command:

```
sc> showlogs
```

The ALOM log file contains event messages similar in format and specificity to the following sample messages.

ALOM Message	Event Description
TEMP_SENSOR at MB/T has exceeded low warning threshold	The temperature sensor on the main board is reported that temperature is below the defined threshold.
Indicator SYS/SERVICE is now ON	The system indicator LED on the server is on.
SC Alert: PSU at PS0 has been inserted	The power supply PS0 has been inserted.
SC Alert: PSU at PS0 has been	The power supply PS0 has been

ALOM Message	Event Description
removed	removed.

## Interpreting Messages Received From Sun Devices

All messages displayed in the HP OVO for UNIX Message Browser are derived ultimately from one of two MIBs:

- `SUN-HW-TRAP-MIB.mib` (for monitoring based on service processors)
- `SUN-PLATFORM-MIB.txt` (for monitoring based on operating system services)

These MIBs and the HP OVO for UNIX trap templates further interpret, classify, and format SNMP traps before they are displayed in the HP OVO for UNIX Message Browser.

### Types of Event Information

Many messages derived from `SUN-HW-TRAP-MIB.mib` or the `SUN-PLATFORM-MIB.txt` focus on threshold-crossing events that occur on the managed node. When trap compatibility mode is enabled in the Hardware Management Agent configuration file (`snmpd.conf`), all messages have very specific textual information about device names and threshold events.

### SUN-PLATFORM-MIB Messages

If you have not enabled trap compatibility mode in the Hardware Management Agent configuration file (`snmpd.conf`), the ALOM log can provide information that supplements what the Hardware Management Agent is reporting.

Type	SNMP Message	Corresponding ALOM Message
Specific	Sensor MB/T_AMB: Temperature reading is outside the normal range.	TEMP_SENSOR at MB/T_AMB has exceeded high warning threshold.
General	<p>A device steady alarm is on. Check ALOM <code>showlogs</code> command or operating system logs for details.</p> <p><b>Note:</b> To eliminate these general messages from the Hardware Management Agent set the <code>SUNW_alwaysIncludeEntPhysName</code> parameter in the <code>snmpd.conf</code> file on the managed node to yes.</p>	Indicator SYS/SERVICE is now ON

The first, specific message indicates that the sensor named MB/T\_AMB is reporting that the ambient temperature of the main board has exceeded the acceptable threshold defined for the main board. The second, general message is produced by SNMP trap that doesn't contain the textual description. In case this event is coupled with sensor related event, it means that the System Service Required Indicator LED is on. This can be verified by logging on to the ALOM CLI of the managed node and running the following command:

```
sc> showlogs
```

General type messages always contain the phrase "Check ALOM showlogs command or operating system logs for details".

### SUN-HW-TRAP-MIB Messages

The following messages were produced by the Sun-ILOM-HWTraps SNMP Template when it interpreted traps sent to it by the ILOM 2.0 service processor which in turn is reporting traps from the SUN-HW-TRAP-MIB MIB.

View Message Browser [opc_adm on sg-prg-v210-02.czech.sun.com]			Help
Browser	Actions	View	Window
Sev.	Application	Message Text	
Norm	SNMPTraps	Voltage sensor /SYS/MB/V_+1V5CORE: Upper Critical going low	
Norm	SNMPTraps	Voltage sensor /SYS/MB/V_+1V5CORE: Reading returned within normal range	
Norm	SNMPTraps	Voltage sensor /SYS/MB/P1/V_VTT: Lower Critical going high	
Norm	SNMPTraps	Voltage sensor /SYS/MB/P1/V_VTT: Reading returned within normal range	
Norm	SNMPTraps	Temperature sensor /SYS/MB/P1/T_CORE: Upper Non-recoverable going low	
Norm	SNMPTraps	Temperature sensor /SYS/MB/P1/T_CORE: Upper Critical going low	
Norm	SNMPTraps	A hard drive sensor /SYS/SASBP/HDD3_FAULT has returned to its normal state	
Norm	SNMPTraps	Voltage sensor /SYS/MB/V_+3V3STBY: Upper Non-recoverable going low	
Norm	SNMPTraps	Voltage sensor /SYS/MB/V_+3V3STBY: Upper Critical going low	
Norm	SNMPTraps	Voltage sensor /SYS/MB/V_+3V3STBY: Reading returned within normal range	
Maj	SNMPTraps	A fan sensor /SYS/FT0/FM0_FAULT has detected an error.	
Warn	SNMPTraps	An intrusion sensor has detected that someone may have physically tampered wi	
Norm	SNMPTraps	A power supply sensor /SYS/PS1/PWROK has returned to its normal state.	

0	34	0	2	225	0	0	0
---	----	---	---	-----	---	---	---

## Troubleshooting

---

This chapter provides a guide how to diagnose common issues and specific problems that may arise while using the Sun Integration Pack. The chapter contains the following sections:

- Agentless Nodes Do Not Appear in the Operator's Node Bank
  - No Messages Appear From the Nodes Running the Hardware Management Agent
  - HP OVO for UNIX Displays Raw SNMP Traps From Sun Servers Running the Hardware Management Agent Instead of Translated Messages
- 

### Agentless Nodes Do Not Appear in the Operator's Node Bank

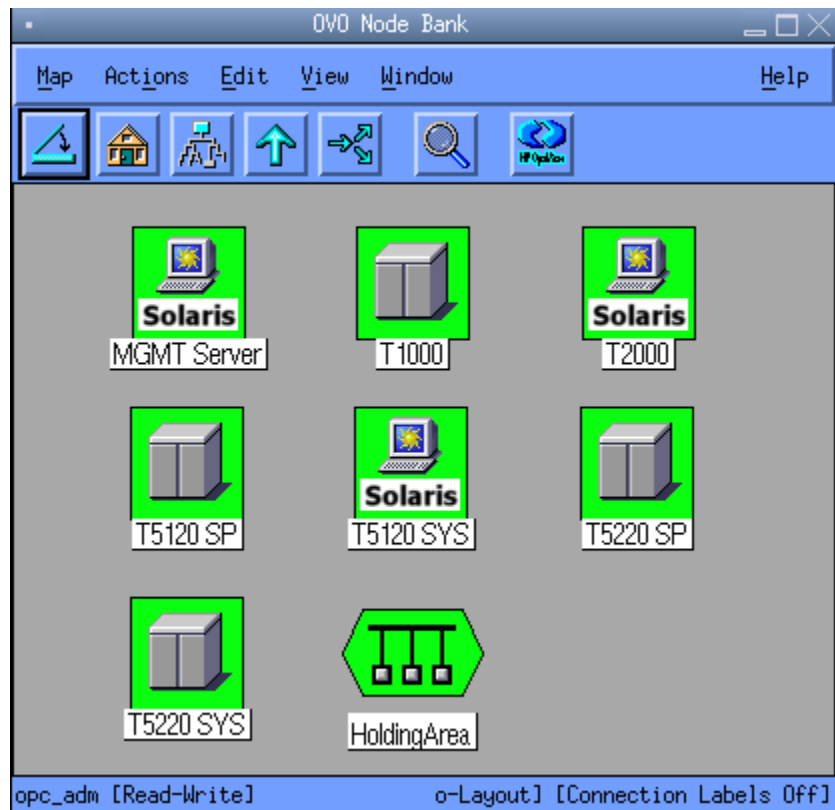
For an HP OVO for UNIX operator or other user to receive messages from agentless nodes (servers/OS or service processors), two prerequisites must be met:

- The agentless nodes must be assigned to a node group. The node group "net\_devices" was used for ILOM 2.x service processors and OVO agentless nodes running the Hardware Management Agent, however some other node group could be used depending on the current management infrastructure.
- The HP OVO for UNIX operator or other user should be able to receive SNMP events from that node group. This can be set within the responsibility matrix as described in "Configuring HP OVO for UNIX to Monitor Sun Servers Without HP OVO for UNIX Agents".

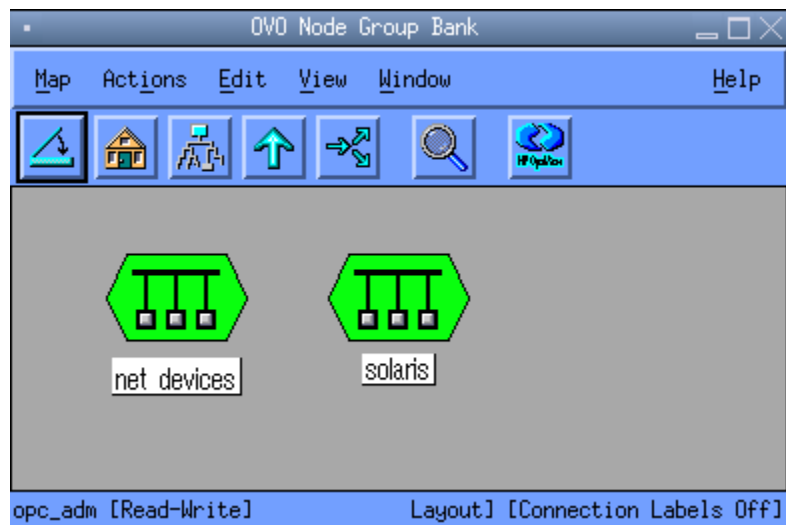
To verify that all necessary configuration options are set correctly, perform the following tasks:

- 1. Launch the OVO Administrator GUI.**
- 2. Choose Window – Node Bank to open the OVO Node Bank window.**

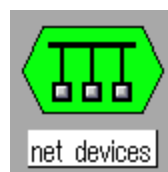




3. Choose Window - Node Group Bank to open the OVO Node Group Bank window.

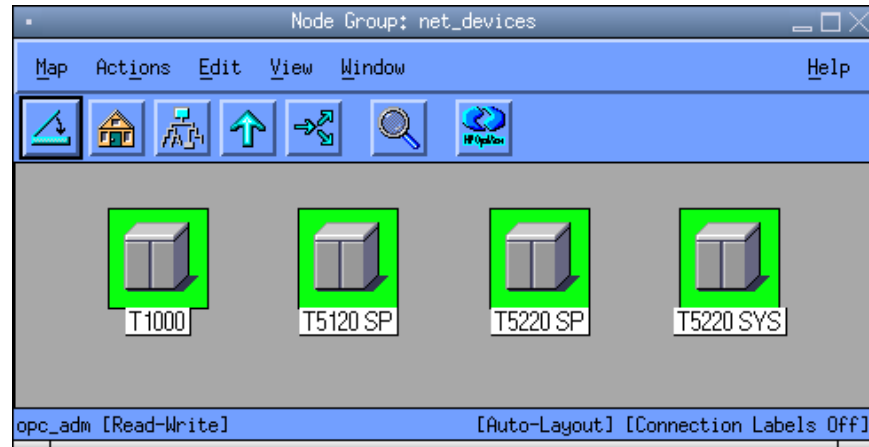


4. Double-click the net\_devices icon to open the Node Group: net\_devices window.



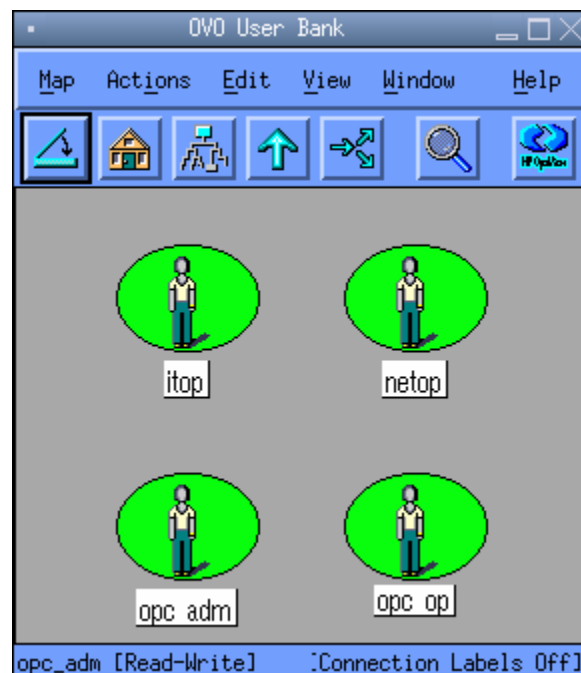
5. **Verify that the agentless node that does not appear in the OVO Operator's Node Bank is present in this window.**

If not, open the OVO Node Bank window by selecting Window - Node Bank from the main menu and by dragging and dropping the node from the OVO Node Bank window into the Node Group:net\_devices window.

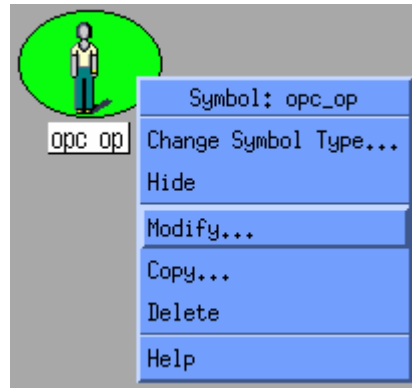


If the node is already present in the net\_devices node group, verify that the HP OVO for UNIX operator can monitor SNMP messages from the net\_devices node group.

6. **From the OVO Administrator GUI, choose Window – User Bank to open the OVO User Bank window.**



7. **Right-click the opc\_op icon.**



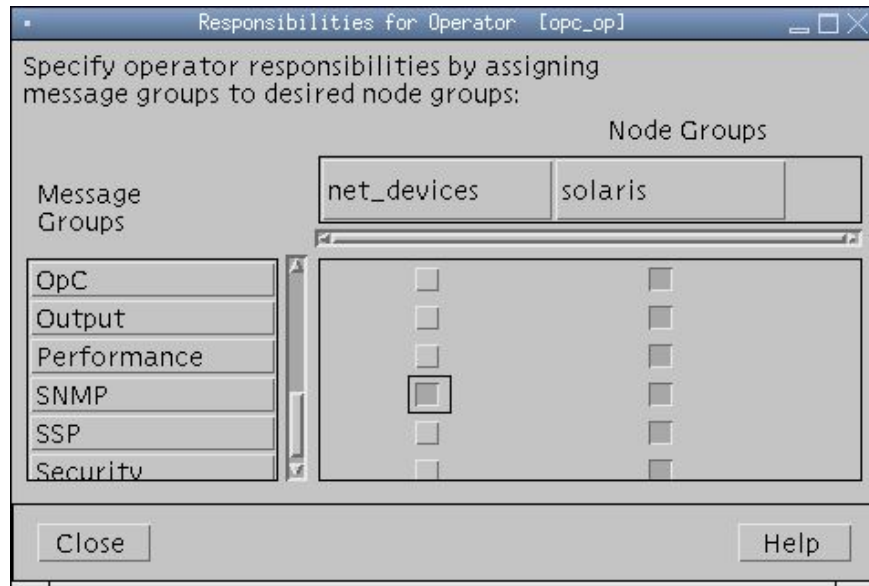
8. Click the **Modify ...** button to display the **Modify User: opc\_op** window.

**Modify User: opc\_op**

Name	Label
opc_op	opc_op
Password	Real Name
*****	JOVO Default Operator
Description	
JOVO Default Operator	
<input type="checkbox"/> Template Administrator <input type="checkbox"/> Operator	
<b>Capabilities</b>	
<input type="checkbox"/> Perform/Stop Actions <input type="checkbox"/> Own/Disown Messages <input type="checkbox"/> Modify Message Attributes <input type="checkbox"/> (Un-)Acknowledge Messages	
<b>Configuration</b>	
Node Hierarchy NodeBank      Get Map Selection	
Responsibilities...      Applications...      Profiles...	
Use Configuration of Selected User	
OK      Cancel      Help	

9. Click the **Responsibilities ...** button.

Verify that the checkbox on the intersection of the SNMP Message Group row and net\_devices Node Group column is checked.



If it is not checked, check it.

10. Click **OK** to submit changes.

---

## No Messages Appear From the Nodes Running the Hardware Management Agent

If HP OVO for UNIX receives no messages from a supported Sun server that is running the Hardware Management Agent, there are four possible causes.

### Hardware Management Agent Configuration on Managed Nodes

For HP OVO for UNIX to receive traps from supported servers using the Hardware Management Agent, that agent must be installed and configured properly on that managed node.

To verify that the Hardware Management Agent is configured properly on your supported Sun servers, do the following:

1. Log in to the HP OVO for UNIX management server as root.
2. Enter the following command to snoop for incoming SNMP traps sent by the Hardware Management Agent:

```
# snoop udp 162 from <managed_node>
```

where *<managed\_node>* is the Sun server that you are testing.

3. Log in to the ALOM service processor of the Sun SPARC Enterprise T1000/T2000 Server that you are testing.

**Note:** Some Sun SPARC Enterprise servers such as the T5120 and T5220 support the ILOM service processor instead of the ALOM service processor. ALOM-specific procedures will not work on these systems.

4. **Enter the following ALOM CMT commands to force the Hardware Management Agent to send an SNMP trap to the HP OVO for UNIX server.**

```
sc> setlocator on
```

Wait approximately 30 seconds.

```
sc> setlocator off
```

These ALOM CMT commands turn the server's locator LED on and off. You may also choose to skip the previous step and press the server's locator button manually.

In case some UDP packets are snooped, the Hardware Management Agent is configured properly. If not, consult the "Configuring the Hardware Management Agent on Sun Servers" section of this document.

### **The HP OV ovtrapd Daemon**

To verify that the HP OV ovtrapd daemon is running in the OVO management server, perform the following steps

1. **Log in to the HP OVO for UNIX management server as root.**
2. **Enter the following command to determine whether the ovtrapd daemon is running:**

```
# /opt/OV/bin/ovstatus -c ovtrapd
```

Verify that ovtrapd appears as running process in the generated output.

Name	PID	State	Last Message(s)
ovtrapd	12345	RUNNING	Initialization Complete

If the ovtrapd daemon is not running, proceed to the next step.

3. **Enter the following command to start the ovtrapd daemon:**

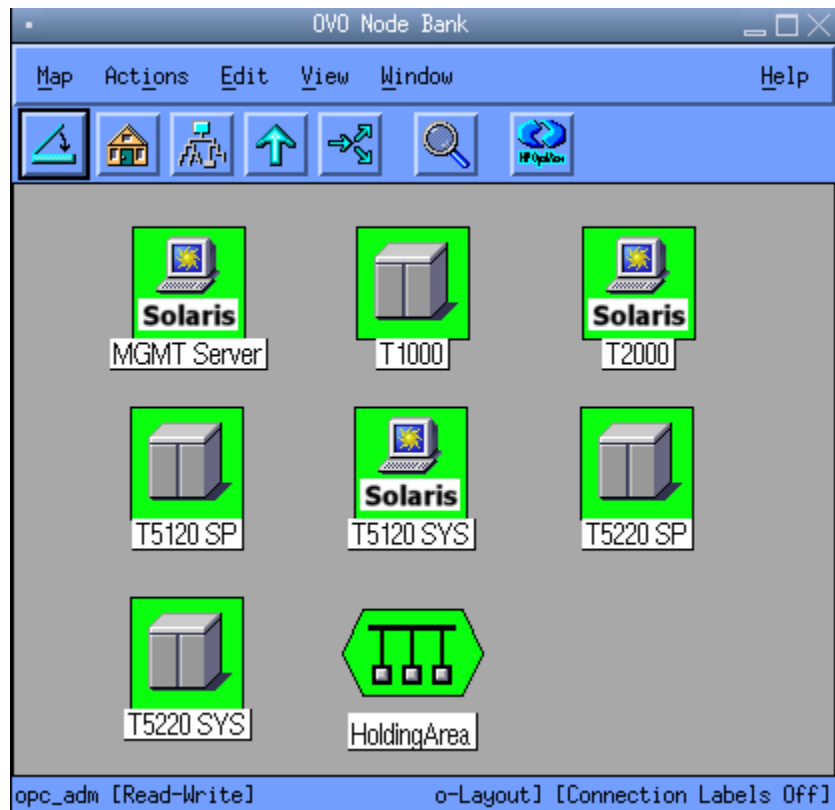
```
# /opt/OV/bin/ovstart -c ovtrapd
```

### **Sun Servers in the HP OVO for UNIX Management Server Node Bank**

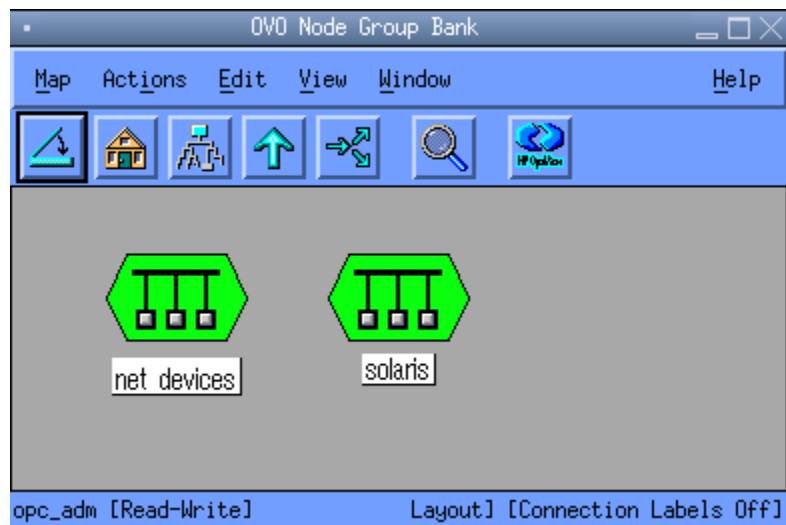
For HP OVO for UNIX to receive traps from a managed server, the name of that server must be in the HP OVO for UNIX management server Node Bank.

To verify that the supported Sun servers that you are testing has been added to the Node Bank, do the following:

1. **Launch the OVO Administrator GUI.**
2. **Choose Window – Node Bank to open the OVO Node Bank window.**



3. Choose Window - Node Group Bank to open the OVO Node Group Bank window.



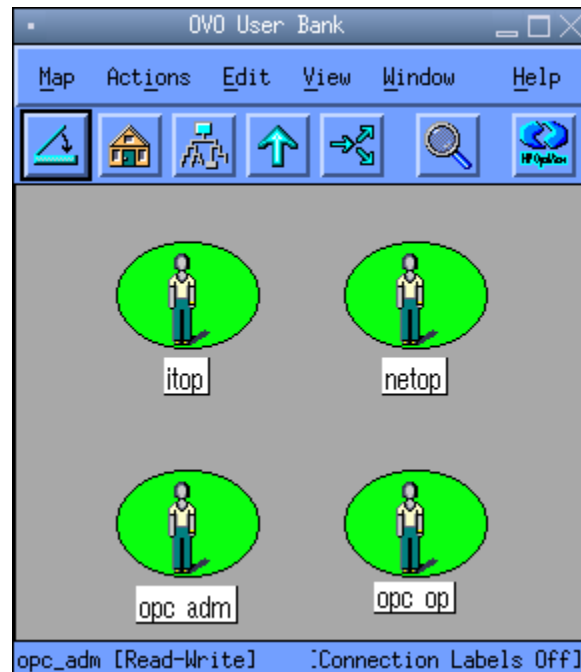
- If the node is already present in the correct node group, verify that the HP OVO for UNIX operator can monitor SNMP messages from this node group.
- If the server is running with an HP OVO for UNIX agent, double-click the solaris icon to open the Node Group:solaris window. Verify that the managed server is present in this node group.

- If the server is running agentless, double-click the net\_devices icon to open the Node Group:net\_devices window. Verify that the managed server is present in this node group.

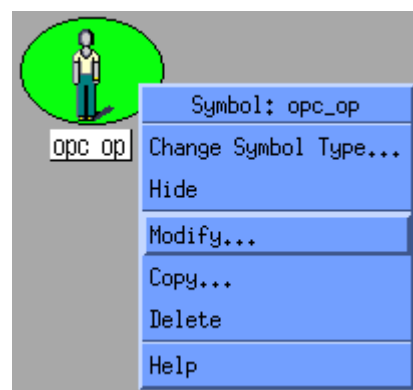
### HP OVO for UNIX User Privileges for opc\_adm and opc\_op users

It is also possible that HP OVO for UNIX is receiving traps from a managed server, but the privileges for the opc\_adm and opc\_op users are insufficient to view them. To verify permission for these users, do the following:

1. **Launch the OVO Administrator GUI.**
2. **Choose Window – User Bank to open the OVO User Bank window.**



3. **Right-click the opc\_op icon.**



4. **Click the Modify ... button to display the Modify User: opc\_op window.**

**5. Click the Responsibilities ... button.**

Verify that the checkbox on the intersection of the SNMP Message Group row and net\_devices Node Group column is checked.

Message Groups	net_devices	solaris	tmp
OpC	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Output	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Performance	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SNMP	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SSP	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Security	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

- If the server is running with an HP OVO for UNIX agent, verify that the checkbox on the intersection of the SNMP Message Group row and solaris Node Group column is checked.
- If the server is running agentless, verify that the checkbox on the intersection of the SNMP Message Group row and net\_devices Node Group column is checked.

**6. Repeat the previous three steps for the op\_adm user.**

You might also need to restart the OVO session. Choose Map - Restart Session from the main menu to perform this action.



---

# HP OVO for UNIX Displays Raw SNMP Traps From Sun Servers Running the Hardware Management Agent Instead of Translated Messages

When raw SNMP traps (i.e., SNMP traps unmatched by any of the OVO SNMP trap template) appears in the managed server's message browser, trap templates provided by the Integration package were not distributed correctly on the OVO Management Server.

To verify that the integration package was installed and configured correctly, do the following:

1. **Log in to the OVO Management Server as root.**
2. **Enter the following command in a terminal window.**  

```
# swlist SPI-SUNSI-OVO
```
3. **Verify the output from this command confirms the presence of the Sun Integration Pack was installed.**

The following sample output reflects a successful installation.

```
-----
# Initializing...
# Contacting target "<mgmt_server>"...
#
# Target:  <mgmt_server>:/
#

# SPI-SUNSI-OVO  1.01.01 HP OVO SPI for Sun Microsystems\
# servers monitoring

SPI-SUNSI-OVO.SPI-SUNSI-SRV

SPI-SUNSI-OVO.SUN-SNMP-MIBS
-----
```

When verified that the integration package is installed correctly, check that all SNMP trap templates are present in OVO.

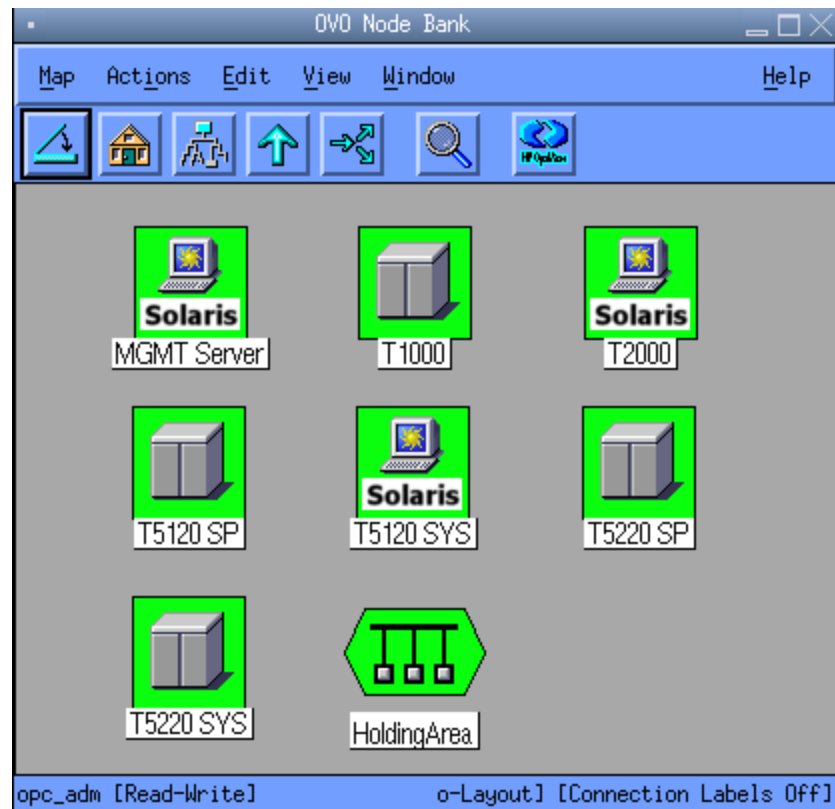
4. **Launch the HP OVO for UNIX Administrator GUI.**
5. **Choose Window - Message Source Templates to display the Message Source Templates window.**
6. **Verify that the following SNMP trap templates and groups are present.**

```
Sun Servers Integration
-> Sun ILOM Service Processor
-> Sun SNMP MASF Agent
```

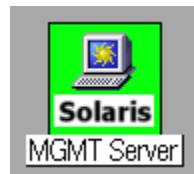
If not, uninstall and install the integration again.

If these templates are listed in the Message Source Templates window, verify that the Sun Servers Integration templates are distributed on the OVO management server.

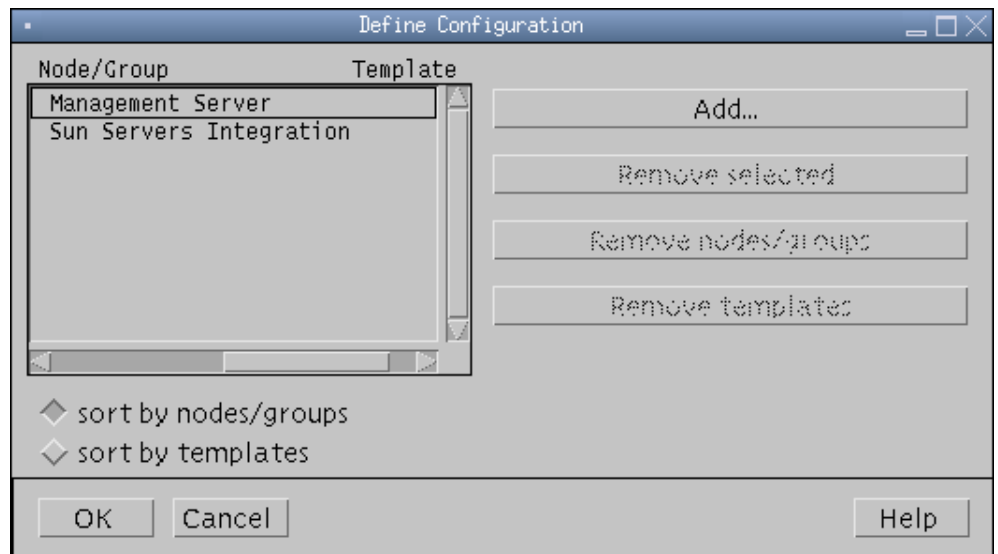
7. Launch the OVO Administrator GUI.
8. From the OVO Administrator GUI, choose **Window – Node Bank** to open the OVO Node Bank window.



9. Click the HP OVO for UNIX management server icon to select it.



10. Choose **Actions – Agents – Assign Templates ...** to display the Define Configuration window.



If the Sun Servers Integration template group is not assigned to the HP OVO for UNIX management server, distribute the templates using the procedure in “Configuring the Sun Integration Pack on HP OVO for UNIX.”

**11. Click OK.**

# Sample Hardware Management Agent Configuration File

---

This appendix provides a sample Hardware Management Agent configuration file for managed nodes. The configuration file is  
 /etc/opt/SUNWmasf/conf/snmpd.conf.

```
#####
# snmpd.conf
#####
# SECTION: Access Control Setup
#   This section defines who is allowed to talk to your running snmp agent.

# rwcommunity: a SNMPv1/SNMPv2c read-write access community name
#   arguments:  community [default|hostname|network/bits] [oid]
rocommunity public
#####
# SECTION: Agent Operating Mode
#   This section defines how the agent will operate when it is running.

# agentaddress: The IP address and port number that the agent will listen on.

#   This allows you to specify which address, interface, transport type
#   and port(s) that you want the agent to listen on. Multiple definitions
#   of this token are concatenated together (using ':'s).
#   arguments: port[@interface/address],...
agentaddress 9000

# agentuser: The user the agent should run as after it has opened the port.
agentuser daemon

# agentgroup: The group the agent should run as after it has opened the port.
agentgroup daemon
#####
# SECTION: Trap Destinations
#   Here we define who the agent will send traps to.

# trapsink: A SNMPv1 trap receiver
#   arguments: host [community] [portnum]
# trapsink machinename
# trap2sink: A SNMPv2 trap receiver
```

```

# arguments: host [community] [portnum]
trap2sink mgmtserver.mydomain.com

#####

# SECTION: Trap compatibility mode (Sun Microsystems RFE 6529451)
# Here we define if the agent will send MASF traps in old style mode
# for compatibility or in new style mode (which includes the varbind
# 'sunPlatNotificationAdditionalText' in all traps in the Sun Platform MIB.

# To maintain compatibility with releases snmp/masf 1.5.1 and earlier,
# leave this entry commented-out. To force the inclusion of this varbind
# in the snmp/masf traps, uncomment this line and this varbind will contain
# 'NAC names' which are object name paths (in ascii) that represent
# the object (entity) that is the cause of the trap event.

SUNW_alwaysIncludeEntPhysName yes

# (end of snmpd.conf for snmp/masf)

```

## Installed Directories and Files

---

The Sun Servers Integration 1.1 for HP OpenView Operations for UNIX installs the following directories and files on your HP OVO for UNIX management server.

```
/var/opt/OV/share/tmp/OpC_appl/sunsispi
/var/opt/OV/share/tmp/OpC_appl/sunsispi/SPI-SUNSI-SRV
/var/opt/OV/share/tmp/OpC_appl/sunsispi/SPI-SUNSI-SRV/C
/var/opt/OV/share/tmp/OpC_appl/sunsispi/SPI-SUNSI-SRV/C/SUNSI-SRV.idx
/var/opt/OV/share/tmp/OpC_appl/sunsispi/SPI-SUNSI-SRV/C/TEMPLATES
/var/opt/OV/share/tmp/OpC_appl/sunsispi/SPI-SUNSI-SRV/C/TEMPLATES/TEMPLGROUP
/var/opt/OV/share/tmp/OpC_appl/sunsispi/SPI-SUNSI-SRV/C/TEMPLATES/TEMPLGROUP/\
templgroup.dat
/var/opt/OV/share/tmp/OpC_appl/sunsispi/SPI-SUNSI-SRV/C/TEMPLATES/TRAP/
/var/opt/OV/share/tmp/OpC_appl/sunsispi/SPI-SUNSI-SRV/C/TEMPLATES/TRAP/trap.dat
/var/opt/OV/share/snmp_mibs/Vendor/Sun
/var/opt/OV/share/snmp_mibs/Vendor/Sun/SUN-PLATFORM-MIB.txt
/var/opt/OV/share/snmp_mibs/Vendor/Sun/SUN-HW-TRAP-MIB.mib
```

## Sample swinstall Output

---

This appendix contains sample output from the `swinstall` utility when it installs the Sun Servers Integration 1.1 for HP OpenView Operations for UNIX on an HP OVO for UNIX management server.

```
===== 06/15/07 23:09:36 CEST BEGIN swinstall SESSION
(non-interactive) (jobid=<mgmt_server>-0009)

* Session started for user "root@<mgmt_server>".

* Beginning Selection
* Target connection succeeded for "<mgmt_server>:/".
* Source:
  /tmp/sun/Sun_Servers_Integration-1.depot
* Targets:      <mgmt_server>:/
* Software selections:
    SPI-SUNSI-OVO.SPI-SUNSI-SRV,r=1.01.01,v=Sun
    SPI-SUNSI-OVO.SUN-SNMP-MIBS,r=1.01.01,v=Sun
* Selection succeeded.

* Beginning Analysis and Execution
* Session selections have been saved in the file
  "/root/.sw/sessions/swinstall.last".
* The analysis phase succeeded for "<mgmt_server>:/".
* The execution phase succeeded for "<mgmt_server>:/".
* Analysis and Execution succeeded.

NOTE: More information may be found in the agent logfile using the
      command "swjob -a log <mgmt_server>-0009 @ <mgmt_server>:/".

===== 06/15/07 23:09:41 CEST END swinstall SESSION
(non-interactive) (jobid=<mgmt_server>-0009)
```

## Sun SNMP MIBs

---

Many Sun system management integration packages depend on the SNMP protocol and use one or more of the following Sun SNMP MIBs:

- **ENTITY-MIB:** This MIB is used by all SNMP agents to monitor and to describe the physical and logical elements of a managed system. The operation of this MIB is described in the Sun publication *Sun SNMP Management Agent Administration Guide for Sun Blade, Sun Fire and Netra Servers* (819-7978).

Filename: ENTITY-MIB.mib

**Note:** The ENTITY-MIB is not used with integrations based exclusively on SNMP traps.

- **SUN-PLATFORM-MIB:** This MIB is used by Solaris-based servers to extend the ENTITY-MIB Physical Entity Table to represent new classes of component and the Logical Entity Table to represent high value platform and server objects. This MIB supplies the Sun™ SNMP Management Agent for Sun Fire™ and Netra™ Systems with traps. The operation of this MIB is described in the Sun publication *Sun SNMP Management Agent Administration Guide for Sun Blade, Sun Fire and Netra Servers* (819-7978).

Filename: SUN-PLATFORM-MIB.mib

- **SUN-ILOM-PET-MIB:** This MIB enables management platforms that are not IPMI compliant to partly decode standard IPMI Platform Event Traps (PETS) generated by the ILOM v1.x and Embedded LOM service processors.

Filename: SUN-ILOM-PET-MIB.mib

- **SUN-HW-TRAP-MIB:** This MIB replaces and enhances the SUN-ILOM-PET MIB for ILOM 2.x systems.

Filename: SUN-HW-TRAP-MIB.mib

To view a summary of the entries in these MIBs or to download them, consult the following Sun web site:

<http://www.sun.com/systemmanagement/tools.jsp>



# What’s New?

The additions and improvements to the functionality of the Sun Servers Integration 1.1 for HP OpenView Operations for UNIX fall into one category:.

- Support for new Sun servers and software

## Support for New Sun Servers and Software

The Sun Integration Pack now supports the following new Sun servers and updated Sun system management software.

Category	Enhancements
New servers	x64/ILOM 2.0 servers, for example the Sun Fire X4x00 M2, Sun Fire X4600, and Sun Blade X8xx0 Server Modules.  SPARC/ALOM servers, for example the Sun SPARC Enterprise T6300 Server.
Updated software	Integrated Lights Out Manager (ILOM) Version 2.0

Sun Integration Pack now supports a variety of x64/ILOM, SPARC/ILOM, and SPARC/ALOM servers.



## Glossary

This appendix provides terminology for both HP OVO for UNIX and Sun system management technologies.

Acronym	Term	Definition
	message browser	The console within which active and acknowledged messages are displayed.
	template	A message source template controls the introduction of messages into HP OVO for UNIX. Templates can be defined for logfiles, opcsmsg(1) and opcsmsg(3), monitored objects, and SNMP traps. A template may contain message conditions and message attributes (severity and group in which the message is placed and so on) for a single message source. The template can also be used to apply new message attributes to a message.
	template groups	A template group is a logical group of templates sharing common characteristics. Template administrators create template groups and template group hierarchies to simplify the management of templates, and the assignment of templates to managed nodes or node groups..

## Sun System Management Terminology

The following terminology references Sun-specific system management technologies.

Acronym	Term	Definition
ALOM	Advanced Lights Out Manager	Sun Advanced Lights Out Manager (ALOM) consists of service processor hardware and firmware that supports the remote monitoring of Sun SPARC servers.
ELOM	Embedded Lights Out Manager	Sun Embedded Lights Out Manager consists of service processor hardware and firmware that supports the remote monitoring and management of Sun servers through IPMI and SNMP interfaces.
ILOM	Integrated Lights Out Manager	Sun ILOM consists of service processor hardware and firmware that supports the remote monitoring and management of Sun servers through IPMI and SNMP interfaces.
MASF	Sun SNMP Management Agent for Sun Fire and Netra Systems	The Sun MASF agent provides SNMP integration between Sun SPARC-based servers and management hosts.

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