Oracle Hardware Management Pack 2.4 Server Management Agents User's Guide

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Product Documentation Library

Documentation and resources for this product and related products are available at https://www.oracle.com/goto/ohmp/docs.

Feedback

Provide feedback about this documentation at https://www.oracle.com/goto/docfeedback.

Change History

The following changes have been made to the documentation set.

- April 2017. Initial publication.
- May 2023. Notes added to describe the removal of the Oracle Hardware Management Pack Watchdog Agent support with release 2.4.9.0.

1

Oracle Server Management Agents Overview

Oracle Hardware Management Pack includes a rich set of command line interface tools and agents that are run from your host operating system to configure and monitor server hardware. For information on operating system and server support for each Oracle Hardware Management Pack component, refer to the support matrix available at https://www.oracle.com/goto/ohmp.

The Oracle Hardware Management Pack download package available from My Oracle Support (MOS) includes support for select versions of Linux and Oracle Solaris (release 10, 11 and 11.1) operating systems. A cross-platform installer is available for all components. For more information on installing Oracle Hardware Management Pack components, refer to the .

Beginning with Oracle Hardware Management Pack 2.4, support for the Microsoft Windows operating system is **no longer available**.

Beginning with Oracle Solaris 11.2, Oracle Hardware Management Pack for Oracle Solaris has become an integrated component of the operating system. Do **not** download and use other versions of Oracle Hardware Management Pack that are not specifically qualified for the Oracle Solaris 11.2 (and later). For details, see https://www.oracle.com/goto/ohmp/solarisdocs.

> **Note:**
>
> This documentation applies to servers running supported versions of Linux and Oracle Solaris 10, 11 and 11.1 operating systems.

This guide includes information on the Oracle Hardware Management Agents:

Description	Link
Introduction to the Oracle Hardware Management Agents	Hardware Monitoring Using the Server Management Agents
Configure the Hardware Management Agent with SNMP.	Configuring the Hardware Management Agent and Hardware SNMP Plugins
Learn about the available SNMP plugin MIBs.	Oracle Server Hardware SNMP Plugins Overview
Use the Hardware Management Agent with SNMP plugins to obtain information about your system.	Working With Management Agents
Configure the host and Oracle ILOM Watchdog agents.	Configuring the HMP Watchdog Agent
Setup the Oracle ILOM trap proxy.	Configuring Oracle ILOM SNMP Trap Forwarding Using itpconfig
Learn about disk events and logs for select SAS HBAs.	Using Oracle Hardware Management Pack to Monitor Disk Diagnostic Events
How to troubleshoot issues with the Hardware Management Agents.	Troubleshooting Management Agents

2

Hardware Monitoring Using the Server Management Agents

Oracle Server Management Agents provide support to monitor and manage your Oracle servers from the host.

Oracle Server Management Agents components include:

- Oracle Server Hardware Management Agent – Runs in the background to collect information about the system to support Oracle ILOM and SNMP monitoring.
- Oracle Server SNMP Plugins – System Management Information Base (MIBs) that support native SNMP monitoring.
- Oracle ILOM SNMP trap forwarding – The `itpconfig` utility allows you to set up a proxy on the host to forward SNMP traps received in Oracle ILOM to an SNMP trap destination of your choice over the Host-to-ILOM Interconnect.
- Oracle Hardware Management Pack Watchdog Agent – Used on Linux systems to alert you if Oracle ILOM or the host become unresponsive so that you can preform a corrective action.

> **Note:**
>
> The SNMP monitoring function of the Server Hardware Management Agent is disabled by default and must be enabled and configured by the user as described in this document.

- Oracle Server Hardware Management Agent
- Oracle Server Hardware SNMP Plugins
- itpconfig and the Oracle ILOM Trap Proxy
- Oracle Hardware Management Pack Watchdog Agent

Oracle Server Hardware Management Agent

The Oracle Server Hardware Management Agent (Hardware Management Agent) and associated Oracle Server Hardware SNMP Plugins (Hardware SNMP Plugins) provide a way to monitor and manage your server and server module's hardware using an operating system native SNMP agent.

This in-band functionality enables you to use a single IP address (the host's IP) for monitoring your servers and blade server modules, without having to connect the management port of the Oracle Integrated Lights Out Manager (ILOM) service processor to the network.

The Hardware Management Agent and Hardware SNMP Plugins run on the host operating system of your Oracle servers, communicating with the Oracle ILOM service processor. The

Hardware Management Agent daemon, called hwmgmtd, regularly polls the service processor for information about the current state of the server. Hardware Management Agent can poll the service processor for hardware information over either the Host-to-ILOM Interconnect, available on Oracle latest servers, or KCS interface on previous generation servers. This information is then made available by Hardware Management Agent over SNMP using the Hardware SNMP Plugins.

> **Note:**
>
> By default, SNMP functionality for the agent is disabled even if you installed the SNMP Plugins. This functionality can be enabled through the `hwmgmtd.conf` file. For more information, see Configuring the Hardware Management Agent and Hardware SNMP Plugins.

In addition, the Hardware Management Agent maintains a separate log that contains information about the Hardware Management Agent status, which can be used for troubleshooting.

Oracle Server Hardware SNMP Plugins

The Oracle Server Hardware SNMP Plugins consists of Net-SNMP plugins, these include versions of hardware-specific Management Information Bases (MIB) which have been designed to enable you to monitor your Oracle servers effectively.

> **Note:**
>
> Even if you install the Hardware SNMP Plugins when you install Oracle Hardware Management Pack, you still need to configure the Hardware Management Agent to support SNMP requests. See Configuring the Hardware Management Agent and Hardware SNMP Plugins.

The sunHwMonMIB describes the state of sensors and alarms on your servers and provides the following information:

- Overall system alarm status
- Aggregate alarm status by device type
- FRU Alarm status
- Lists of sensors, sensor types, sensor readings, and sensor thresholds
- Indicator states
- System locator control
- Inventory including basic manufacturing information
- Product and chassis inventory information (such as serial number and part numbers)
- Per-sensor alarm status

The sunHwTrapMIB describes a set of traps for hardware events that can be generated by an Oracle server and provides the following information:

- Conditions affecting the environmental state of the server (such as temperature, voltage, and current out-of-range conditions)
- Error conditions affecting the hardware components in the server such as FRU insertion and removal and security intrusion notification

The sunStorageMIB provides the following information about system storage:

- Basic manufacturing information, properties, and alarm status for controllers
- Properties and alarm status for disks
- Properties and alarm status for RAID volumes
- Status of logical components

itpconfig and the Oracle ILOM Trap Proxy

The `itpconfig` command line tool allows you to configure a trap forwarding proxy to forward Oracle ILOM generated SNMP traps to the host or a configured SNMP trap destination over the Host-to-ILOM Interconnect. This allows SNMP traps to be forwarded to a destination you specify without having to have a network connection to the server's NET MGT port.

> **Note:**
>
> The Hardware Management Agent supports a trap-triggered polling feature that will only work with host-based SNMP monitoring in conjunction with the Oracle LOM trap proxy. For more information about this feature, see Hardware Management Agent Configuration File.

The `itpconfig` command can be used to both set up a trap proxy and to configure the Host-to-ILOM Interconnect between the Oracle ILOM service processor and the host.

Refer to your server documentation to see if your server supports the Host-to-ILOM Interconnect.

For information on setting up the Oracle ILOM trap proxy, see Configuring Oracle ILOM SNMP Trap Forwarding Using itpconfig.

Oracle Hardware Management Pack Watchdog Agent

> **Note:**
>
> Starting with Oracle Hardware Management Pack (HMP) 2.4.9.0, the HMP watchdog agent and associated ILOM and host watchdog services are no longer available.

The Oracle Hardware Management Pack Watchdog Agent (HMP Watchdog Agent) is an optional component that works with Linux. The HMP Watchdog Agent periodically checks the host and/or Oracle ILOM and performs a user-configured action if either proves unresponsive. The actions can include posting a warning to a log file, resetting the corresponding device, and in the case of the host, power cycling or powering off the host.

The HMP Watchdog Agent provides two services: ILOM watchdog and host watchdog.

You can configure the HMP Watchdog Agent using the `ilomconfig` CLI command (preferred), or by editing the `hmp_watchdogd.conf` file. For instructions, see Configuring the HMP Watchdog Agent.

For information on how to install this component, refer to the .

3 Configuring the Hardware Management Agent and Hardware SNMP Plugins

This section provides instructions for configuring the Hardware Management Agent and Hardware SNMP Plugins, as well as information about using Hardware Management Agent successfully. The section contains the following:

- Hardware Management Agent Configuration File
- Configure the Hardware Management Agent for SNMP Support and Logging Level
- Configuring Your Host Operating System's SNMP
- (Solaris and Linux) Configuring Net-SNMP/SMA
- How to Restart the SNMP Daemon

Hardware Management Agent Configuration File

By default, the Hardware Management Agent manages the storage poller and provides Oracle ILOM information about storage devices in the system including any changes to these devices.

In Oracle Hardware Management Pack 2.4, a feature was added that allows the trap proxy to notify the agent when Oracle ILOM has sent a trap. Instead of regularly polling Oracle ILOM for information, detection of a trap will initiate an update cycle to get the newest data from Oracle ILOM. By default, if no traps trigger a polling cycle then Oracle ILOM is polled by the Hardware Management Agent once per hour.

> **Note:**
>
> The trap-based polling feature will only work if the host is configured for SNMP monitoring and the Oracle LOM trap proxy has been set up. For information on setting up the Oracle ILOM trap proxy, see Configuring Oracle ILOM SNMP Trap Forwarding Using itpconfig.

If more precise real-time data of sensor values (temperature/voltage) is required, a custom "polling_round_delay" configuration option can be added to the `hwmgmtd.conf` file. Adding this option into the configuration file allows you to change the default polling interval.

For SNMP monitoring, the Hardware Management Agent can be configured as an SNMP agent for the SUN-HW-MONITORING-MIB and SUN-STORAGE-MIB that are part of Oracle Hardware Management Pack. This enables the native SNMP service running on the host to query information stored in these MIBs. By default, this feature is turned off but can be configured in the `hwmgmtd.conf` configuration file.

The Hardware Management Agent also records log messages in the `hwmgmtd.log` file. These messages can be used to troubleshoot the running status of the Hardware Management Agent. Log level configuration is done using *basic* or *bit flag* parameters.

The following subsections describe the configurable parameters in the `hwmgmtd.conf` file. For information on performing the configuration, see Configure the Hardware Management Agent for SNMP Support and Logging Level.

- Polling and SNMP Support
- Log Levels: Basic and Bit Flag Parameters

Polling and SNMP Support

The following table lists the configurable values for polling and thread selection in the `hwmgmtd.conf` file when SNMP monitoring is used on the host.

> **Note:**
>
> The default configuration for polling provides the optimal functionality in systems where SNMP monitoring is not used. Where host-based SNMP monitoring is configured and the Oracle ILOM trap proxy setup using `itpconfig`, the Hardware Management Agent will perform an initial poll of Oracle ILOM and then listen for Oracle ILOM SNMP traps to decide when a re-pole is needed. Enabling SNMP polling threads increase resources used by the Hardware Management Agent which might affect system performance.

Thread	Description
`storage_poller_enabled=<value>`	When enabled, the Hardware Management Agent provides up-to-date information about host internal storage to Oracle ILOM. In addition, if SNMP monitoring is enabled on the host, this poller responds to host SNMP requests to the SUN-STORAGE-MIB. Supported values are: 0=disabled; 1=enabled. The default is 1. **Note:** Disabling this parameter is not recommended as it will prevent storage information from being sent to Oracle ILOM.

Thread	Description
`inventory_poller_enabled=<value>`	When enabled, this poller responds to host SNMP requests to the SUN-HW-MONITORING-MIB. Supported values are: 0=disabled; 1=enabled. The default is 0.
`request_thread_enabled=<value>`	When enabled, the Hardware Management Agent responds to host SNMP requests and listens for SNMP traps generated by Oracle ILOM. Supported values are: 0=disabled; 1=enabled. The default is 0.
`polling_round_delay=<time in seconds>`	If needed, this option can be added. When set, this option overrides the default polling delay of every hour, or sooner if a trap is detected when using host-based SNMP monitoring and the Oracle ILOM trap proxy. You might want to add this option if you require more precise real-time data regarding sensor values (temperature/voltage). Set the default sleep time in seconds. **Note:** When using this option, Oracle recommends not setting it to anything under 60 seconds due to the additional use of system resources.

Log Levels: Basic and Bit Flag Parameters

The following table lists the supported *basic* values for the `-hwagentd_log_levels` section in the `hwmgmtd.conf` file.

Log Level	Messages Logged
ERROR	Any error messages generated by the Hardware Management Agent
WARNING	Any error and warning messages generated by the Hardware Management Agent
INFO	Any error and warning messages generated by the Hardware Management Agent and informative messages about normal functioning

Using *bit flag* parameters allows you to set the logging level with a finer level of granularity. The following table lists supported values.

> **Note:**
>
> Oracle recommends that you use the basic logging levels. The bit flag parameters are for advanced troubleshooting.

Log Level	Bit Code	Messages Logged
EMERG	0x0001	Information about the system being unusable
ALARM	0x0002	Information about any immediate action that must be taken
CRIT	0x0004	Information related to the Hardware Management Agent either not starting or stopping because of critical conditions
ERROR	0x0008	Information about any error messages generated by the Hardware Management Agent
WARNING	0x0010	Information about any error and warning messages generated by the Hardware Management Agent
NOTICE	0x0020	Information related to normal functioning
INFO	0x0040	Information about any error and warning messages generated by the Hardware Management Agent and informative messages about normal functioning
DEBUG	0x0080	Verbose debug-level messages, useful in troubleshooting
TRACE	0x0100	Highly verbose debug-level messages, useful in troubleshooting

> **Note:**
>
> levels DEBUG and TRACE generate a lot of detailed messages and are designed for troubleshooting. These levels are not recommended for production usage.

For example, when you want to set all logging levels between EMERG and NOTICE, the bit code values of all the required levels must be added and then converted to a decimal value. Referring to preceding table, the addition would be as follows:

0x0001 + 0x0002 + 0x0004 + 0x0008 + 0x0010 + 0x0020 = 0x003f

Converting 0x003f to decimal equals 63, which is the desired log level. This is the decimal number that should be assigned to the `-hwagentd_log_levels` parameter in the `hwmgmtd.conf` file.

Configure the Hardware Management Agent for SNMP Support and Logging Level

1. Find the hwmgmtd.conf file and open it for editing.

   The following table shows the file location on different operating systems.

Operating System	Configuration file path
Oracle Solaris	`/etc/`*`ssm_directory`*`/hwmgmtd.conf` Where *ssm_directory* is either `sun-ssm` or `ssm`, depending on your version of Oracle Hardware Management Pack.
Linux based	`/etc/`*`ssm_directory`*`/hwmgmtd.conf` Where *ssm_directory* is either `sun-ssm` or `ssm`, depending on your version of Oracle Hardware Management Pack.

2. Find the hwagentd_log_levels parameter and change the logging level to one of the options described in the Hardware Management Agent Configuration File.
3. Find the polling and thread parameters and enable them as described in the Hardware Management Agent Configuration File.
4. Save the modified hwmgmtd.conf file.
5. Choose one of the following options to make the Hardware Management Agent reread the hwmgmtd.conf file:

   - On Oracle Solaris, disable and enable the agent:

     ```
     # /usr/sbin/svcadm disable svc:/application/management/
     hwmgmtd:default
     ```

     ```
     # /usr/sbin/svcadm enable svc:/application/management/
     hwmgmtd:default
     ```

   - On Linux based operating systems, restart the agent:

     ```
     # /sbin/service hwmgmtd restart
     ```

   The Hardware Management Agent rereads the `hwmgmtd.conf` file with the modified polling and logging level parameters.

Configuring Your Host Operating System's SNMP

The Hardware Management Agent uses native SNMP for network communications. This means that SNMP must already be installed and running on the host operating system. For the Hardware Management Agent to be able to use SNMP, you must ensure that SNMP is configured correctly. Incorrect settings can cause the Hardware Management Agent to have limited, or no, network connectivity.

Oracle Solaris and Linux based operating systems, the `snmpd.conf` file controls network access to the Hardware Management Agent. See (Solaris and Linux) Configuring Net-SNMP/SMA

(Solaris and Linux) Configuring Net-SNMP/SMA

Depending on which operating system the Hardware Management Agent has been installed on, you can find the `snmpd.conf` file at the path shown in the following table.

Operating System	Path to **`snmpd.conf`**
Linux	`/etc/snmp/snmpd.conf`
Oracle Solaris 10 Operating System	`/etc/sma/snmp/snmpd.conf`
Oracle Solaris 11 Operating System	`/etc/net-snmp/snmp/snmpd.conf`

The exact modifications you need to make to the `snmpd.conf` file depend on which host operating system the Hardware Management Agent is running on. The following procedures explain how to configure SNMP gets, sets, and traps.

> **Note:**
>
> The following instructions assume you are using an unmodified `snmpd.conf` file. If you have customized your `snmpd.conf` file, use these instructions as a guide to make sure your `snmpd.conf` file is compatible with the Hardware Management Agent.

- How to Configure SNMP Gets
- How to Configure SNMP Sets
- How to Configure SNMP Traps

How to Configure SNMP Gets

SNMP gets enable you to read data filled by the Hardware Management Agent.

To be able to perform SNMP gets, use the following procedure.

1. Open your snmpd.conf file for editing.
2. Choose one of the following options:
   - For Red Hat Enterprise Linux, add the following line to `snmpd.conf`:

     ```
     view systemview included .1.3.6.1.4.
     ```

     This adds the Hardware SNMP Plugins to the specified view.
   - For Oracle Solaris OS and SUSE Linux Enterprise Server, add the following line to `snmpd.conf`:

     ```
     rocommunity public
     ```

     This adds a read-only community from a network location other than localhost.

How to Configure SNMP Sets

Use the following procedure to enable SNMP to perform sets.

1. Open your snmpd.conf file for editing.
2. Choose one of the following options:
   - For Oracle Solaris and SUSE Linux Enterprise Server add the following line:

     ```
     rwcommunity private
     ```

     By default the public community is blocked as rocommunity on these operating systems.
   - For Red Hat Enterprise Linux, change:

     ```
     access notConfigGroup "" any noauth exact systemview none none
     ```

     to the following:

     ```
     access notConfigGroup "" any noauth exact systemview systemview none
     ```

     This modification grants write access for the specified view and group. In this example the specified view is `-systemview` and the specified group is `-NotConfigGroup`. By default, the group uses the public community string.

How to Configure SNMP Traps

1. Open your snmpd.conf file for editing.
2. Depending on the version of SNMP traps you want to send:
   - To be able to send SNMP version 1 traps from the Hardware Management Agent, add the following line to `snmpd.conf`:

     ```
     trapsink host communitystring trapport
     ```
   - To be able to send SNMP version 2 traps from the Hardware Management Agent, add the following line to `snmpd.conf`:

     ```
     trap2sink host communitystring trapport
     ```

Example 3-1 Setting SNMP Version 2 Traps

The following example shows the line added to the `snmpd.conf` file to configure SNMP Traps using SNMP version 2:

```
trap2sink 10.18.141.22 public 162
```

How to Restart the SNMP Daemon

- After configuring snmpd.conf, restart the SNMP daemon using the appropriate command:
  - For Linux, type:

    ```
    # /sbin/service snmpd restart
    ```
  - For Oracle Solaris, do one of the following:

    On Oracle Solaris 10 OS, type:

    ```
    # /usr/sbin/svcadm restart sma
    ```

On Oracle Solaris 11 OS, type:

```
# /usr/sbin/svcadm restart net-snmp
```

4

Oracle Server Hardware SNMP Plugins Overview

This section contains overviews of the Management Information Bases (MIBs) that are implemented by Oracle Server Hardware SNMP Plugins.

> **Note:**
>
> To perform SNMP monitoring using the Hardware SNMP plugins, you must configure polling support in the Hardware Management Agent `hwmgmtd.conf` file as described in Configuring the Hardware Management Agent and Hardware SNMP Plugins.

- Overview of Sun HW Monitoring MIB
- Overview of Sun HW Trap MIB
- Overview of Sun Storage MIB

Overview of Sun HW Monitoring MIB

The Sun HW Monitoring Management Information Base (MIB) provides the following details about the server or server module implementing this MIB:

- A hardware inventory of all Field Replaceable Units (FRU) and sensors monitoring different physical parameters
- Parent/child relationship or containment information of all FRUs and sensors
- Individual status of each sensor as well as combined status of each device type
- Any threshold values configured for each sensor, where applicable
- Details about the service processor
- Information about total power consumption

The MIB is subdivided into sections, based on the information provided by the MIB objects. The information provided by the MIB objects is categorized into logically divided groups of scalars, as well as MIB tables.

For a complete list of all of the objects defined by each group, refer to the comments section defined at the beginning of each group in the `SUN-HW-MONITORING-MIB.mib` file.

The following sections briefly describe each of the MIB sections, with some examples of the objects defined in each group.

- Sun Server Product and Chassis
- Sun Server Service Processor

- Sun Server Hardware Monitoring MIB
- Sun Server Hardware Management Agent
- Sun Server Hardware Inventory
- Sun Server Hardware Monitor Sensor Group
- sunHwMonIndicatorGroup
- sunHwMonTotalPowerConsumption

Sun Server Product and Chassis

The first two groups, sunHwMonProductGroup and sunHwMonProductChassisGroup, define scalar MIB objects that provide information about the server, including part number, and manufacturer. These groups are:

- sunHwMonProductGroup is a scalar group that provides general product details about the server or server module, such as the part number, type, name, and serial number.
- sunHwMonProductChassisGroup is a scalar group that provides details about the server's chassis or the chassis into which the server has been inserted.

> **Note:**
>
> sunHwMonProductChassisGroup is populated only on server modules, where it is relevant.

Sun Server Service Processor

The Sun Server Service Processor group consists of one group, sunHwMonSPGroup, which is a scalar group that provides details about the server's Oracle Integrated Lights Out Management (ILOM) service processor. This group includes information such as serial number, manufacturer, MAC Address, IP details, and Web accessibility information such as the URL to access the Oracle ILOM Web interface.

Sun Server Hardware Monitoring MIB

The Sun Server Hardware Monitoring MIB group consists of one scalar group, sunHwMonMibGroup that provides details about the SUN-HW-MONITORING-MIB itself, such as MIB version number.

Sun Server Hardware Management Agent

The Sun Servers Hardware Management Agent group consists of one scalar group, sunHwMonAgentSoftwareGroup that provides details about the Hardware Management Agents associated with this MIB, such as the version of the Agent and the connection status to Oracle ILOM.

Sun Server Hardware Inventory

The Sun Servers Hardware Inventory group consists of one scalar group, sunHwMonInventoryGroup with a MIB table, sunHwMonInventoryTable. This table contains details about the server's field replaceable units (FRUs). For each FRU, it includes the name, type, description, part number, status, and the FRU in which it is contained (if any).

Sun Server Hardware Monitor Sensor Group

The sunHwMonSensorGroup contains details about all of the server's hardware sensors, except indicators. The MIB objects that define the sensor properties are hierarchically and logically grouped based on device type, for example temperature or voltage, as well as sensor type, for example numeric or discrete.

The sunHwMonSensorGroup also contains a device-specific group for all significant device types, such as sunHwMonVoltageGroup or sunHwMonCurrentGroup. There is also a group for sensors that are not part of any device—specific group.

Each of the groups listed below contains two tables. One table provides details about all of the numeric sensors of this device type and the other table provides details about all of the discrete sensors of corresponding device type on the server.

The numeric sensors tables provide details about numeric sensors such as the sensor name, sensor type, the current reading, defined thresholds, current status, perceived severity, and the FRU in which the sensor is contained. The discrete sensors tables provide details about discrete sensors, such as sensor name, sensor type, sensor state, perceived severity, and the FRU in which the sensor is contained.

The alarm status of an entity can be one of the following, where critical is the most severe and indeterminate is the least severe.

- critical
- major
- minor
- warning
- cleared
- indeterminate

The sunHwMonSensorGroup contains the following groups:

- sunHwMonSensorAlarmStatusGroup is a scalar group that provides a single view of the alarm status of the server and aggregate status per device type such as rolled-up status of all voltage sensors. This is the main value used to obtain the overall status of a server. The individual sensor status is provided by MIB objects that are defined in the corresponding device-specific group.
- sunHwMonVoltageGroup contains two MIB tables that provide details regarding all voltage sensors contained in the server.
- sunHwMonCurrentGroup contains two MIB tables that provide details regarding all current sensors contained in the server.
- sunHwMonPowerDeviceGroup contains two MIB tables that provide details regarding all power device sensors contained in the server.

- sunHwMonCoolingDeviceGroup contains two MIB tables that provide details regarding all cooling device sensors contained in the server.
- sunHwMonTemperatureGroup contains two MIB tables that provide details regarding all temperature sensors contained in the server.
- sunHwMonMemoryGroup contains two MIB tables that provide details regarding all memory sensors contained in the server.
- SunHwMonProcessorGroup contains two MIB tables that provide details regarding all processor sensors contained in the server.
- sunHwMonHardDriveGroup contains two MIB tables that provide details regarding all hard drive sensors contained in the server.
- sunHwMonIOGroup contains two MIB tables that provide details regarding all input/output sensors contained in the server.
- sunHwMonSlotOrConnectorGroup contains two MIB tables that provide details regarding all slot or connector sensors contained in the server.
- sunHwMonOtherSensorGroup contains two MIB tables that provide details regarding all sensors contained in the server that are not part of above defined device type groups.

sunHwMonIndicatorGroup

This group contains multiple groups that provide details about the indicators present on the server. These groups are as follows:

- sunHwMonIndicatorLocator is a scalar group that provides details about the locator indicator, such as the name of the locator indicator sensor and its status. The sunHwMonIndicatorLocatorCurrentStatus MIB object is a read-write MIB object. You can control the locator indicator sensor through an SNMP set command, using a community string with write access.
- sunHwMonIndicatorService is a scalar group that provides the name and status of the service indicator sensor.
- sunHwMonIndicatorAll contains sunHwMonIndicatorTable, which provides details about all indicators present on the server, such as power supply failure indicator or fan failure indicator.

sunHwMonTotalPowerConsumption

This scalar group provides details about the server's total power consumption, including:

- Sensor name and type
- Current reading
- Defined thresholds
- Current status
- Perceived severity
- The FRU in which the sensor is contained

Note:

Data is available here only if the platform has implemented a total power consumption indicator.

Overview of Sun HW Trap MIB

The Hardware Management Agent uses the Sun HW Trap MIB to implement SNMP traps. These traps report the environmental state of the server as well as faults, errors, and other conditions affecting hardware components.

The SNMP traps are categorized into three groups.

- Any SNMP trap name ending in Ok or Error, as well as any SNMP trap name containing Threshold, is reporting a change in a sensor value.
- Any SNMP trap name ending in Fault is reporting a problem detected by the system's fault management subsystem, if such a subsystem is available on the server.
- The final group is the status SNMP traps, which report the environmental state and any hardware information that is not covered by the two previous groups.

For more detailed information on the Sun HW Trap MIB, see the comments in the `SUN-HW-TRAP-MIB.mib` file.

Overview of Sun Storage MIB

The Sun Storage MIB supplements the Sun HW Monitoring MIB with storage-related information. The following sections briefly describe each of the MIB sections:

- Sun Storage MIB Objects
- Physical and Logical Storage Objects

Sun Storage MIB Objects

The following scalar objects contain information about the Sun Storage MIB itself:

- sunStorageAgentVersion defines the version of the software implementing the sunStorageMIB. The version is in the following format: *MajorVersion*.*MinorVersion*.*SubMinorVersion* (for example: 1.2.3).
- sunStorageMibVersion defines the version of the SUN-STORAGE-MIB this agent implements. The version defined is in the format of *MajorVersion*.*MinorVersion*.*SubMinorVersion* (for example: 1.3.0).

Physical and Logical Storage Objects

The following tables list physical and logical storage objects:

- sunStorageControllerTable. The storage controller object represents either an on-board or bus-attached storage controller. The properties associated with a controller object describe the type of controller (vendor and model) as well as the features it supports (such as RAID). The table is indexed with an arbitrary integer to uniquely identify each entry. Entries can contain the following:

  - Identifying: name, part number, serial number, manufacturer, model, firmware version, and PCIbus address
  - RAID capabilities: levels supported, maximum volumes manageable, number of spares, and stripe size
  - Status: operational and alarm
- sunStorageDiskTable. Each disk object corresponds to one physical disk that is available to the host operating system. Entries in this table might have parent objects in other tables (such as sunStorageControllerTable). The table is indexed with sunHwMonFruIndex, so that information corresponding to the same physical disk is retrievable from both the sunHwMonInventoryTable and sunStorageDiskTable at the same index.
  - Identifying: name and OS device name
  - Relational: parent name and index, slot number
  - Descriptive: physical type, interface type, and capacity
  - Status: mapping, RAID, and operational
- Entries can contain the following:
- sunStorageVolumeTable. This table contains logical volume objects that correspond to a logical disk visible to the host OS. Only RAID logical volumes are supported. The table is indexed with an arbitrary integer to uniquely identify each entry. Entries can contain the following:
  - Identifying: name, OS device name, and mount point
  - Relational: parent name and index
  - Descriptive: capacity, RAID level, and sizing
  - Status: mapping, mounting, RAID parameters, task, and operational
- sunStorageLogicalCompTable. A logical component node represents an active or passive component of its logical device parent. A logical component object is always a direct child of a logical device node. In the case of a RAID logical device, the logical component represents a physical device, or part of a physical device, used to create the specified RAID level. The table is indexed with an arbitrary integer to uniquely identify each entry. Entries can contain the following:
  - Identifying: name, disk name, and index
  - Relational: parent name and index
  - Status: RAID spare and RAID operational

5 Working With Management Agents

Once the Management Agents are installed on your Oracle Server, you can monitor the server. The Hardware Management Agent provides the SNMP Plugins layer, which enables you to retrieve and set information using SNMP, and to generate SNMP traps.

> **Note:**
>
> To perform SNMP monitoring using the Hardware SNMP plugins, you must configure polling support in the Hardware Management Agent `hwmgmtd.conf` file as described in Configuring the Hardware Management Agent and Hardware SNMP Plugins.

- Retrieving and Setting Information Through SNMP
- sunHwMonProductGroup
- sunHwMonProductChassisGroup
- sunHwMonSPGroup
- sunHwMonInventoryTable
- sunHwMonSensorGroup
- sunHwMonIndicatorLocator
- Generating SNMP Traps

Retrieving and Setting Information Through SNMP

The following section provides some examples of using Net-SNMP's `snmpwalk` utility to get and set information from Oracle servers running the Hardware Management Agent. For more information on the Hardware Management Agent functionality shown here, see Overview of Sun HW Monitoring MIB or the `SUN-HW-MONITORING-MIB.mib` file.

The format of the Net-SNMP `snmpwalk` command is:

```
snmpwalk Application options Common Options OID
```

The command examples in this section use the default MIB locations, which are listed below. If your MIB files are located somewhere else, change the pathnames accordingly.

- Solaris 11.1: `/usr/lib/`*`ssm_directory`*`/lib/mibs`

  Where *ssm_directory* is either `sun-ssm` or `ssm`, depending on your version of Oracle Hardware Management Pack.
- Solaris 10: `/opt/`*`ssm_directory`*`/lib/mibs`

  Where *ssm_directory* is either `sun-ssm` or `ssm`, depending on your version of Oracle Hardware Management Pack.

- Linux: `/usr/share/snmp/mibs`

For more information, see the Net-SNMP documentation.

sunHwMonProductGroup

The sunHwMonProductGroup contains information about the server implementing the MIB.

The following procedures are covered in this section:

- Retrieve the Product Information from a Sun x86 Server
- Retrieve The Product Information on a Sun x86 Server Module

Retrieve the Product Information from a Sun x86 Server

- At the command prompt, type the following:
  - On a Linux system:

    ```
    snmpwalk -v 2c -c public -M /usr/share/snmp/mibs/ -m ALL
    localhost sunHwMonProductGroup
    ```

  - On an Oracle Solaris 11.1 system:

    ```
    snmpwalk -v 2c -c public -M +/usr/lib/ssm_directory/lib/
    mibs/ -m ALL localhost sunHwMonProductGroup
    ```

    Where *ssm_directory* is either `sun-ssm` or `ssm`, depending on your version of Oracle Hardware Management Pack.

  - On an Oracle Solaris 10 system:

    ```
    snmpwalk -v 2c -c public -M +/opt/ssm_directory/lib/mibs/ -m
    ALL localhost sunHwMonProductGroup
    ```

    Where *ssm_directory* is either `sun-ssm` or `ssm`, depending on your version of Oracle Hardware Management Pack.

  You should see output similar to the following:

  ```
  SUN-HW-MONITORING-MIB::sunHwMonProductName.0 = STRING: SUN
  FIRE X4440

  SUN-HW-MONITORING-MIB::sunHwMonProductType.0 = INTEGER:
  rackmount(3)

  SUN-HW-MONITORING-MIB::sunHwMonProductPartNumber.0 = STRING:
  602-4058-01

  SUN-HW-MONITORING-MIB::sunHwMonProductSerialNumber.0 =
  STRING: 0823QBU01C

  SUN-HW-MONITORING-MIB::sunHwMonProductManufacturer.0 =
  STRING: SUN MICROSYSTEMS

  SUN-HW-MONITORING-MIB::sunHwMonProductSlotNumber.0 =
  INTEGER: -1

  SUN-HW-MONITORING-MIB::sunHwMonProductUUID.0 = STRING:
  080020FFFFFFFFFFFFFF00144FEDE5E0
  ```

```
SUN-HW-MONITORING-MIB::sunHwMonProductBiosVersion.0 = STRING:
S90_3B18
```

Note:

On a Sun x86 rack mount server, the following line signifies that there is no slot number (nodef).

```
sunHwMonProductSlotNumber.0 = INTEGER: -1
```

This is expected behavior because slot numbers are relevant only to blade servers. Rackmount servers do not have slot numbers.

Retrieve The Product Information on a Sun x86 Server Module

- At the command prompt, type the following:
  - On a Linux system:

    ```
    snmpwalk -v 2c -c public -M /usr/share/snmp/mibs/ -m ALL
    localhost sunHwMonProductGroup
    ```

  - On an Oracle Solaris 11.1 system:

    ```
    snmpwalk -v 2c -c public -M +/usr/lib/ssm_directory/lib/mibs/
    -m ALL localhost sunHwMonProductGroup
    ```

    Where *ssm_directory* is either `sun-ssm` or `ssm`, depending on your version of Oracle Hardware Management Pack.

  - On an Oracle Solaris 10 system:

    ```
    snmpwalk -v 2c -c public -M +/opt/ssm_directory/lib/mibs/ -m
    ALL localhost sunHwMonProductGroup
    ```

    Where *ssm_directory* is either `sun-ssm` or `ssm`, depending on your version of Oracle Hardware Management Pack.

  You should see output similar to the following:

  ```
  SUN-HW-MONITORING-MIB::sunHwMonProductName.0 = STRING: Sun Blade
  X6250 Server Module

  SUN-HW-MONITORING-MIB::sunHwMonProductType.0 = INTEGER: blade(4)

  SUN-HW-MONITORING-MIB::sunHwMonProductPartNumber.0 = STRING:
  540-7254-01

  SUN-HW-MONITORING-MIB::sunHwMonProductSerialNumber.0 = STRING:
  142300943223

  SUN-HW-MONITORING-MIB::sunHwMonProductManufacturer.0 = STRING:
  Sun Microsystems Inc

  SUN-HW-MONITORING-MIB::sunHwMonProductSlotNumber.0 = INTEGER: 1

  SUN-HW-MONITORING-MIB::sunHwMonProductUUID.0 = STRING:
  080020FFFFFFFFFFFFFF001B24782F9C

  SUN-HW-MONITORING-MIB::sunHwMonProductBiosVersion.0 = STRING:
  S90_3B18
  ```

sunHwMonProductChassisGroup

This group is filled only on Sun x86 server modules and represents the chassis holding the server module.

- Retrieve the Server Module's Product Chassis Information

Retrieve the Server Module's Product Chassis Information

- At the command prompt, type the following:
  - On a Linux system:

    ```
    snmpwalk -v 2c -c public -M /usr/share/snmp/mibs/ -m ALL
    localhost sunHwMonProductChassisGroup
    ```

  - On an Oracle Solaris 11.1 system:

    ```
    snmpwalk -v 2c -c public -M +/usr/lib/ssm_directory/lib/
    mibs/ -m ALL localhost sunHwMonProductChassisGroup
    ```

    Where *ssm_directory* is either `sun-ssm` or `ssm`, depending on your version of Oracle Hardware Management Pack.

  - On an Oracle Solaris 10 system:

    ```
    snmpwalk -v 2c -c public -M +/opt/ssm_directory/lib/mibs/
    -m ALL localhost sunHwMonProductChassisGroup
    ```

    Where *ssm_directory* is either `sun-ssm` or `ssm`, depending on your version of Oracle Hardware Management Pack.

  You should see output similar to the following:

  ```
  SUN-HW-MONITORING-MIB::sunHwMonProductChassisName.0 =
  STRING: SUN BLADE 6000 MODULAR SYSTEM

  SUN-HW-MONITORING-MIB::sunHwMonProductChassisPartNumber.0 =
  STRING: 541-1983-07

  SUN-HW-MONITORING-MIB::sunHwMonProductChassisSerialNumber.0
  = STRING: 1005LCB-0728YM01R7

  SUN-HW-MONITORING-MIB::sunHwMonProductChassisManufacturer.0
  = STRING: SUN MICROSYSTEMS
  ```

sunHwMonSPGroup

This group contains information about the Oracle ILOM service processor.

- Retrieve Service Processor Information

Retrieve Service Processor Information

- At the command prompt, type the following:
  - On a Linux system:

```
snmpwalk -v 2c -c public -M /usr/share/snmp/mibs/ -m ALL
localhost sunHwMonSPGroup
```

- On an Oracle Solaris 11.1 system:

  ```
  snmpwalk -v 2c -c public -M +/usr/lib/ssm_directory/lib/mibs/
  -m ALL localhost sunHwMonSPGroup
  ```

  Where *ssm_directory* is either `sun-ssm` or `ssm`, depending on your version of Oracle Hardware Management Pack.

- On an Oracle Solaris 10 system:

  ```
  snmpwalk -v 2c -c public -M +/opt/ssm_directory/lib/mibs/ -m
  ALL localhost sunHwMonSPGroup
  ```

  Where *ssm_directory* is either `sun-ssm` or `ssm`, depending on your version of Oracle Hardware Management Pack.

You should see output similar to the following:

```
SUN-HW-MONITORING-MIB::sunHwMonSPSerialNumber.0 = STRING:
1762TH1-0750000707

SUN-HW-MONITORING-MIB::sunHwMonSPManufacturer.0 = STRING: ASPEED

SUN-HW-MONITORING-MIB::sunHwMonSPFWVersion.0 = STRING: 2.0.3.10

SUN-HW-MONITORING-MIB::sunHwMonSPMacAddress.0 = STRING:
0:1b:24:78:2f:a1

SUN-HW-MONITORING-MIB::sunHwMonSPIPAddress.0 = IpAddress:
10.18.141.164

SUN-HW-MONITORING-MIB::sunHwMonSPNetMask.0 = IpAddress:
255.255.255.128

SUN-HW-MONITORING-MIB::sunHwMonSPDefaultGateway.0 = IpAddress:
10.18.141.129

SUN-HW-MONITORING-MIB::sunHwMonSPIPMode.0 = INTEGER: dhcp(2)

SUN-HW-MONITORING-MIB::sunHwMonSPURLToLaunch.0 = STRING:

SUN-HW-MONITORING-MIB::sunHwMonSPSystemIdentifier.0 = STRING:
```

> **Note:**
>
> When using Oracle ILOM 2.0 the following lines are returned:
>
> ```
> SUN-HW-MONITORING-MIB::sunHwMonSPURLToLaunch.0 = STRING:
>
> SUN-HW-MONITORING-MIB::sunHwMonSPSystemIdentifier.0 =
> STRING:
> ```
>
> This is expected behavior because this information is specific to Oracle ILOM 3.0.

sunHwMonInventoryTable

Information about only one FRU, `mb.net0.fru`, is shown in this example.

- Retrieve Inventory Information

Retrieve Inventory Information

- At the command prompt, type the following:
  - On a Linux system:

    ```
    snmpwalk -v 2c -c public -M /usr/share/snmp/mibs/ -m ALL
    localhost sunHwMonInventoryTable | grep '.148 = '
    ```

  - On an Oracle Solaris 11.1 system:

    ```
    snmpwalk -v 2c -c public -M +/usr/lib/ssm_directory/lib/
    mibs/ -m ALL localhost sunHwMonInventoryTable | grep
    '.148 = '
    ```

    Where *ssm_directory* is either `sun-ssm` or `ssm`, depending on your version of Oracle Hardware Management Pack.

  - On an Oracle Solaris 10 system:

    ```
    snmpwalk -v 2c -c public -M +/opt/ssm_directory/lib/mibs/
    -m ALL localhost sunHwMonInventoryTable | grep '.148 = '
    ```

    Where *ssm_directory* is either `sun-ssm` or `ssm`, depending on your version of Oracle Hardware Management Pack.

  where `grep '.148 = '` is filtering for results with a property of the FRU we are interested in.

  You should see output similar to the following:

  ```
  SUN-HW-MONITORING-MIB::sunHwMonFruName.148 =
  STRING: /SYS/MB/NET0

  SUN-HW-MONITORING-MIB::sunHwMonFruType.148 = INTEGER:
  networkInterface(80)

  SUN-HW-MONITORING-MIB::sunHwMonFruDescr.148 = STRING:

  SUN-HW-MONITORING-MIB::sunHwMonFruPartNumber.148 = STRING:
  82546GB

  SUN-HW-MONITORING-MIB::sunHwMonFruSerialNumber.148 = STRING:
  00:14:4F:A8:39:44

  SUN-HW-MONITORING-MIB::sunHwMonFruManufacturer.148 = STRING:

  SUN-HW-MONITORING-MIB::sunHwMonFruStatus.148 = INTEGER:
  indeterminate(6)

  SUN-HW-MONITORING-MIB::sunHwMonParentFruIndex.148 = INTEGER:
  146

  SUN-HW-MONITORING-MIB::sunHwMonParentFruName.148 =
  STRING: /SYS/MB
  ```

Note:

When using Oracle ILOM 2.0 the following lines are returned:

```
SUN-HW-MONITORING-MIB::sunHwMonFruType.75 = INTEGER:
unknown(1)
```

```
SUN-HW-MONITORING-MIB::sunHwMonParentFruIndex.75 =
INTEGER: -1
```

```
SUN-HW-MONITORING-MIB::sunHwMonParentFruName.75 = STRING:
```

This is expected behavior because this information is specific to Oracle ILOM 3.0. In this case, the -1 signifies nodef.

sunHwMonSensorGroup

In the following example, the numeric sensor MB/V_+12V is retrieved.

- Retrieve the Sensor Group Information

Retrieve the Sensor Group Information

- At the command prompt, type the following:
  - On a Linux system:

    ```
    snmpwalk -v 2c -c public -M /usr/share/snmp/mibs/ -m ALL
    localhost sunHwMonSensorGroup | grep '\.9 = '
    ```

  - On an Oracle Solaris 11.1 system:

    ```
    snmpwalk -v 2c -c public -M +/usr/lib/ssm_directory/lib/mibs/
    -m ALL localhost sunHwMonSensorGroup | grep '\.9 = '
    ```

    Where *ssm_directory* is either `sun-ssm` or `ssm`, depending on your version of Oracle Hardware Management Pack.

  - On an Oracle Solaris 10 system:

    ```
    snmpwalk -v 2c -c public -M +/opt/ssm_directory/lib/mibs/ -m
    ALL localhost sunHwMonSensorGroup | grep '\.9 = '
    ```

    Where *ssm_directory* is either `sun-ssm` or `ssm`, depending on your version of Oracle Hardware Management Pack.

  where `grep '\.9 = '` is filtering a property of the FRU we are interested in.

  You should see output similar to the following:

  ```
  SUN-HW-MONITORING-MIB::sunHwMonNumericVoltageSensorType.9 =
  INTEGER: voltage(133)
  ```

  ```
  SUN-HW-MONITORING-MIB::sunHwMonNumericVoltageSensorName.9 =
  STRING: /SYS/MB/V_+12V
  ```

  ```
  SUN-HW-MONITORING-
  MIB::sunHwMonNumericVoltageSensorParentFruIndex.9 = INTEGER: 146
  ```

```
SUN-HW-MONITORING-
MIB::sunHwMonNumericVoltageSensorParentFruName.9 =
STRING: /SYS/MB

SUN-HW-MONITORING-
MIB::sunHwMonNumericVoltageSensorAlarmStatus.9 = INTEGER:
cleared(1)

SUN-HW-MONITORING-
MIB::sunHwMonNumericVoltageSensorStateDescr.9 = STRING:
Normal

SUN-HW-MONITORING-
MIB::sunHwMonNumericVoltageSensorCurrentValue.9 = INTEGER:
12160

SUN-HW-MONITORING-
MIB::sunHwMonNumericVoltageSensorBaseUnit.9 = INTEGER:
volts(4)

SUN-HW-MONITORING-
MIB::sunHwMonNumericVoltageSensorExponent.9 = INTEGER: -3

SUN-HW-MONITORING-
MIB::sunHwMonNumericVoltageSensorUpperNonRecoverableThreshol
d.9 = INTEGER: 14994

SUN-HW-MONITORING-
MIB::sunHwMonNumericVoltageSensorUpperCriticalThreshold.9 =
INTEGER: 13986

SUN-HW-MONITORING-
MIB::sunHwMonNumericVoltageSensorUpperNonCriticalThreshold.9
= INTEGER: 12978

SUN-HW-MONITORING-
MIB::sunHwMonNumericVoltageSensorLowerNonRecoverableThreshol
d.9 = INTEGER: 8946

SUN-HW-MONITORING-
MIB::sunHwMonNumericVoltageSensorLowerCriticalThreshold.9 =
INTEGER: 9954

SUN-HW-MONITORING-
MIB::sunHwMonNumericVoltageSensorLowerNonCriticalThreshold.9
= INTEGER: 10962

SUN-HW-MONITORING-
MIB::sunHwMonNumericVoltageSensorEnabledThresholds.9 = BITS:
FC lowerThresholdNonCritical(0) upperThresholdNonCritical(1)
lowerThresholdCritical(2) upperThresholdCritical(3)
lowerThresholdFatal(4) upperThresholdFatal(5)
```

Note:

When using Oracle ILOM 2.0 the following lines are returned:

```
SUN-HW-MONITORING-MIB::sunHwMonNumericVoltageSensorType.9
= INTEGER: unknown(1)
```

```
SUN-HW-MONITORING-
MIB::sunHwMonNumericVoltageSensorParentFruIndex.9 =
INTEGER: -1
```

```
SUN-HW-MONITORING-
MIB::sunHwMonNumericVoltageSensorParentFruName.9 = STRING:
```

This is expected behavior because this information is specific to Oracle ILOM 3.0.

Tip:

When analyzing the following lines, do not forget that the sunHwMonNumericVoltageSensorCurrentValue is returned using the exponent set in sunHwMonNumericVoltageSensorExponent.

```
SUN-HW-MONITORING-MIB::
```

```
sunHwMonNumericVoltageSensorCurrentValue.9 = INTEGER:
12290
```

```
SUN-HW-MONITORING-MIB::
```

```
sunHwMonNumericVoltageSensorBaseUnit.9 = INTEGER: volts(4)
```

```
SUN-HW-MONITORING-MIB::
```

```
sunHwMonNumericVoltageSensorExponent.9 = INTEGER: -3
```

This example has an exponent of -3, which means that the voltage value of sunHwMonNumericVoltageSensorCurrentValue has to be multiplied by 10^{-3}, resulting in 12.290 volts.

sunHwMonIndicatorLocator

You can get and set the sunHwMonIndicatorLocator. The following example sets the sunHwMonIndicatorLocator to integer(i) value 7, which means fastBlink for this OID.

- Set the Indicator Locator

Set the Indicator Locator

- At the command prompt, type the following:

  ```
  # snmpset -v2c -c public -m ALL localhost SUN-HW-MONITORING-
  MIB::sunHwMonIndicatorLocatorCurrentStatus.0 i 7
  ```

  You should see output similar to the following:

```
SUN-HW-MONITORING-
MIB::sunHwMonIndicatorLocatorCurrentStatus.0 = INTEGER:
fastBlinking(7)
```

Generating SNMP Traps

The combination of Hardware Management Agent and Hardware SNMP Plugins enables you to generate SNMP traps. To test this, you can use IPMItool, which is a component of Hardware Management Pack, to inject a simulated fault. This causes the Hardware SNMP Plugins to generate an SNMP fault.

- Inject a Simulated Fault

Inject a Simulated Fault

> **Caution:**
>
> This procedure returns test SNMP traps, however the values received might not match the values you expect to see when a real SNMP trap is generated. This does not impact non-test SNMP trap functionality.

1. At the command prompt, type:

   ```
   ipmitool -U user -P password -H hostname -v sdr list
   ```

   Choose a sensor from the returned list that you want to inject a simulated fault to. In this example the IPMI event: 'P0/VTT' unc assert is used.

2. At the command prompt, type:

   ```
   # ipmitool -U user -P password -H hostname event 'P0/VTT'
   unc assert
   ```

   This injects the IPMI event: 'P0/VTT' unc assert.

   You should receive an SNMP trap similar to the following:

   ```
   sysUpTime.0 = Timeticks: (4300) 0:00:43.00

   snmpModules.1.1.4.1.1 = OID:
   sunHwTrapVoltageNonCritThresholdExceeded

   sunHwTrapSystemIdentifier.0 = STRING: sg-prg-x6220-01-sp0

   sunHwTrapChassisId.0 = STRING:
   1005LCB-0728YM01R7::0739AL71EA

   sunHwTrapProductName.0 = STRING: SUN BLADE 6000 MODULAR
   SYSTEM::SUN BLADE X6220 SERVER MODULE

   sunHwTrapComponentName.0 = STRING: /SYS/MB/P0/VTT

   sunHwTrapThresholdType.0 = INTEGER: upper(1)

   sunHwTrapThresholdValue.0 = STRING:

   sunHwTrapSensorValue.0 = STRING:
   ```

```
sunHwTrapAdditionalInfo.0 = STRING: Upper Non-critical going high
sunHwTrapAssocObjectId.0 = OID: zeroDotZero
sunHwTrapSeverity.0 = INTEGER: nonCritical(4)
```

You can verify the SNMP trap by checking the syslog record, which should contain something similar to the following:

```
sg-prg-x6250-01 hwagentd[3470]: P0/VTT (Sensor ID: 0x1b) (Record
ID: 0x821): Upper Non-critical going high.
```

The messages stored in syslog correspond exactly to the SNMP traps. On Linux and Oracle Solaris operating systems, the messages are logged with facility *daemon* and level *notice*.

Note:

If records corresponding to SNMP traps are not being stored on Linux and Oracle Solaris operating systems, make sure that the *daemon* facility and *notice* level are enabled.

6

Configuring the HMP Watchdog Agent

Starting with Oracle Hardware Management Pack 2.3.0.0, the HMP watchdog agent and associated ILOM and host watchdog services are available for systems running a Linux OS. The following sections describe the agent and how to configure it.

> **Note:**
>
> Starting with Oracle Hardware Management Pack 2.4.9.0, the HMP watchdog agent and associated ILOM and host watchdog services are no longer available.

- HMP Watchdog Agent Overview
- HMP Watchdog Agent Parameters
- Configuring the HMP Watchdog Agent

HMP Watchdog Agent Overview

> **Note:**
>
> Starting with Oracle Hardware Management Pack 2.4.9.0, the HMP watchdog agent and associated ILOM and host watchdog services are no longer available.

When it is installed and configured, the HMP Watchdog Agent periodically checks the host and/or Oracle ILOM and performs a user-configured action if either proves unresponsive. The actions can include posting a warning to a log file, resetting the corresponding device, and in the case of the host, power cycling or powering off the host.

The Oracle HMP watchdog agent is an optional Oracle Hardware Management Pack component that you can install using the Oracle Oracle Hardware Management Pack installer. For information on how to install this component, refer to the *Oracle Hardware Management Pack 2.4 Installation Guide*.

Note the following important information regarding the HMP watchdog agent:

- Your system must meet the following requirements to run the HMP watchdog agent:
  - A Linux operating system installed
  - Oracle HMP 2.3.0.0 or later installed
  - Oracle ILOM 3.2.2 or later on the SP
- The agent must be started after it is installed and it must be restarted after the host is reset.
- The host or ILOM watchdog configuration is preserved after the host is reset.

- You can configure the HMP watchdog agent using the `ilomconfig` CLI command, or by editing the `hmp_watchdogd.conf` file. For instructions, see Configuring the HMP Watchdog Agent. The `ilomconfig` is the preferred method.

The HMP watchdog agent provides two services, ILOM watchdog and host watchdog.

- ILOM Watchdog Overview
- Host Watchdog Overview

ILOM Watchdog Overview

> **Note:**
>
> Starting with Oracle Hardware Management Pack (HMP) 2.4.9.0, the HMP watchdog agent and associated ILOM and host watchdog services are no longer available.

The ILOM watchdog periodically queries Oracle ILOM. If Oracle ILOM becomes unresponsive, the host either posts a warning or resets Oracle ILOM.

It also logs an appropriate message into the HMP watchdog log file, and in the host's system log at `/var/log/messages`.

You can control ILOM watchdog's parameters from the `ilomconfig` command, or by editing the HMP watchdog agent's configuration file. See ILOM Watchdog Parameters for more information on the ILOM watchdog parameters that you can modify. The `ilomconfig` command is the preferred method for controlling ILOM watchdog.

Host Watchdog Overview

> **Note:**
>
> Starting with Oracle Hardware Management Pack (HMP) 2.4.9.0, the HMP watchdog agent and associated ILOM and host watchdog services are no longer available.

The host watchdog causes Oracle ILOM to watch the host. If the host becomes unresponsive, Oracle ILOM performs a customer-configured action, which can be: Warning, Reset, Power Off, or Power Cycle.

You can control the host watchdog parameters using the `ilomconfig` command, or by editing the HMP watchdog agent's configuration file. The `ilomconfig` command is the preferred method for controlling host watchdog.

See Host Watchdog Parameters for more information on the host watchdog parameters that you can modify.

Host watchdog is built on top of standard IPMI watchdog timer capability. The host watchdog interacts with the IPMI watchdog timer as follows:

- When the host watchdog is enabled by the user, it first checks to see if the IPMI watchdog timer is already started. If the IPMI watchdog timer is started, the host watchdog issues a log message indicating that the watchdog timer is already started, and the host watchdog remains in the Disable state.
- When the host watchdog has already been enabled, the host watchdog periodically resets the IPMI watchdog timer to the configuration values of host watchdog. This takes care of the case where someone changes configuration outside of HMP watchdog agent.
- When the OS hangs, the IPMI watchdog timer is not reset by the time the timer expires. This causes Oracle ILOM to perform the action specified by timer-action parameter.

HMP Watchdog Agent Parameters

> **Note:**
>
> Starting with Oracle Hardware Management Pack 2.4.9.0, the HMP watchdog agent and associated ILOM and host watchdog services are no longer available.

The following sections describe the parameters that you can set for the HMP watchdog agent:

- ILOM Watchdog Parameters
- Host Watchdog Parameters

ILOM Watchdog Parameters

> **Note:**
>
> Starting with Oracle Hardware Management Pack 2.4.9.0, the HMP watchdog agent and associated ILOM and host watchdog services are no longer available.

The ILOM watchdog parameters can be set by the user in one of the following ways:

- Preferred method: Use the `ilomconfig` commands to change the parameters. See Configure ILOM Watchdog Using ilomconfig Commands. For more information on ilomconfig CLI commands, see ILOM Watchdog ilomconfig Commands in *Oracle Hardware Management Pack 2.4 Server CLI Tools User’s Guide*.
- Manually edit the configuration file. See Manually Edit the Configuration File.

The following table lists the ILOM watchdog parameters.

Parameter Name	Parameter in Configuration File	Description	Possible Values	Default value
Query Time Interval	`ilom_watchdog_query_time_interval`	The interval at which the host queries Oracle ILOM (seconds). If Oracle ILOM does not respond the host performs the Timer Action.	Positive integer up to 214748364	60 seconds
Timer Action	`ilom_watchdog_timer_action`	The action which the host performs when it notices that Oracle ILOM is unresponsive	`Warning|Reset`	Warning
Number of Consecutive SP Resets	`ilom_watchdog_number_sp_reset`	If the value of Timer Action is Reset, this parameter tells the host the number of times the host resets the SP before it gives up	Positive integer up to 20	2
Admin State	`ilom_watchdog_admin_state`	The ILOM watchdog state	`enable|disable`	disable

Host Watchdog Parameters

> **Note:**
>
> Starting with Oracle Hardware Management Pack 2.4.9.0, the HMP watchdog agent and associated ILOM and host watchdog services are no longer available.

The following host watchdog parameters can be set by the user in one of the following ways:

- Preferred method: Use the `ilomconfig` commands to change the parameters. See Configure Host Watchdog Using ilomconfig Commands. For more information on ilomconfig CLI commands, see Host Watchdog ilomconfig Commands in *Oracle Hardware Management Pack 2.4 Server CLI Tools User's Guide*.
- Manually edit the configuration file. See Manually Edit the Configuration File.

Property Name	Parameter in Configuration File	Description	Possible values	Default value
Reset Period	`host_watchdog_reset_period`	The interval at which the host informs Oracle ILOM that the host is alive (seconds). This value must be less than that of Timer Interval.	Positive integer that is less than the value of timer-value	60
Timer Action	`host_watchdog_timer_action`	The action Oracle ILOM takes when the host become unresponsive	`Warning|Reset|PowerOff|PowerCycle`	Warning
Timer Value	`host_watchdog_timer_value`	The interval at which Oracle ILOM performs the Timer Action if the host is unresponsive (seconds).	Positive integer, with a maximum of 6553	300
Admin State	`host_watchdog_admin_state`	The host watchdog state.	`enable|disable`	disable

Configuring the HMP Watchdog Agent

> **Note:**
>
> Starting with Oracle Hardware Management Pack 2.4.9.0, the HMP watchdog agent and associated ILOM and host watchdog services are no longer available.

This section describes the HMP watchdog agent.

- Commands to Control the HMP Watchdog Agent
- File Locations
- Change the Logging Level of the HMP Watchdog Agent
- Configure ILOM Watchdog Using ilomconfig Commands
- Configure Host Watchdog Using ilomconfig Commands
- Manually Edit the Configuration File

Commands to Control the HMP Watchdog Agent

> **Note:**
>
> Starting with Oracle Hardware Management Pack 2.4.9.0, the HMP watchdog agent and associated ILOM and host watchdog services are no longer available.

The commands in the following table can be used to control the HMP watchdog agent.

Task	Command

Start the HMP watchdog agent.	`/etc/init.d/hmp_watchdogd start`
	or
	`service hmp_watchdog start`

Stop the HMP watchdog.	`/etc/init.d/hmp_watchdogd stop`
	or
	`service hmp_watchdog stop`

Stop and start the HMP watchdog agent.	`/etc/init.d/hmp_watchdogd restart`
	or
	`service hmp_watchdog restart`

Cause HMP watchdog agent to reread its configuration file.	`/etc/init.d/hmp_watchdogd reload`
	or
	`service hmp_watchdog reload`

Get the status of the watchdog agent.	`/etc/init.d/hmp_watchdogd status`
	or
	`service hmp_watchdog status`

File Locations

> **Note:**
>
> Starting with Oracle Hardware Management Pack 2.4.9.0, the HMP watchdog agent and associated ILOM and host watchdog services are no longer available.

The following table lists the location of important HMP watchdog agent files.

File Type	Location
Configuration file	`/etc/`*`ssm_directory`*`/hmp_watchdogd.conf` Where *ssm_directory* is either `sun-ssm` or `ssm`, depending on your version of Oracle Hardware Management Pack.
Log file	`/var/log/`*`ssm_directory`*`/hmp_watchdogd.log` Where *ssm_directory* is either `sun-ssm` or `ssm`, depending on your version of Oracle Hardware Management Pack.
PID file	`/var/run/sun-ssm-hmp-watchdogd.pid`
Binary file	`/usr/sbin/hmp_watchdogd`
ILOM watchdog state file	`/var/run/sun-ssm-ilom-watchdog-state`
Host watchdog state file	`/var/run/sun-ssm-host-watchdog-state`

> **Note:**
>
> The ILOM and host watchdog state file locations are listed for your information only. These files are for internal use only.

Change the Logging Level of the HMP Watchdog Agent

> **Note:**
>
> Starting with Oracle Hardware Management Pack 2.4.9.0, the HMP watchdog agent and associated ILOM and host watchdog services are no longer available.

The logging level of the HMP watchdog agent can be changed by editing the agent's configuration file and changing the value of the `hmp_watchdogd_log_levels` property.

1. Open the following file in a text editor:

   ```
   # /etc/ssm_directory/hmp_watchdogd.conf
   ```

   Where *ssm_directory* is either `sun-ssm` or `ssm`, depending on your version of Oracle Hardware Management Pack.

2. Change the value of the following parameter:

   ```
   hmp_watchdogd_log_levels=value
   ```

   The following table shows the available log level values.

Value	Resulting Messages
CRIT	critical messages
ERROR	critical and error messages
WARNING	critical, error messages and warnings
NOTICE	critical, error messages, warnings, and notices
INFO	critical, error messages, warnings, notices, and informational

3. Save the configuration file.

4. Run the following command:

   ```
   # /etc/init.d/hmp_watchdogd reload
   ```

Configure ILOM Watchdog Using ilomconfig Commands

> **Note:**
>
> Starting with Oracle Hardware Management Pack 2.4.9.0, the HMP watchdog agent and associated ILOM and host watchdog services are no longer available.

You must be able to run commands on the host in administrator mode.

This procedure provides basic instructions for using ilomconfig commands to configure the watchdog timer. For more details, see ILOM Watchdog ilomconfig Commands in *Oracle Hardware Management Pack 2.4 Server CLI Tools User's Guide*.

- To modify the ILOM watchdog timer, use the following commands:
  - To enable or disable the ILOM watchdog:

    ```
    # ilomconfig enable|disable ilomwatchdog
    ```

  - To modify the ILOM watchdog settings:
  - `# ilomconfig modify ilomwatchdog --`*`option`*

    where *option* is one of:

Option	Possible values	Description
`--timer-action=`*`action`*	`Warning|Reset`	This sets the `ilom_watchdog_timer_action` parameter, which determines the action the ILOM watchdog takes when Oracle ILOM is not responsive.
`--number-sp-reset=`*`numspreset`*	Positive integer up to 20	This sets the `ilom_watchdog_number_sp_reset` parameter, which determines the number of times the SP can be reset consecutively.
`--query-interval=`*`queryinterval`*	Positive integer up to 2147483647	This sets the `ilom_watchdog_query_time_interval` parameter, which determines the number of seconds between querying for Oracle ILOM's health.

Configure Host Watchdog Using ilomconfig Commands

> **Note:**
>
> Starting with Oracle Hardware Management Pack 2.4.9.0, the HMP watchdog agent and associated ILOM and host watchdog services are no longer available.

You must be able to run commands on the host in administrator mode.

This procedure provides basic instructions for using ilomconfig commands to configure the host watchdog. For more details, see Host Watchdog ilomconfig Commands in *Oracle Hardware Management Pack 2.4 Server CLI Tools User's Guide*.

- To modify the host watchdog parameters, use the following commands:
  - To enable or disable the host watchdog:

```
# ilomconfig enable|disable hostwatchdog
```

- To modify the host watchdog settings:
- `# ilomconfig modify hostwatchdog --`*`option`*

  where *option* is one of:

Option	Possible Values	Description
`--timer-action=`*`action`*	`Warning|Reset|PowerOff|PowerCycle`	This sets the `host_watchdog_timer_action` parameter, which determines the action the host watchdog takes when the timer value expires.
`--timer-value=`*`timervalue`*	Positive integer up to 6553	This sets the `host_watchdog_timer_value` parameter, which determines the number of seconds before the timer expires.
`--reset-period=`*`queryinterval`*	Positive integer that is less than the value of timer-value parameter	This sets the `host_watchdog_reset_period` parameter, which determines the number of seconds before resetting the timer value.

Manually Edit the Configuration File

> **Note:**
>
> Starting with Oracle Hardware Management Pack 2.4.9.0, the HMP watchdog agent and associated ILOM and host watchdog services are no longer available.

The recommended way to change parameters in the configuration file for ILOM watchdog and host watchdog is to use the `ilomconfig` command with the `ilomwatchdog` or `hostwatchdog` targets. Use this procedure only if you are not able to use the `ilomconfig` command.

1. Open the following file in a text editor:

   `# /etc/`*`ssm_directory`*`/hmp_watchdogd.conf`

   Where *ssm_directory* is either `sun-ssm` or `ssm`, depending on your version of Oracle Hardware Management Pack.

2. Change the value of any of the following parameters:
   - For ILOM watchdog:
     – `ilom_watchdog_admin_state=`*`value`*
     – `ilom_watchdog_number_sp_reset=`*`value`*
     – `ilom_watchdog_timer_action=`*`value`*

    - `ilom_watchdog_query_time_interval=`*`value`*

- For host watchdog:
    - `host_watchdog_admin_state=`*`value`*
    - `host_watchdog_timer_action=`*`value`*
    - `host_watchdog_timer_value=`*`value`*
    - `host_watchdog_reset_period=`*`value`*

See ILOM Watchdog Parameters and Host Watchdog Parameters for information on defaults and available values for each parameter.

3. Save the configuration file.
4. Run the following command:

```
# /etc/init.d/hmp_watchdogd reload
```

7

Configuring Oracle ILOM SNMP Trap Forwarding Using itpconfig

The `itpconfig` tool enables you to configure a trap proxy to send SNMP traps from Oracle Integrated Lights Out Manager (ILOM) over the Host-to-ILOM Interconnect and forward the traps from the host server to a configurable destination. `itpconfig` can also enable or disable the Host-to-ILOM Interconnect, which is available on the latest Oracle servers. The Host-to-ILOM Interconnect provides a high speed internal interconnection between your server's Oracle ILOM service processors and the host, and must be enabled for the trap forwarding to function.

Some functionality, such as configuring the Host-to-ILOM Interconnect, is available using either `itpconfig` or `ilomconfig`. For more information on using `ilomconfig`, see *Oracle Hardware Management Pack 2.4 Server CLI Tools User's Guide*.

- itpconfig Command Usage
- itpconfig Usage Scenario
- Host-to-ILOM Interconnect Configuration Commands
- itpconfig Trap Forwarding Commands

itpconfig Command Usage

The `itpconfig` commands must be run in administrator mode. The command syntax for `itpconfig` is:

```
itpconfig <subcommand> <type> [options]
```

When a command fails, it returns one of several failure codes listed in Error Codes.

- Subcommands
- Supported Types
- Options
- Error Codes

Subcommands

The available `itpconfig` subcommands are:

Subcommand	Description
`list`	Show Oracle ILOM trap proxy or Host-to-ILOM Interconnect settings.
`modify`	Modify Oracle ILOM trap proxy settings.
`enable`	Enable trap forwarding or Host-to-ILOM Interconnect.
`disable`	Disable trap forwarding or Host-to-ILOM Interconnect.

See also CLI Tools Command Syntax and Conventions in *Oracle Hardware Management Pack 2.4 Server CLI Tools User's Guide*.

Supported Types

Type	Description
`interconnect`	Modify Host-to-ILOM interconnect settings. Mandatory options for enable or modify include: • `--ipaddress=`*`ipaddress`* ILOM interconnect IP address • `--hostipaddress=`*`ipaddress`* Host interconnect IP address • `--netmask=`*`netmask`*Host-to-ILOM interconnect netmask
`trapforwarding`	Modify ILOM to send SNMP traps for all faults. Mandatory options for enable or modify include: • `--ipaddress=`*`ipaddress`* IP Address to forward fault traps to • `--port=`*`port`* Port number to forward fault traps to • `--community=`*`community`* SNMP V2c community to use when forwarding fault traps

Options

The following options are available to all CLI Tools commands including `itpconfig`:

Short Option	Long Option	Description
`-?`, `-h`	`--help`	Displays help information.
`-V`	`--version`	Displays the tool version.
`-q`	`--quiet`	Suppresses informational message output and returns only error codes.
`-y`	`--yes`	Execute command without prompting for confirmation.

Error Codes

`itpconfig` generates error codes in a similar way to the Oracle Server CLI Tools. See CLI Tools Error Codes in *Oracle Hardware Management Pack 2.4 Server CLI Tools User's Guide*.

In addition, `itpconfig` generates the following error codes:

Code Number	Error Description
81	Oracle ILOM SNMP timeout.
82	Oracle ILOM SNMP failure.
83	Service Processor has conflicting configuration.

These errors can occur if there are issues communicating with the Oracle ILOM SNMP service when enabling the trap proxy.

itpconfig Usage Scenario

The high level steps for enabling SNMP trap forwarding from Oracle ILOM are:

1. Install the Oracle Hardware Management Agents and SNMP Plugins packages.

   See *Oracle Hardware Management Pack Installation Guide*.

   These packages contain all the necessary software for `itpconfig`.

2. Enable the Host-to-ILOM Interconnect, required for `itpconfig` to function.

   The Host-to-ILOM Interconnect can be configured during the installation Oracle Hardware Management Pack when using the installer. Alternatively, you can use the `itpconfig` command, see How to Enable Host-to-ILOM Interconnect.

3. Enable the Oracle ILOM trap proxy.

   See How to Enable Trap Forwarding

   > **Note:**
   >
   > `itpconfig` uses Oracle ILOM Notification Alert Rule 15 to set up the trap forwarding. If this alert rule is in use, `itpconfig` fails. See itpconfig Troubleshooting for a work around.

4. Start or restart the SNMP service daemon on the server.

   Refer to your OS documentation.

5. Ensure that SNMP has been configured in Oracle ILOM so that traps can be generated.

   Refer to your Oracle ILOM documentation (http://www.oracle.com/goto/ilom/docs).

6. Start a trap listener on the destination server configured to listen to traps from the port and community described in the `itpconfig` arguments.

   Any fault generated by the service processor should now generate an SNMP trap which is sent to the destination SNMP trap listener.

Host-to-ILOM Interconnect Configuration Commands

The following procedures are covered in this section:

- How to Enable Host-to-ILOM Interconnect
- How to Disable Host-to-ILOM Interconnect
- How to List the Host-to-ILOM Interconnect Settings

How to Enable Host-to-ILOM Interconnect

The Host-to-ILOM Interconnect can be enabled during the Hardware Management Pack installation. See Enabling the Host-to-ILOM Interconnect in *Oracle Hardware Management Pack 2.4 Installation Guide* for details.

Alternatively, you can use `itpconfig` to enable this feature and manage its properties.

Note:

It is recommended that you use this command without any arguments and let `itpconfig` choose the settings. You can override the defaults with different IP and netmask addresses, but this is for advanced users only.

- Issue the following command:

```
# itpconfig enable interconnect [--ipaddress=ipaddress] [--
netmask=netmask] [--hostipaddress=hostipaddress]
```

Option	Description	Example
`--ipaddress`	Oracle ILOM IP address. This address must be in the format: 169.254.x.x	`169.254.175.72`
`--netmask`	Oracle ILOM netmask.	`255.255.255.0`
`--hostipaddress`	Host IP address. This address must be in the format: 169.254.x.x	`169.254.175.73`

How to Disable Host-to-ILOM Interconnect

To disable the Host-to-ILOM Interconnect between the host and Oracle ILOM, use the `itpconfig disable interconnect` command.

- Issue the following command:

```
# itpconfig disable interconnect
```

How to List the Host-to-ILOM Interconnect Settings

To list the Host-to-ILOM Interconnect state and IP settings on both the Oracle ILOM and host side of the interconnect, use `itpconfig list interconnect`.

- Issue the following command:

```
# itpconfig list interconnect
```

itpconfig Trap Forwarding Commands

This section includes the following procedures:

- How to Enable Trap Forwarding
- How to Disable Trap Forwarding
- How to List Trap Forwarding Settings

How to Enable Trap Forwarding

- To enable trap forwarding, issue the following command:

```
# itpconfig enable trapforwarding --ipaddress=ipaddress --
port=port --community=community
```

> **Note:**
>
> If the trap forwarding is already enabled, use the `itpconfig modify trapforwarding` command instead.

Mandatory options for `itpconfig enable trapforwarding` are:

Option	Description
`--ipaddress`	Sets the destination IP address for the forwarded trap. This can be loopback (127.0.0.1) or any other valid IP address. This must correspond to the configuration of the SNMP listener.
`--port`	Sets the destination port for the forwarded trap. There is no default value, but 162 is a common port value. This must correspond to the configuration of the SNMP listener.
`--community`	Sets the destination SNMP V2c community for the forwarded trap. This value must correspond to the configuration of the SNMP listener.

Example:

```
# itpconfig enable trapforwarding --ipaddress=127.0.0.1 --
port=1234 --community=test
```

How to Disable Trap Forwarding

- To disable itpconfig trap forwarding, issue the following command:

```
# itpconfig disable trapforwarding
```

The disable command takes no additional parameters and disables the trap forwarding operation on both ILOM and the host.

How to List Trap Forwarding Settings

- To list itpconfig trap forwarding settings, issue the following command:

```
# itpconfig list trapforwarding
```

This returns output similar to the following:

```
Trap Forwarding
================
Trap Forwarding is enabled
Trap Forwarding Destination: 127.0.0.1
Trap Forwarding Port: 162
Trap Forwarding Community: test
```

The list command takes no additional parameters.

8 Using Oracle Hardware Management Pack to Monitor Disk Diagnostic Events

This section describes enhanced diagnostic features added to Oracle Hardware Management Pack to collect disk error and SMART events from disks attached to the Sun Storage 6 Gb SAS PCIe HBA, Internal (SGX-SAS6-INT-Z) and store them in the hardware management agent event log.

- Monitoring Disk Events

Monitoring Disk Events

As of Oracle Hardware Management Pack 2.3.2.2, enhanced diagnostic features have been added to collect disk error and SMART events from disks attached to the Sun Storage 6 Gb SAS PCIe HBA, Internal (SGX-SAS6-INT-Z), whether independent or in a RAID volume.

These enhanced diagnostic events are captured and logged in `/var/log/ssm/event.log` when the hardware management agent is running.

The following table lists the enhanced diagnostic events being logged.

Event Name in Log	Description
PD_RECOVERED_ERROR	A disk recovered error was detected.
PD_BAD_DEVICE_FAULT	A non-recoverable drive failure was detected by the device while performing a command.
PD_MEDIA_ERROR	A medium error was detected by the device that was non-recoverable.
PD_DEVICE_ERROR	A non-recoverable hardware failure was detected by the device. The device may be offlined or degraded.
PD_TRANSPORT_ERROR	A path to the device has been unconfigured due to transport instability.
PD_OVER_TEMPERATURE	Disk SMART process reports a critical temperature.
PD_SELF_TEST_FAILURE	One or more disk SMART self tests failed.
PD_PREDICTIVE_FAILURE	SMART health-monitoring firmware reported that a disk failure is imminent.

The controller polls each physical disk at regular intervals. If a disk has encountered an error, an event is generated by the controller. The hardware management agent captures that event and enters it in the hardware management event log.

To view the event information in the hardware management event log, type:

```
# view /var/log/ssm/event.log
```

For enhance diagnostic disk events, you will see information similar to:

```
Thu Apr 30 12:32:31 2015:(CLI) Event Name  : PD_MEDIA_ERROR
Thu Apr 30 12:32:31 2015:(CLI) Event Description : A medium error was
detected by the device that was non-recoverable.
Thu Apr 30 12:32:31 2015:(CLI) ASC  : 0x10
Thu Apr 30 12:32:31 2015:(CLI) ASCQ : 0x3
Thu Apr 30 12:32:31 2015:(CLI) Sense Key : 0x3
Thu Apr 30 12:32:31 2015:(CLI) Source : LSI
Thu Apr 30 12:32:31 2015:(CLI) SAS Address : 0x5000cca01200fadd
Thu Apr 30 12:32:31 2015:(CLI) LSI Description : Unexpected sense: PD
0c(e0xfc/s1) Path 5000cca01200fadd, CDB: 2f 00 00 fc 4d 42 00 10 00 00,
Sense: 3/10/03
Thu Apr 30 12:32:31 2015:(CLI) Event TimeStamp : 04/30/2015 ; 19:30:25
Thu Apr 30 12:32:31 2015:(CLI) Node ID : 00000000:12
Thu Apr 30 12:32:31 2015:(CLI) Nac Name : /SYS/HDD1
Thu Apr 30 12:32:31 2015:(CLI) Serial Number : 001015N0JPXA   PMG0JPXA
Thu Apr 30 12:32:31 2015:(CLI) WWN No : PDS:5000cca01200fadd
Thu Apr 30 12:32:31 2015:(CLI) Disk Model : H106030SDSUN300G
```

You can then use the information in the event listing to determine which physical disk in the system has the issue. Information such as the Oracle ILOM Nac Name (which matches the label on the front panel of the system) and drive Serial Number help you identify the disk and its drive slot in the system.

Note:

For PD_OVER_TEMPERATURE, PD_SELF_TEST_FAILURE and PD_PREDICTIVE_FAILURE events, use Oracle ILOM to configure proactive alerts.

For the other disk diagnostic events described in this document, it is up to the administrator to check the hardware management event log for these disk events when a disk problem is suspected. There is currently no alert mechanism to proactively announce these events.

9 Troubleshooting Management Agents

This section provides tips and solutions for the most common problems you might encounter when working with Management Agents. The section contains:

General Management Agents Troubleshooting

The best way to troubleshoot problems with Management Agents is to review the log files.

The Hardware Management Agent stores log information in the `hwmgmtd.log` file.

For more information on the `hwmgmtd.log` file, see Hardware Management Agent Configuration File.

itpconfig Troubleshooting

`itpconfig` uses ILOM Notification Alert Rule 15 to set up the trap forwarding. If this alert rule is in use, `itpconfig` fails with error code 83. This error is caused when you try to run `itpconfig` when ILOM Notification Alert Rule 15 is already defined on the system.

To work around this, set the destination IP address of ILOM Notification Alert Rule 15 to 0.0.0.0.

SNMP Data Is Not Available Immediately After Starting the Hardware Management Agent

The Initialization of the hardware management agent service can take up to 5 minutes, depending on the system configuration. No data will be available through SNMP queries during that time.

Wait a full 5 minutes after a system boot or agent restart before attempting to view any SNMP data.

Where Are the MIB Files Located?

The MIB files available with Oracle Hardware Management Pack are installed in:

```
/usr/lib/ssm/lib/mibs
```

Oracle Solaris Operating System Troubleshooting

The following topics can help you to identify and solve problems when using the Hardware Management Pack on Oracle Solaris OS.

- Issues Installing with pkgadd

Issues Installing with pkgadd

When using `pkgadd`(1M) during installation, if you encounter the following error message:

```
#Waiting for up to <300> seconds for package administration
commands to become available (another user is administering
packages on zone <XXX>)
```

An interruption of the `pkgadd`(1M) process can leave an outstanding packaging lock file, which blocks further use of the `pkgadd` (1M) command. Before attempting another installation, remove the packaging lock file.

- How to Remove a Packaging Lock File

How to Remove a Packaging Lock File

1. At the command prompt, type the following:

   ```
   svccfg list
   ```

   If you see`/TEMP/application/management/hwmgmtd` listed in the output then delete the file by typing the following:

   ```
   svccfg delete TEMP/application/management/hwmgmtd
   ```

2. Type the following:

   ```
   svccfg list
   ```

   You should no longer see `TEMP/application/management/hwmgmtd` listed.

3. Remove the packages by typing the following:

   ```
   pkgrm ORCLhmp-hwmgmt
   ```

   You should now be able to install `ORCLhmp-hwmgmt`.

Linux Troubleshooting

The following topics can help you to identify and solve problems when using the Hardware Management Pack on Linux.

- Hardware Management Agent Service Fails to Start
- Hardware Management Agent Service Status Dead

Hardware Management Agent Service Fails to Start

After installing the Hardware Management Agent on SUSE Linux Enterprise, you might encounter the following:

```
Starting Sun HW agent services: . . . . . . . . failed
```

In addition, there might be a line in the Hardware Management Agent log file similar to the following:

```
(hwagentd_poller.c:334:hwagent_bmc_response_test):Unable to reach
the KCS interface over ipmitool-hwagentd.
```

This problem occurs when the IPMI device drivers are not installed. Hardware Management Agent uses the IPMI drivers to access the KCS interface.

- How to Solve Issues With IPMI Device Drivers

How to Solve Issues With IPMI Device Drivers

1. Install an IPMI system such as OpenIPMI which provides device drivers for full access to IPMI information.
2. Start the Hardware Management Agent.

Hardware Management Agent Service Status Dead

After installing the Hardware Management Agent on Red Hat Enterprise Linux, the hwmgmtd service starts but you see something similar to the following:

```
/etc/init.d/hwmgmtd start
```

```
Starting Sun HW agent services: . . . . . . . . [ OK ]
```

```
/etc/init.d/hwmgmtd status
```

```
hwmgmtd dead but subsys locked
```

In addition, there may be a line in the Hardware Management Agent similar to the following:

```
hwagentd_poller.c:334:hwmgmtd_bmc_response_test):Unable to reach the
KCS interface over ipmitool-hwmgmtd.
```

This problem occurs when the IPMI device drivers have not been installed. Hardware Management Agent uses the IPMI drivers to access the KCS interface.

Solution: Install an IPMI system such as OpenIPMI, which provides device drivers for full access to IPMI information.

- How to Solve Issues with IPMI Device Drivers

How to Solve Issues with IPMI Device Drivers

1. Install an IPMI system such as OpenIPMI which provides device drivers for full access to IPMI information.
2. Start the Hardware Management Agent.

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