Oracle® Hardware Management Pack for Oracle Solaris 11.2 Installation Guide

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Using This Documentation

This section describes how to get the latest documentation and support for Oracle Hardware Management Pack (HMP) for Oracle Solaris. It also provides feedback links and a document change history.

- "About Oracle Hardware Management Pack for Oracle Solaris" on page 7
- "Documentation and Feedback" on page 7
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About Oracle Hardware Management Pack for Oracle Solaris

Oracle Hardware Management Pack for Oracle Solaris is a set of commands and agents that help you manage your Oracle servers and is part of the Oracle Solaris operating system starting with Oracle Solaris 11.2.

If you have an earlier version of Oracle Solaris, you can obtain the standalone version of Oracle Hardware Management Pack through the Oracle Support site.

Documentation and Feedback

The following documentation is available related to the Oracle Hardware Management Pack for Oracle Solaris.

Documentation	Link
All Oracle products	http://docs.oracle.com
Oracle Hardware Management Pack for Oracle Solaris	http://www.oracle.com/goto/ohmp/solarisdocs

Documentation	Link
Oracle ILOM	http://www.oracle.com/goto/ilom/docs

Provide feedback on this documentation at:

http://www.oracle.com/goto/docfeedback.

About This Documentation

This documentation is available in both PDF and HTML. The information is presented in topic-based format (similar to online help) and therefore does not include chapters, appendixes, or section numbering.

Support and Training

These web sites provide additional resources:

- Support: https://support.oracle.com
- Training: http://education.oracle.com

Contributing Authors

The following authors contributed to this documentation: Cynthia Chin-Lee, Lisa Kuder, David Moss, Ralph Woodley, Michael Bechler.

Change History

The following changes have been made to the document.

- July 2014. Initial publication.
- December 2014. Updated *Release Notes* to document bug 19462769.
- January 2015. Updated the *Management Agent User's Guide* to correct the name of the hardware management agent service for Solaris 11.2 and later.
- March 2015. Updated *CLI User's Guide* and *Installation Guide* to add the `nvmeadm` command. Updated *CLI User's Guide* to add error codes for the `ubiosconfig` command. Made general editorial improvements and other minor technical updates.

- June 2015. Updated the *Release Notes* to document bug 21098717. Updated *CLI User's Guide* to describe new raidconfig read/write cache options. Updated *Management Agent User's Guide* to add section on enhanced disk diagnostic events. Made general editorial improvements and other minor technical updates.

Oracle Hardware Management Pack Installation Guide Overview

This guide provides instructions for installing components of Oracle Hardware Management Pack for Oracle Solaris.

Note - This documentation applies to servers running Oracle Solaris 11.2 and later versions.

Beginning with Oracle Solaris 11.2, Oracle Hardware Management Pack (HMP) has become an integrated component of the operating system and is called Oracle HMP for Oracle Solaris. 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) operating system. If you have Oracle Solaris 11.1 or earlier or other operating systems, continue to use Oracle HMP, available as a separate download from `https://support.oracle.com`.

Oracle Hardware Management Pack (HMP) for Oracle Solaris is a set of commands and agents to help you manage your Oracle servers. Now part of Oracle Solaris 11.2, this software was previously a separate download.

This software has features similar to Oracle HMP 2.2.8, which is available for servers with Oracle Solaris 11.1 and earlier and for servers with other operating systems.

Description	Link
Introduction to the Oracle Hardware Management Pack	“Introduction to the Oracle Hardware Management Pack”
Install or uninstall Oracle Hardware Management Pack components	“Installing or Uninstalling Oracle Hardware Management Pack Components”

Introduction to the Oracle Hardware Management Pack

This section provides an overview of the Oracle Hardware Management Pack components and how to use them with your Oracle servers. Starting with Oracle Solaris OS 11.2, Oracle Hardware Management Pack is included as part of the operating system installation. For details on which Oracle Hardware Management Pack components are installed per Oracle Solaris OS installation, see “Available Hardware Management Pack Components” on page 20.

Oracle Hardware Management Pack (Hardware Management Pack) provides tools to help you manage and configure your Oracle servers. Hardware Management Pack consists of components that you install on your servers. These components enable you to:

- Use a management agent at the operating system level to enable in-band monitoring of your Oracle hardware over Simple Network Management Protocol (SNMP). You can use this information to integrate your Oracle servers into your data center management infrastructure.
- Use command-line tools to:
  - Configure BIOS, UEFI BIOS, RAID volumes and Oracle Integrated Lights Out Manager (ILOM) service processors on your servers.
  - Upgrade your server components' firmware.
  - View hardware configuration information and the status of your Oracle servers.
  - Configure an ILOM trap proxy that forwards SNMP traps from your Oracle ILOM service processor over the Host-to-ILOM Interconnect.
- Use IPMItool to access server service processors using the IPMI protocol and perform management tasks.

This guide provides an overview of the Hardware Management Pack components and how to install them. For more information on how to configure and work with the Hardware Management Pack components. Refer to:

- “Oracle Server Management Agent for Oracle Solaris 11.2 User’s Guide ”
- “Oracle Server CLI Tools for Oracle Solaris 11.2 User’s Guide ”

For more information on the Hardware Management Pack features, see:

- “About the Oracle Server Hardware Management Agent” on page 14

- "Oracle Server CLI Tools" on page 16
- "IPMItool" on page 16
- "Host-to-ILOM Interconnect" on page 16

About the Oracle Server Hardware Management Agent

Oracle Hardware Management Pack includes a Server Management Agent to help you monitor your Oracle servers.

Oracle Server Management Agent includes following components:

- Oracle Server Hardware Management Agent
- Oracle Server Hardware SNMP Plugins
- `itpconfig`, a tool that enables you to forward traps generated by an Oracle ILOM service processor over the Host-to-ILOM Interconnect.

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 hardware using an operating system native 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 svc:/system/sp/management:default (called hwmgmtd in Solaris versions earlier than 11.2), regularly polls the service processor to fetch information about the current state of the server. The Hardware Management Agent can poll the service processor for hardware information over either the Keyboard Controller Style (KCS) interface or the Host-to-ILOM Interconnect. This information is then made available by Hardware Management Agent through the Hardware SNMP Plugins.

In addition, the Hardware Management Agent also 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, that are compiled versions of hardware-specific Management Information Bases (MIB) which have been designed to enable you to monitor your Oracle servers effectively.

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. It 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

The `itpconfig` tool enables you to configure a trap proxy on the host to forward SNMP traps generated from Oracle ILOM based service processors over the Host-to-ILOM Interconnect to a configurable destination. `itpconfig` can also enable or disable the Host-to-ILOM Interconnect, which is available on the latest Oracle servers.

Oracle Server CLI Tools

Oracle Server CLI Tools (CLI Tools) are command-line interface tools that configure Oracle servers. CLI Tools consists of the following:

- `biosconfig` enables you to configure your server's BIOS settings, found on the previous generation of servers.
- `fwupdate` enables you to upgrade the firmware of your server components.
- `hwmgmtcli` enables you to view hardware configuration information and the status of your Oracle servers.
- `ilomconfig` enables you to configure Oracle ILOM, and can also configure Host-to-ILOM Interconnect settings.
- `NVMeadm` enables you to view information on and configure NVM express controllers and their storage devices.
- `raidconfig` enables you to configure RAID volumes on your servers.
- `ubiosconfig` enables you to configure your server's UEFI BIOS, found on the latest Oracle servers.

IPMItool

IPMItool is a command line application that enables you to manage and configure devices which support the IPMI protocol. A version of IPMItool is provided as part of the Hardware Management Pack. It can be installed if your system does not already have IPMItool installed. For more information on IPMItool. Refer to: `http://ipmitool.sourceforge.net/`

Host-to-ILOM Interconnect

As of Oracle ILOM 3.0.12, a communication channel known as the Host-to-ILOM Interconnect was added to enable you to communicate locally with Oracle ILOM from the host operating system (OS) without the use of a network management connection (NET MGT) to the server. The Host-to-ILOM Interconnect is available on the latest Oracle servers and is particularly useful when you want to perform these Oracle ILOM tasks locally:

- All server management functions in Oracle ILOM that you typically perform from the command line, web, or IPMI interfaces through the network management (NET MGT) connection on the server.
- All data transfers, such as firmware upgrades, to Oracle ILOM that you typically perform from the host over a Keyboard Controller Style (KCS) interface using the `fwupdate` tool.

For these types of server management environments, the Host-to-ILOM Interconnect can provide a more reliable and potentially faster data transfer rate than traditional KCS interfaces.

- All future server monitoring and fault detection operations that you typically perform from the host operating system through the use of Oracle enabled software tools and agents installed on the server.

In Oracle Solaris operating system, the Host-to-ILOM Interconnect feature is automatically configured for you.

Note - The Oracle Hardware Management Pack refers to this feature as Host-to-ILOM Interconnect. The Oracle ILOM interface refers to this feature as Local Host Interconnect.

Installing or Uninstalling Oracle Hardware Management Pack Components

This section describes how to install and uninstall Hardware Management Pack components on an Oracle server manually using OS-specific commands.

The section contains:

- "Installation, Upgrade and Usage Issues" on page 19
- "Available Hardware Management Pack Components" on page 20
- "How to Install Components on Oracle Solaris" on page 22
- "How to Uninstall Components on Oracle Solaris" on page 22

Installation, Upgrade and Usage Issues

Review the following notes before performing the Oracle Hardware Management Pack installation.

Note - There might be additional installation issues in the "Oracle Hardware Management Pack for Oracle Solaris 11.2 Release Notes ". Review the Release Notes, along with the following issues, before installing Hardware Management Pack.

- **For Oracle Solaris 11.2 installations, many Oracle Hardware Management Pack components are pre-installed and ready to use.**

  To find out which Oracle Hardware Management Pack components are ready to use and which ones you need to install, see "Available Hardware Management Pack Components" on page 20.
- **When upgrading to Solaris 11.2 from a previous version of Oracle Solaris that had Oracle Hardware Management Pack installed.**
  - *If you have upgraded to Oracle Solaris OS 11.2 from a previous version that had Oracle Hardware Management Pack 2.2.7 or later installed*, Hardware Management Pack will be automatically upgraded (or downgraded) to the version that comes standard with your Oracle Solaris OS 11.2 package.
  - *If you have upgraded to Oracle Solaris OS 11.2 from a previous version that had Oracle Hardware Management Pack earlier than 2.2.7 installed*, you must reconfigure

the Oracle Hardware Management Pack repository publisher so that the Solaris 11.2 publisher is used. Enter the command:

```
pkg set-publisher --non-sticky mp-re
```

- **Installing and running Oracle Hardware Management Pack tools in Oracle Solaris zones.**

  Oracle Hardware Management Pack components are meant to be installed and run from Solaris global zones. Although you can install component packages from non-global zones, running Hardware Management Pack tools from non-global zones generates a “Not supported” error message.

- **Running Oracle Hardware Management Pack tools in Oracle Solaris Logical Domains.**

  Only `fwupdate` and `raidconfig` can run on LDOM guest domains. Usage will only be meaningful if the LDOM has physical hardware (IO domain).

  All other tools generate a “Not supported” error message when run on LDOM guest domains.

- **Supported hardware for use with Oracle Hardware Management Pack tools.**

  Different Oracle Hardware Management Pack components are supported by different servers and operating systems, so ensure that your target platform is supported by all of the components you intend to install. Before proceeding make sure that you have consulted the support matrix for the version that you plan to install. The support matrix is available at:

  http://www.oracle.com/goto/ohmp

- **Host-to-ILOM Interconnect feature might be left in a disabled state when Oracle Solaris Automated Installer is used (CR 18696723).**

  When using the Oracle Solaris Automated Installer (introduced with Oracle Solaris 11) to deploy software on a server, the server's Host-to-ILOM interconnect feature (required for many Oracle Hardware Management Pack features) might be left in a disabled state after the Automated Installer performs a reboot during installation. If this happens, a second server reboot after the installation has completed should fix the problem.

  To determine if your server was setup by the Automated Installer, enter the following command:

```
# netadm list | grep ncp
ncp         Automatic      online      <-- Automated Installer was used
ncp         DefaultFixed   disabled
```

Available Hardware Management Pack Components

Oracle Solaris OS 11.2 comes with many Oracle Hardware Management Pack tools preinstalled and ready for use. To find out what Oracle Hardware Management Pack packages are included in your installation of Oracle Solaris OS, use the `pkg list` command. For example:

```
pkg list | grep system/management
```

Packages with an "i" under IFO indicate that the package has already been installed. For example:

```
root@system1:~# pkg list | grep system/management
NAME (PUBLISHER)                  VERSION                    IFO
...
system/management/fwupdate        2.2.8-0.175.2.0.0.38.0     i--
system/management/fwupdate/emulex 6.3.12.2-0.175.2.0.0.38.0  i--
system/management/fwupdate/qlogic 1.7.3-0.175.2.0.0.38.0     i--
system/management/hmp-snmp        2.2.8-0.175.2.0.0.38.0     i--
system/management/hwmgmtcli       2.2.8-0.175.2.0.0.38.0     i--
system/management/hwmgmtd         2.2.8-0.175.2.0.0.38.0     i--
system/management/ilomconfig      5.11-0.175.2.0.0.38.0      i--
system/management/ipmitool        1.8.12-0.175.2.0.0.38.0    i--
...
system/management/raidconfig      2.2.8-0.175.2.0.0.38.0     i--
...
```

If your OS installation is missing a package you need, you can still install it from the Oracle Solaris repository.

Included Oracle Hardware Management Pack components vary depending on the Oracle Solaris OS server installation package used. The following table lists all available packages.

Package Name	Package Description
system/management/biosconfig	x86: Legacy BIOS configuration utility.
system/management/hwmgmtd	Oracle Server Hardware Management Agent daemon. Configured to autostart after installation.
system/management/hmp-snmp	Oracle Server Hardware SNMP plugins.
system/management/ipmitool	IPMItool utility used for controlling IPMI-enabled devices.
system/library/hmp-libs	Libraries required by Oracle Hardware Management Pack.
system/management/raidconfig	RAID configuration tool.
system/management/fwupdate	Firmware update tool.
system/management/fwupdate/qlogic	QLogic Fibre Channel Host Bus Adapter command line interface and library plugin for fwupdate.
system/management/fwupdate/emulex	Emulex Fibre Channel support, drivers and library plugin for fwupdate.
system/management/ilomconfig	Oracle ILOM configuration tool.
system/management/hwmgmtcli	Oracle Server CLI monitoring tool.
system/management/ubiosconfig	x86: UEFI BIOS configuration utility.
system/storage/nvme-utilities	NVM express device management tool.

How to Install Components on Oracle Solaris

Before You Begin

- To install Hardware Management Pack components, you must be logged into your system with root privileges.
- If you are not using the public Oracle Solaris repository but instead have set up your own internal repository, ensure that you have set the publisher to point to your internal repro site. For example:

  pkg set-publisher -p http://*repository_URI*

  Where *repository_URI* is the URI to your internal repository.
- If you are using the public Oracle Solaris repository (for example, `http://pkg.oracle.com/solaris/release/en/index.shtml`), and your company uses a proxy server, ensure that you have configured the proxy. For example:

  export http_proxy=http://*proxy-server***:***port-number*

  Where *proxy-server* is the address of your proxy server and *port-number* is the port number used for the proxy server.

1. **Determine which Hardware Management Pack components to install. See "Available Hardware Management Pack Components" on page 20.**

2. **To install a package, use the following command:**

   pkg install *package-name*

   Where *package-name* is one or more of the packages (each separated by a space) listed in "Available Hardware Management Pack Components" on page 20. For example:

```
root@system1:~# pkg install system/management/raidconfig
           Packages to install:  1
       Create boot environment: No
Create backup boot environment: No
DOWNLOAD                                  PKGS         FILES    XFER (MB)   SPEED
Completed                                  1/1           9/9 0.1/0.1  1.6M/s

PHASE                                          ITEMS
Installing new actions                         38/38
Updating package state database                 Done
Updating package cache                           0/0
Updating image state                            Done
Creating fast lookup database                   Done
Updating package cache                           1/1
root@system1:~#
```

How to Uninstall Components on Oracle Solaris

Before You Begin

- To uninstall Hardware Management Pack components manually, you must be logged into your system with root privileges.

1. **Determine which component(s) to uninstall. See "Available Hardware Management Pack Components" on page 20.**

Note - The following package dependencies exist.

- `hmp-libs` must be uninstalled at the same time or after all other Hardware Management packages have been uninstalled.
- `hmp-snmp` must be uninstalled at the same time or before `hwmgmtcli` is uninstalled.

---

2. **To uninstall the packages, use the following command:**

`pkg uninstall` *package-name*

Where *package-name* is one of the packages listed in "Available Hardware Management Pack Components" on page 20. For example:

```
root@system1:~# pkg uninstall system/management/raidconfig
            Packages to remove:  1
       Create boot environment: No
Create backup boot environment: No
PHASE                                          ITEMS
Removing old actions                           20/20
Updating package state database                 Done
Updating package cache                           1/1
Updating image state                            Done
Creating fast lookup database                   Done
Updating package cache                           1/1
root@system1:~#
```

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