# **hp** OpenView
# Smart Plug-In for hp OpenView Storage Area Manager

## Administrator's Reference for HP OpenView Operations on HP-UX and Solaris

This Administrator's Reference describes how to integrate hp OpenView Storage Area Manager with hp OpenView Operations on HP-UX and Solaris.

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# Introduction

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# About hp OpenView storage area manager

HP OpenView Storage Area Manager provides comprehensive, centralized management across distributed, heterogeneous storage networks. The Storage Area Manager product suite includes the following five applications: Storage Node Manager, Storage Optimizer, Storage Builder, Storage Accountant, and Storage Allocater.

These applications work within a framework that is available regardless of which applications are installed and licensed. Among other features, this framework provides:

## Device discovery and mapping

Storage Area Manager automatically discovers hosts, interconnect devices, and storage devices in direct attached (Fibre Channel or SCSI) and networked storage (SAN and NAS) environments. Discovered devices are placed in the Resources tree and a device map. Storage Area Manager illustrates the relationship of these devices by displaying their links within each device map.

If the storage network is using interconnect hardware to support fabric zoning, Storage Area Manager identifies the pre-configured zones and lists them under the Storage Networks node in the Resources tree. Storage Area Manager also creates a corresponding device map of each zone.

## Event management

Based on its status inquiries of the storage network and its own processes, Storage Area Manager generates and displays events in the event panel. Framework and discovery-related events are displayed regardless of which applications are installed and licensed. Device status, performance, capacity, billing, and LUN security related events only appear if the applicable application is installed and licensed.

Storage Area Manager is able to receive SNMP traps from devices that support trap forwarding. You can also configure event triggers to perform certain actions based on event criteria. For example you can configure an event trigger to send e-mail notification to your on-call administrator for all events of a particular severity level.

Storage Area Manager also provides several features to manage the events that appear in the event panel. You can configure filters so only events that meet the filter's criteria are displayed in the event panel. You can also export all or selected events to a .txt, .csv, or .xml file. Finally, you can configure Storage Area Manager to automatically delete events based on a maximum number or on certain criteria such as event age, event severity level, or event category.

## Manager of Managers

The Manager of Managers (MoM) enables you to monitor several storage domains from one console. You can configure MoM to retrieve and display status and event information from each Storage Area Manager management server in your environment. This feature allows Storage Area Manager to easily scale in large, complex storage environments.

## User authentication and authorization

When starting Storage Area Manager, users must login with their unique user name and password. Storage Area Manager user accounts can be configured with different levels of privilege. User accounts with Administrator privilege are able to save changes to the Storage Area Manager database and may perform all Storage Area Manager tasks. User accounts with Guest privilege are only able to view information provided by Storage Area Manager and are not able to save changes. User account privileges apply to tasks conducted both through the graphical user interface (GUI) and command line user interface (CLUI).

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# Storage Node Manager

Storage Node Manager provides device status monitoring and reporting capability to the Storage Area Manager product suite. Among other features, Storage Node Manager provides:

## Device status monitoring

Storage Node Manager monitors and graphically displays the status of each discovered device in your storage network. Device status is displayed wherever the device is referenced in the user interface, including the Resources tree, device map, and event panel.

Based on its status inquiries of the storage network, Storage Area Manager generates and displays status-related events as they occur in your storage network.

## Application linking

You can link device-specific applications to Storage Area Manager and then start them from the user interface. The applications are linked to specific devices or device models. Many default device-specific application links are provided with Storage Node Manager.

# Storage Optimizer

Storage Optimizer monitors and reports device performance in a storage network. Performance metrics vary by device; however, a set of common metrics are available for all devices supported by Storage Optimizer. Among other features, Storage Optimizer provides:

## Performance views

Performance views for host disks, volumes, interconnect devices, ports, storage devices, and LUNs. Performance lists, displayed for groups of devices in the Resources tree, allow you to compare common metrics for all disks, volumes, storage devices, and so on. Performance charts show you the performance analysis of individual devices over time.

## Top-N analysis

You can sort performance lists by order of performance and limit the length of the list to the first 5, 10, 15, and so on to 100 devices.

## Past and future trends

Performance charts display a line graph of past and future performance. Storage Optimizer predicts future performance by identifying trends in past data. You can turn this feature on or off, and you can select from a full range of predictive models.

## Performance thresholds and threshold events

Storage Optimizer monitors the current and predicted performance of individual resources for threshold violations. If performance differs significantly from a mathematically derived baseline, Storage Optimizer sends a threshold violation to Storage Area Manager's event panel. Administrators can turn baselines on or off and configure event triggers.

## Data export

You can save the contents of performance charts in a comma-delimited (.csv) file.

# Storage Builder

Storage Builder monitors and reports storage capacity in a storage network. It routinely discovers the physical capacity of storage devices and logical capacity of hosts and NAS devices, and analyzes the information for current usage, past and future usage trends, and threshold violations. Among other features, Storage Builder provides:

## Capacity data for host resources

Host resources include directories, disks, users, volumes, and volume groups. Clicking any of these labels in the Resources tree displays a list of the individual resources and their capacities. Selecting a resource from the list displays additional information about the individual directory, disk, user, and so on.

## Capacity views

For hosts and NAS devices, the view panels show the used and free file space. For storage devices, the view panels show the disk space that is visible to hosts, that is unformatted, and that is spent in overhead. At the group level in the Resources tree -- the domain Hosts, NAS Devices, and Storage Devices nodes -- Capacity view panels display summarized capacity information for the corresponding resources.

## Past and future usage trends

From the Capacity view panel, you can display a line graph of past and future capacity. Storage Builder predicts future capacity by identifying trends in past data. You can turn this feature on or off, and you can select from a full range of predictive models.

## Capacity thresholds and threshold events

Storage Builder monitors the current and predicted capacity of individual resources for threshold violations. If measured capacity exceeds or falls below a specified target, Storage Builder sends a threshold violation to Storage Area Manager's event panel. Administrators can set thresholds and configure event triggers.

### Data export

You can save the contents of capacity graphs and pie charts in a comma-delimited (.csv) file.

### File Analysis

You can generate a report on stale files, junk files, the largest files, largest directories, and all files and directories on each and all hosts in the domain. You can modify the default reports and create original reports.

# Storage Accountant

Storage Accountant meters storage space in organization accounts and reports the associated cost at the end of each month. Accounts belong to internal or external organizations. Among other features, Storage Accountant provides:

## Service Level, Organization and Account nodes in the Applications tree

Storage Accountant associates LUNs with service levels and then associates the service-rated LUNs with organization accounts. You can view, create, add LUNs to, and maintain service levels and organization accounts from these nodes.

## Centralized setup functions

The Accounting view panel provides all the tools you need to set up storage billing. You can view, create, and add LUNs to service levels; view and create organizations; add organization accounts; and attach LUNs to accounts. You can also view the total number of service levels, organizations, LUNs in service levels, and the total storage value that is billed and not billed.

## Monthly and interim bill reports

Storage Accountant rolls up daily charges into a monthly bill that is arranged by organization and account. Detailed bills describe the charges for each LUN. Summary bills show only the total charges for each organization and account. Using the Bill Viewer, you can view, export, and print bills for the current (interim) or past billing periods and for all or individual organizations.

## Storage device and service level billing reports

Storage Accountant creates monthly billing reports that are organized by storage device or service level. Summary reports show the total charges for the storage device or service level LUNs in accounts and LUNs not in accounts. Detailed reports show summary information and a LUN-by-LUN description of charges.

## Exported bills

Storage Accountant automatically exports monthly bill reports in a format and location that you choose. Available formats include CSV, HTML, and XML. You can set event triggers that launch a third-party billing application once the report is exported.

# Storage Allocater

Storage Allocater controls storage access and provides security by assigning logical units (LUNs) to specific hosts or groups. Assigned LUNs cannot be accessed by any other hosts. With this application, you can assign, unassign, and reassign storage and related devices from a diverse pool. Among other features, Storage Allocater provides:

## Security Groups

Share groups and associated LUN groups streamline your storage assignments. Share groups allow multiple hosts to share the same storage devices. Associated LUN groups keep sets of logical units (for example, stripe sets or mirror sets) together, requiring them to be assigned and unassigned as a unit.

## Organizational Groups

Host groups and LUN groups allow you to arrange hosts and logical units into hierarchical groups in the Storage Area Manager user interface.

## Reports

Storage Allocater can generate reports that show all LUNs, assigned LUNs, or unassigned LUNs. These reports allow you to quickly view the assignment status of all of the LUNs in the current storage domain.

## System availability

Storage Allocater provides increased system availability by enabling storage to be assigned, unassigned, and re-assigned without reboots.

## Automation of LUN allocation operations

Hooks in the Storage Area Manager command-line interface allow you to automate LUN allocation operations with scripts.

# hp OpenView storage area manager architecture

Storage Area Manager's hardware and software architecture consists of the bridge, management server, managed host(s), management client(s), and the Manager of Managers (optional). This section offers an overview of each of these elements.
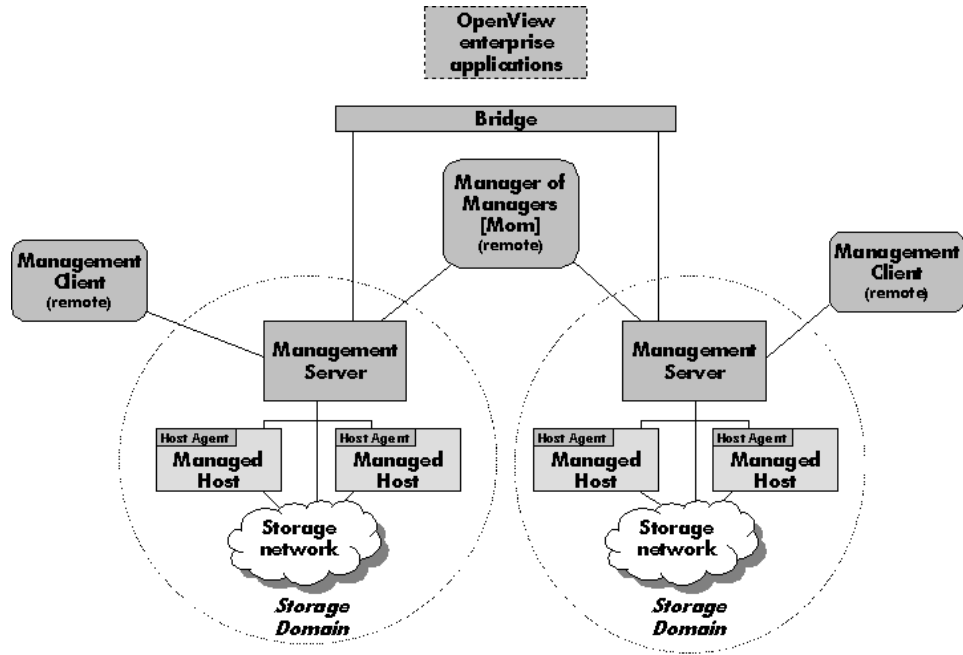


**Figure 1: hp OpenView storage area manager Architecture**

## Bridge

The Storage Area Manager bridge is a web server application that allows other applications access to Storage Area Manager's functionality. This access enables Storage Area Manager to have tight integration with other hp OpenView enterprise applications. The bridge is able to consolidate information from multiple management servers for use by the application integrating with the bridge.

The bridge is automatically installed on the management server when you install Storage Area Manager from the CD.

## Management Server

The management server is a server application that hosts the majority of Storage Area Manager functionality. This framework includes Storage Area Manager's database, discovery subsystem, event handling subsystem, configuration files, and server components for each of the five applications that comprise the product suite.

The management server software is installed from the Storage Area Manager CD on a dedicated Windows 2000 server or workstation. One management server manages a single storage domain. A storage domain consists of storage resources that are visible to the SAN hosts associated with the management server. Storage Area Manager is capable of managing direct-attached, SAN-attached, or network-attached storage resources.

## Managed Host

The managed host contains the host agent software, which includes all components that require access to the storage resources that are visible to the hosts. These components include discovery, status and event inquiry, and performance and capacity data collection.

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The host agent software can be installed remotely from the management server or locally from the Storage Area Manager CD on to a Windows, HP-UX, Solaris, Linux, AIX, Tru64 Unix, OpenVMS, or Netware host. Upon successful installation, the host becomes associated with and dedicated to the management server. The host agent runs as a service on Windows hosts and as a daemon on Unix hosts.

## Management Client

The management client is a graphical user interface (GUI) application that uses a common navigation and presentation framework to display the storage information that is stored by the management server.

The management client software is automatically installed on the management server. The management client can also be downloaded from the management server to remote client systems running Windows, HP-UX, Solaris, or Linux.

## Manager of Managers

The Manager of Managers (MoM) is a graphical user interface (GUI) application that consolidates storage information from multiple storage domains. This allows an administrator to view from a single location the high-level status and filtered event information of a large or geographically dispersed storage network. The administrator can also launch the management client for a particular storage domain to view the detailed information displayed by the client.

The MoM software can be downloaded from the management server to remote Windows, HP-UX, Solaris, or Linux hosts. It is an optional piece of the Storage Area Manager architecture.

## OpenView Enterprise Applications

Storage Area Manager integrates with various OpenView enterprise applications. Through the bridge, the Storage Area Manager SMART Plug-In (SPI), and the integration packages contained on the Storage Area Manager CD, Storage Area Manager information and control can be integrated with:

- hp OpenView Reporter (OVR)
- hp OpenView Service Information Portal (SIP)
- hp OpenView Operations for Windows (OVW)
- hp OpenView Operations for Unix (OVO)
- hp OpenView Internet Usage Manager (IUM)
- hp OpenView Service Navigator
- hp OpenView Service Activator
- hp OpenView Service Desk

# hp OpenView storage area manager user interfaces

Storage Area Manager provides two interfaces within which you can perform storage management tasks: the graphical user interface (GUI) and the command line user interface (CLUI).

## Graphical User Interface

Storage Area Manager's intuitive, tri-pane GUI allows you to monitor the status of your storage network, view event information, and easily perform administrative tasks. Figure 2 illustrates some of the key elements of the Storage Area Manager GUI.
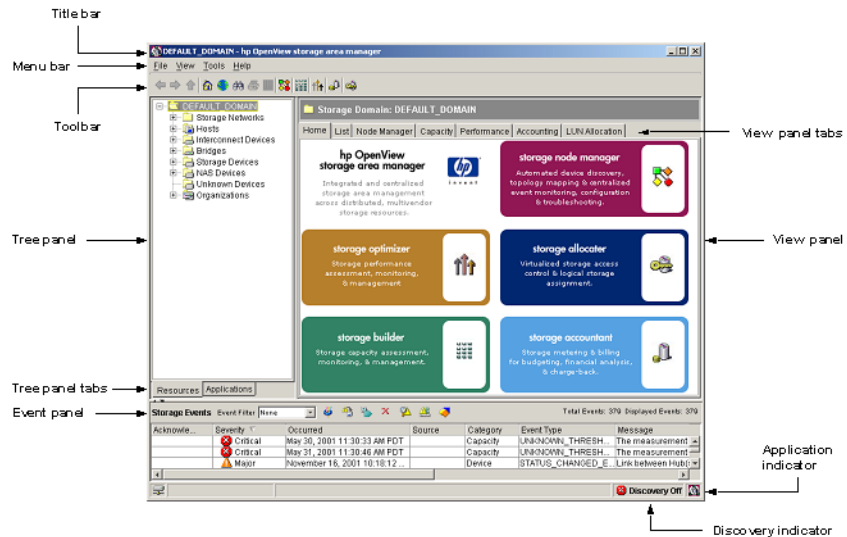


**Figure 2: hp OpenView storage area manager GUI**

### Title bar

The title bar indicates the node or subnode currently selected in the tree panel and the product name. For example, "DEFAULT_DOMAIN - hp OpenView storage area manager".

## Menu bar and toolbar

The menu bar and toolbar provide access to commonly performed tasks. Application icons are included on the toolbar, which provide direct navigation to each application's home page.

## Tree panel

The tree panel includes two views, Resources and Applications, which are controlled by the Tree panel tabs at the bottom of the tree panel.

- The Resources tree lists resources managed by the storage domain including storage networks, devices, and organizations. Storage networks are defined as islands of Fibre Channel connectivity, which indicates that each device in the storage network is able to send Fibre Channel commands to all other devices in the storage network. Each storage network is represented by a corresponding device map.

  Device types include hosts, interconnect devices, bridges, storage devices, NAS devices, and unknown devices.

  Organizations include various resources in their membership and are used by Storage Accountant as part of its billing functionality.

- The Applications tree includes a node for each of the five applications that make up the Storage Area Manager product suite. Each application node includes shortcut navigation to that application's primary tasks.

## Event panel

The event panel lists events received and reported by Storage Area Manager as it monitors the storage network. Each event listed in the event panel includes its severity level, the date and time it occurred, the source of the event, the event's category and type, and the message provided by the event itself.

Storage Area Manager's event management subsystem enables several features to help you manage the events displayed in the event panel. These features are conducted through use of the toolbar icons near the top of the event panel and include such tasks as acknowledging, deleting, and exporting events. You can also create event filters, which enable you to display only those events that meet the criteria you set when creating the event filter.

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## View panel

The view panel displays detailed content for the node or subnode that is currently selected in the tree panel.

This may include lists (for example, a list of all storage devices), specific device properties information (for example, identifying information for a particular disk array), device capacity or performance data (for example, the amount of unconfigured space for a particular disk array), or device maps that illustrate the storage network.

Tabs near the top of the view panel provide navigation to other areas of content for the displayed device.

## Application indicator

The application indicator reflects which application's information is currently displayed in the view panel.

## Discovery indicator

The discovery indicator reflects if Storage Area Manager's ongoing device discovery process is on or off.

# Command Line User Interface

Storage Area Manager's CLUI provides an alternative interface to the GUI. Nearly all tasks that can be performed in the GUI can also be performed from the CLUI.

Like the GUI, the tasks that can be performed within the CLUI are restricted by the Storage Area Manager applications that are installed and licensed and by the privileges assigned to the user name that is used to log into the CLUI.

The CLUI offers several forms of assistance for each command including purpose statements, help text, and man pages.

■ Purpose statements offer a high-level description of the command. To view the purpose statement for a particular command, enter:

**purpose <"command name">**

---

**Note:** You must include the command name in quotes ("") when running the purpose command. This is not required for the help text or man page commands.

---

■ Help text offers detailed usage information for each of the command's options and arguments. To view the help text for a particular command, enter:

**help <command name>**

■ Man pages are the highest level of assistance for each command. Each man page includes an expanded description of the command, its options and arguments, the license and user account privilege required to run the command, an example, and a list of other CLUI commands that are closely related to this command. To view the man page for a particular command, enter:

**man <command name>**

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# What is the hp OpenView storage area manager SPI?

The HP OpenView SMART Plug-In for hp OpenView Storage Area Manager is a software product which, by means of a full integration with HP OpenView Operations (OVO) -- a market-leading management solution for networks, systems, databases, and applications in heterogeneous IT environments -- extends OVO's management scope to include systems managed by the HP OpenView Storage Area Manager. Installed in an environment consisting of one or more OVO servers and one or more OVO managed nodes, the Storage Area Manager SPI can be used to monitor and manage the functionality of HP OpenView Storage Area Manager.

The HP OpenView SMART Plug-In for hp OpenView Storage Area Manager integrates OpenView Operations with hp OpenView Storage Area Manager by:

1. forwarding storage events from Storage Area Manager into OVO, and
2. monitoring and controlling the services and daemons of Storage Area Manager.

This allows a storage network to be proactively monitored and managed from one central point: the OpenView Operations management server console. Once configured, the Storage Area Manager SPI allows OVO operators to react to problems in the storage area network before the problems become serious enough to affect applications, and ultimately the end-users.

Storage events are stored in the Storage Area Manager SOLID database and also logged into an ASCII log file on the Storage Area Manager management server. OVO intelligent agents are installed, configured and running on the Storage Area Manager management server and Host Agent servers, which are managed nodes in the OVO management domain.

The Storage Area Manager SPI intercepts, analyzes and filters storage events in the ASCII log file and forwards them to the OVO management server.

The Storage Area Manager SPI monitors the availability of the Storage Area Manager processes at periodic intervals and forwards appropriate events to the operator, if they are not running.

The Storage Area Manager SPI is also integrated with another HP OpenView product: HP OpenView Service Navigator. This integration allows the user of the Storage Area Manager SPI, the additional perspective of Service Views. Service Views provide root-cause analysis of all the essential SAM services and failure of links between different managed devices in the SAM storage environment. Note that the Service Views are only possible if the appropriate *additional* software is already installed and running.

## A note on integration with Service Desk

Storage Area Manager SPI utilizes the integration of Service Desk with OVO to forward Storage Area Manager specific events to Service Desk. The Storage Area Manager SPI templates have been modified in order to forward events to Service Desk as incidents, provided the Service Desk integration is present on the OVO management server. No changes to templates are required for forwarding Storage Area Manager events to Service Desk.

**Note:** For more details on how to integrate the hp OpenView storage area manager with Service Desk, refer to the *hp OpenView storage area manager Service Desk integration administrator's reference*.

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# Features and functionality of hp OpenView storage area manager SPI

The HP OpenView SMART Plug-In for hp OpenView Storage Area Manager includes the following features:

- Monitoring changes to the Storage Area Manager storage events file CS-EventExport.log: The SPI intercepts the storage event entries available in the log file and forwards only events of signifance, while suppressing the others. The SPI also associates actions and instructions to the operator with the events

- Monitoring changes to the acknowledged Storage Area Manager storage events file CS-EventAckDelExport.log: The SPI intercepts the acknowledged storage event of signifance entries,  while suppressing the others  available in the log file and acknowledges the corresponding event on the OVO message browser.

- Process monitoring of the Storage Area Manager management server, Storage Area Manager Embedded DB service, and Storage Area Manager bridge service

- Process monitoring of the Host Agent and OpenDial services on Windows managed nodes

- Process monitoring of the Host watchdog, Host Agent and OpenDial daemons on UNIX managed nodes

- Limited application control by supplying tools to launch the Storage Area Manager GUI and also tools like 'HostAgent Stop' etc.

- OpenView SAM Service model for the HP OpenView Service Navigator: The SPI has the ability to provide a Service model of the management server and Hosts present in the storage network. Events related to the failure of critical services get mapped to the appropriate elements in the Service map helping the administrator diagnose the problem

- Storage Links Service model for the HP OpenView Service Navigator: The SPI has the ability to provide a service model of the device links between various storage devices in the storage domain.  Events related to the failure of links get mapped to the appropriate elements in the Service map helping the administrator diagnose the problem

- A wide range of applications [like ManagementServer stop, HostAgent Status, Backup Database etc.] for the quick and easy execution of common Storage Area Manager related operating tasks

# Installation

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# Installation prerequisites

This section lists the prerequisites for the installation of Storage Area Manager SPI. To avoid problems during the installation of the Storage Area Manager SPI software, it is essential that you read this section, and any other documents recommended in the section, before you start the installation process.

# Hardware requirements

For a detailed list of hardware requirements on the:

- OVO management server, refer to the *HP OpenView Vantage Point Operations for UNIX Installation Guide*

- OVO managed node, refer to the *HP OpenView VantagePoint Operations for UNIX Administrator's Reference Volume II*

**Table 1: Disk Space Requirements**

| Machine | Operating System | Installation | Runtime Files | Total |
|---------|------------------|--------------|---------------|-------|
| OVO management server (includes documentation) | HP-UX 11.00, 11.11 | 4 MB | 1.5 MB | 5 MB |
| | Solaris 2.7, 8, 9 | | | |
| OVO managed node | Windows NT 4.0 Windows 2000 Windows 2003 | | 1 MB | 1 MB |
| | HP-UX 11.00, 11.11, 11.23 | | | |
| | Solaris 2.7, 8, 9 | | | |
| | RedHat Linux 7.1 RedHat Linux Advanced Server 2.1 SuSE Linux Enterprise Server 8 | | | |
| | AIX 4.3.3, 5L 5.1,5L 5.2 | | | |
| | Tru64 4.0F, 5.1A, 5.1B | | | |
| | Novell Netware 6.0 | | | |

> **Note:** No additional memory (RAM) is required either on the OVO management server or on the managed nodes.

## Software requirements

The following tables list the versions of Storage Area Manager, OVO management server and OVO managed nodes supported by the Storage Area Manager SPI.

**Table 2: hp OpenView storage area manager Supported Versions**

| Operating System | Storage Area Manager Version |
|---|---|
| Windows 2000 | 03.10.00 and 03.20.00 |
| Windows 2003 | 03.20.00 |

**Table 3: hp OpenView storage area manager Host Agent Supported Versions**

| Operating System | Storage Area Manager Host Agent Version | |
|---|---|---|
| | 03.10.00 | 03.20.00 |
| Windows NT | X | |
| Windows 2000 | X | X |
| Windows 2003 | | X |
| HP-UX 11.0 | X | X |
| HP-UX 11.11 | X | X |
| HP-UX 11.23 | | X |
| Tru64 4.0F | X | |
| Tru64 5.1A | X | X |
| Tru64 5.1B | X | X |
| Solaris 2.7 | X | |
| Solaris 8 | X | X |
| Solaris 9 | | X |
| AIX 4.3.3 | X | |

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**Table 3: hp OpenView storage area manager Host Agent Supported Versions**

| Operating System | Storage Area Manager Host Agent Version | |
|---|---|---|
| | 03.10.00 | 03.20.00 |
| AIX 5L 5.1 | X | X |
| AIX 5L 5.2 | | X |
| RedHat Linux 7.1 | X | |
| RedHat Linux Advanced Server 2.1 | X | X |
| SuSE Linux Enterprise Server 8 | X | X |
| Novell Netware 6.0 | X | X |

**Table 4: OVO Management Server Supported Versions**

| Operating System | OVO Version |
|---|---|
| HP-UX 11.0, 11.11 | A.07.00 and A.07.10 |
| Solaris 2.7, 8, 9 | |

**Table 5: OVO Agent Supported Versions**

| Operating System | OVO Agent Version | |
|---|---|---|
| | A.07.00 | A.07.10 |
| Windows NT 4.0 | X | X |
| Windows 2000 | X | X |
| Windows 2003 | | X |
| HP-UX 11.0 | X | X |
| HP-UX 11.11 | X | X |
| HP-UX 11.23 | | X |
| Tru64 4.0F | X | X |
| Tru64 5.1A | | X |
| Tru64 5.1B | | X |
| Solaris 2.7 | X | X |

**Table 5: OVO Agent Supported Versions**

| Operating System | OVO Agent Version | |
|---|---|---|
| | A.07.00 | A.07.10 |
| Solaris 8 | X | X |
| Solaris 9 | | X |
| AIX 4.3.3 | X | X |
| AIX 5L 5.1 | | X |
| AIX 5L 5.2 | | X |
| RedHat Linux 7.1 | X | X |
| RedHat Linux Advanced Server 2.1 | | X |
| SuSE Linux Enterprise Server 8 | | X |
| Novell Netware 6.0 | | X |

## Software prerequisites on the OVO management server

Ensure that the following software is installed on the OVO management server system:

■ hp OpenView Storage Area Manager client

To verify that Storage Area Manager client is installed on the system, do the following:

### On an OVO management server running HP-UX:

1. Login to the system as user **root** and open a terminal window

2. Type the following:

   ```
   swlist HPOVSAMCL
   ```

3. The command returns:

   ```
   HPOVSAMCL 03.20.00.xxxx  HP OpenView Storage Area Manager Client

   HPOVSAMCL.HPOVSAMCL 03.20.00.xxxx  HP OpenView Storage Area
   Manager Client
   ```

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**On an OVO management server running Solaris:**

To verify that Storage Area Manager client is installed on the system, do the following:

1. Login to the system as user **root** and open a terminal window.

2. Type the following:

   ```
   pkginfo HPOVSAMCL
   ```

3. The command returns:

   ```
   application HPOVSAMCL   HP OpenView Storage Area Manager Client
   ```

**Note:** For detailed information on installation/configuration of hp OpenView Storage Area Manager client, refer to the *hp OpenView storage area manager installation guide.*

# Pre-installation checks

Before starting the installation, make sure that you are installing the correct software files. The following tables list the bundles, products, and filesets of the Storage Area Manager SPI, and explain the contents.

**Table 6: Filesets Contained in the hp OpenView storage area manager SPI Product Bundle**

| SD Product | SD Filesets | Description |
|---|---|---|
| HPSAMSPI | HPSAMSPI-CONF | The integration contents in uploadable format |
| | HPSAMSPI-SN-INTEGRATION | The Service Navigator Integration contents |
| | HPSAMSPI-DOCS | Documentation |

**Table 7: Contents of the hp OpenView storage area manager SPI Filesets**

| SD Filesets | Description |
|---|---|
| HPSAMSPI-CONF | Contains the OVO GUI integration executables, templates, monitor and application scripts |
| HPSAMSPI-SN-INTEGRATION | Contains the Service Navigator Integration files |
| HPSAMSPI-DOCS | Contains the Administrator's Guide |

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# Installing the hp OpenView storage area manager SPI on HP-UX

The quickest and most convenient way to install the Storage Area Manager SPI software bundle is to use the Software Distributor (SD). The SD installs the selected product bundle, verifies whether OVO is installed, checks for the correct database configuration, and uploads the configuration into OVO.

To install the Storage Area Manager SPI software bundle on the OVO management server, you can use either the swinstall GUI or the swinstall command as described in the following steps:

1. Make sure that the management server system where you want to install Storage Area Manager SPI meets the hardware and software prerequisites listed in page 28.

2. Login to the OVO management server as user **root** and open a terminal window.

3. Copy the Storage Area Manager SPI depot to the */tmp* directory.

4. Enter the following:

   ```
   swinstall -s /tmp/HPOVSAMSPI_HPUX-032000.sdtape HPOVSAMSPI
   ```

The swinstall command installs the HPOVSAMSPI software bundle from the depot and performs the basic configuration. The software bundle contains all the Storage Area Manager SPI software, configuration files, and documentation.

To install the Storage Area Manager SPI using the swinstall GUI, follow these steps:

1. Login to the OVO management server as user **root** and open a terminal window.

2. Make sure that the DISPLAY environment variable is set to the appropriate node name.

3. Copy the Storage Area Manager SPI depot to the /tmp directory.

4. To start the swinstall GUI and to select the Storage Area Manager SPI bundle, enter the following:

   ```
   /usr/sbin/swinstall -s /tmp/HPOVSAMSPI_HPUX-032000.sdtape
   ```

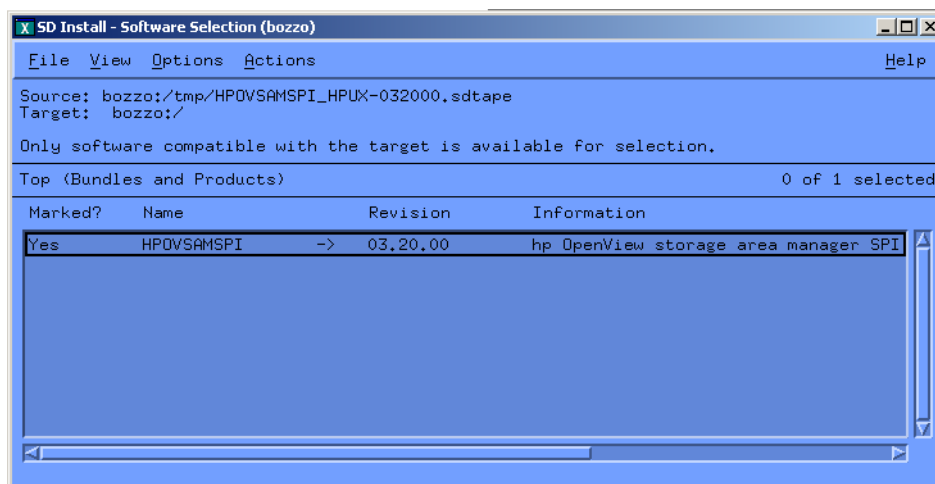This displays the SD Install - Software Selection window.

**Figure 3: The SD Install - Software Selection**

5. Select the **HPOVSAMSPI** bundle.

6. From the **Actions** menu, select **Install Analysis**. This starts the analysis part of the installation, which checks whether the system is suitable for the installation of the chosen bundle.

7. Verify that the analysis phase of the installation completes without errors by clicking the **Logfile** button in the Install Analysis window or viewing the logfile: `/var/adm/sw/swagent.log`.

   If the analysis phase fails, follow the recommendations given in the logfile (located at `/var/adm/sw/swagent.log`) and rerun the analysis.

   After the installation analysis is completed without errors, click **OK** in the Install Analysis window to install the selected software. The analysis is complete when you see the message `Status=Complete`.

8. Verify that the installation phase completes without errors by clicking the **Logfile** button or viewing the logfile: `/var/adm/sw/swagent.log`.

9. Click the **Done** button in the Install window to complete the installation of the software. If the installation execution fails, follow the recommendation given in the logfile (located at `/var/adm/sw/swagent.log`) and run the installation execution again.

# Upgrading the hp OpenView storage area manager SPI on HP-UX

If you already have hp OpenView storage area manager SPI versions 03.00.00, 03.00.01, 03.00.02 or 03.10.00 installed and want to upgrade to version 03.20.00, perform the following steps on the OVO management server:

1.  Install the hp OpenView storage area manager SPI. For details, refer to page 34.

2.  Add the Storage Area Manager management server and the nodes running the Host Agent to the appropriate Node Groups. For details, refer to step 4, page 46.

3.  Distribute the Storage Area Manager SPI templates to the Storage Area Manager nodes. For details, refer to page 50.

4.  Start the Storage Area Manager service discovery daemon. For details, refer to step 3, page 54.

5.  Start the automatic acknowledgement daemon. For details, refer to page 55.

# Installing the hp OpenView storage area manager SPI on Sun Solaris

To install the Storage Area Manager on an OVO management server:

1. Make sure that the management server system where you want to install the Storage Area Manager SPI meets the hardware and software prerequisites listed in page 28.

2. Login as user **root** and open a terminal window.

3. Copy the Storage Area Manager SPI depot to the /tmp directory.

4. Enter the following:

   ```
   swinstall -s /tmp/HPOVSAMSPI_Solaris-032000.sdtape HPOVSAMSPI
   ```

   The swinstall command installs the HPOVSAMSPI software bundle from the depot and performs basic configuration. The software bundle contains all the Storage Area Manager SPI software, configuration files, and documentation.

5. You can follow the progress of your installation by viewing the analysis and installation logfiles. This enables you to detect any warnings or errors at an early stage. In a different window, enter the following:

   ```
   tail -f /var/adm/swagent.log
   ```

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# Upgrading the hp OpenView storage area manager SPI on Sun Solaris

If you already have hp OpenView storage area manager SPI versions 03.00.00, 03.00.01, 03.00.02 or 03.10.00 installed and want to upgrade to version 03.20.00, perform the following steps on the OVO management server:

1. Install the hp OpenView storage area manager SPI.  For details, refer to page 37.

2. Add the Storage Area Manager management server and the nodes running the Host Agent to the appropriate Node Groups.  For details, refer to step 4, page 46.

3. Distribute the Storage Area Manager SPI templates to the Storage Area Manager nodes.  For details, refer to page 50.

4. Start the Storage Area Manager service discovery daemon.  For details, refer to step 3, page 54.

5. Start the automatic acknowledgement daemon.  For details, refer to page 55.

# Verifying the installation of the hp OpenView storage area manager SPI

To verify whether the installation of the Storage Area Manager SPI was completed successfully on the OVO management server, carry out the following steps:

1. On the command line, enter: `swlist`
   Look for the entry: `HPOVSAMSPI 03.20.00 hp OpenView storage area manager SPI`

2. In the OVO GUI, open the appropriate windows and check whether the following elements are present.

**Table 8: hp OpenView storage area manager SPI Elements on the OVO Management Server**

| Window | Element |
|--------|---------|
| Node Groups | OpenView-SAM_MgmtServer |
| | OpenView-SAM_HA-UX |
| | OpenView-SAM_HA-Windows |
| | OpenView-SAM_HA-NW |
| Application Groups | OpenView SAM |
| Message Source Templates | OpenView SAM |
| User | storage_op |
| User Profile | OpenView SAM Admin |
| Message Group | OpenView-SAM |

3. If for any reason either of these steps fails to produce the expected results, use the `swverify` command to ensure that all rules and dependencies were followed during the installation of the Storage Area Manager SPI software.

   a. Enter

   ```
   swverify -x autoselect_dependencies=false HPOVSAMSPI
   ```

   b. Check the following log files for more information relating to installation problems:

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

Check the installation with the details in Table 9 and Table 10.

# Installed file locations

The installation process copies the necessary files to the OVO management server. Table 9 shows the directories that are created during the installation process on the OVO management server for the Storage Area Manager SPI.

**Table 9:  File Locations on the OVO Management Server**

| File Type | Installed Location |
|---|---|
| Logfiles | /var/opt/OV/log/OVSAMSPI |
| OVO integration | /opt/OV/OVSAMSPI |
| Documentation | /opt/OV/OVSAMSPI/doc/C |

Table 10 shows the directories for Storage Area Manager SPI files that you install on an OVO managed node. These are the standard locations for OVO commands.

**Table 10:  File Locations for the OVO Managed Node**

| Operating System | Installed Location |
|---|---|
| HPUX, Solaris, Redhat Linux, SuSE Linux, Tru64 | /var/opt/OV/bin/OpC/monitor |
| Windows | \usr\OV\bin\OpC\cmds |
| AIX | /var/lpp/OV/OpC/monitor |
| Novell Netware | sys:/var/opt/OV/bin/OpC/monitor |

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# Configuration

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# Adding nodes to node groups

The first step in the configuration process is to add the Storage Area Manager management server and the nodes running the Host Agent to the appropriate Node Groups. The installation of Storage Area Manager SPI creates the following node groups:

- OpenView-SAM_MgmtServer

- OpenView-SAM_HA-Windows

- OpenView-SAM_HA-UX

- OpenView-SAM_HA-NW

To add the Storage Area Manager nodes to the OVO Node Bank:

1. Start the OVO GUI and login as the administrator **opc_adm**.

2. In the Node Bank window, select the following menu option:

   **Actions: Node -> Add**

**Figure 4: Add Node**

3. Add the Storage Area Manager management server and all Host Agent nodes to the Node Bank window.

4. In the Node Group Bank window, double-click the
   **OpenView-SAM_MgmtServer** icon. The OpenView-SAM_MgmtServer
   Node Group window opens.

5. Drag and drop the Storage Area Manager management server running HP
   OpenView SAM 3.1/3.2 from the Node Bank window into this folder.

6. In the Node Group Bank window, double-click the
   **OpenView-SAM_HA-Windows** icon. The OpenView-SAM_HA-Windows
   Node Group window opens.

7. Drag and drop the Windows Host Agent servers running HP OpenView SAM
   3.1/3.2 Host Agent from the Node Bank window into this folder.

8. In the Node Group Bank window, double-click the **OpenView-SAM_HA-UX**
   icon. The OpenView-SAM_HA-UX Node Group window opens.

9. Drag and drop the Unix Host Agent servers running HP OpenView SAM
   3.1/3.2 Host Agent from the **Node Bank** window into this folder.

10. In the Node Group Bank window, double-click the
    **OpenView-SAM_HA-NW** icon. The OpenView-SAM_HA-NW Node
    Group window opens.

11. Drag and drop the Novell Netware Host Agent servers running HP OpenView
    SAM 3.1/3.2 Host Agent from the **Node Bank** window into this folder.

# Installing the OVO agent

The next step in the configuration of the Storage Area Manager SPI is to ensure that the OVO agent is installed on the Storage Area Manager nodes.

Before starting the OVO agent installation, make sure that the system on which you want to install the OVO agent meets the hardware and software requirements described in page 28.

You can install the OVO agent by various methods on a OVO managed node. Two examples are given below:

■   Standard installation

■   Manual installation

For more detailed information about the various installation methods, refer to section "Installation and De-installation" in the *HP OpenView VantagePoint Operations for UNIX Administrator's Reference Volume II.*

# Assigning user profiles

This section describes how to assign the Storage Area Manager SPI user profiles to the OVO users whom you intend to make responsible for the administration of the Storage Area Manager SPI and the managed nodes on which the Storage Area Manager SPI runs. For more information about user profiles in OVO, see page 71.

To assign user profiles to OVO users:

1. Start the OVO GUI and login as the administrator **opc_adm**.

2. In the User Bank window, select and right-click the user to whom you want to assign responsibility for the Storage Area Manager SPI (e.g. **opc_adm**) and choose the following option from the menu that pops up:

   **Modify...**

3. The Modify User: <user> window displays. In this example, the <user> would be **opc_adm**.
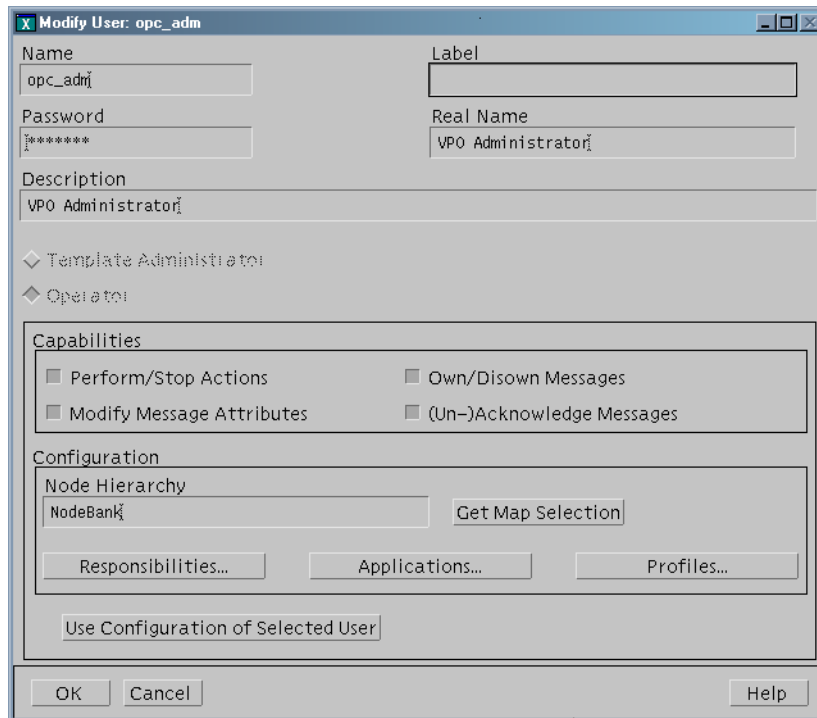


**Figure 5: Modify User**

4.  Click the **Profiles...** button. The Profiles of user: <user> window appears.

5.  Open the User Profile Bank window.

---

**Note:** The responsibilities in a user profile are *global* and, as a result, not immediately visible in the Responsibility Matrix window of the individual user to whom the user profile is assigned. Similarly, the responsibilities of the user are *local* and only visible in the user's own responsibility matrix. For example, if you assign the **OpenView SAM Admin** user profile to the OVO user **opc_adm**, *all* the message groups and node groups assigned in the OpenView SAM operator user profile are indeed assigned to the OVO user, **opc_adm,** even if it does not, at first, appear so in **opc_adm's** responsibility matrix.

---

6.  Drag the **OpenView SAM Admin** user profile from the **User Profile Bank** window and drop it into the Profiles of user: <user> window.
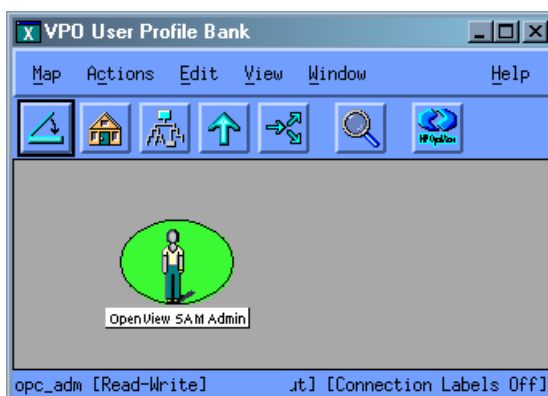


**Figure 6: OpenView SAM Admin User Profile**

In the Modify user: <user> window, click **OK**.

# Distributing the templates

In this step of the Storage Area Manager SPI configuration process, you distribute the Storage Area Manager SPI templates to the Storage Area Manager nodes.

To distribute the templates to Storage Area Manager nodes:

1. From the OVO Node Group Bank window, press the **Ctrl** key and select all the Storage Area Manager related node groups.

2. Select **Actions -> Agents -> Install/Update SW & Config...** The Install/Update VPO Software and Configuration window is displayed.
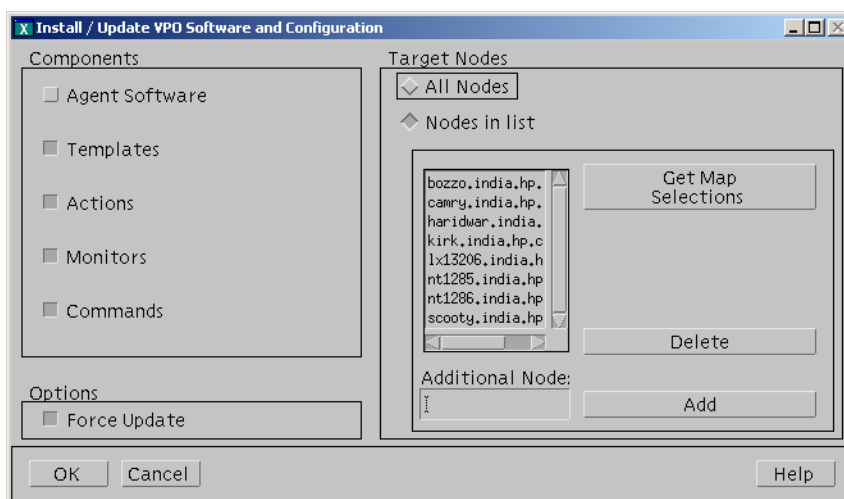


**Figure 7: Install/Update VPO Software and Configuration**

3. In the window, click the following, if not already selected:
   — Templates
   — Actions
   — Monitors
   — Commands

   Finally, check the **Force Update** check box to ensure that the modifications are distributed.

4. Click **OK** to distribute the templates to the OVO agent nodes.

5. Open the message browser and wait for the following message:

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

**Note:** The above message would be displayed on the message browser of the user whose responsibilities include messages relating to the OpC message group. If you do not see this message, modify the responsibilities of the user you logged in as to include the OpC message group.

The Storage Area Manager SPI is now installed on the management server and the selected managed node(s).

# Setting up service discovery

The Storage Area Manager SPI includes integration with Service Navigator but will be installed only when the Service Navigator product is available on the target machine. The integration provides a UNIX daemon which will query the Storage Area Manager bridge to discover Storage Area Manager related services. The integration also updates the service maps once a day. The user has a choice of changing the schedule for update while configuring service discovery.

---

**Note:** For details on how to configure the Storage Area Manager bridge, refer to Chapter 7, "Configuring the Bridge," in the *hp OpenView storage area manager administrator's guide.*

---

Follow the steps below to set up Service Discovery of Storage Area Manager services:

1. Install the **HPSAMSPI-SN-INTEGRATION** fileset if it is not already installed.

   For detailed installation instructions, refer to page 32.

2. Configure the Storage Area Manager service discovery daemon. To configure the daemon:

   a. Login to the OVO management server as user **root** and open a terminal window.

   b. Type **/opt/OV/OVSAMSPI/ovsamsn/ovsamconf.sh** and press **Enter**. The following message is displayed:

      ```
      Starting to create /opt/OV/OVSAMSPI/ovsamsn/ovsamsnd.conf...
      ```

   c. At the prompt

      ```
      'Enter the hostname of the HP OpenView SAM Bridge:'
      ```

      Type the hostname of the Storage Area Manager bridge and press **Enter**. The following message is displayed:

      ```
      Trying to ping <hostname>...
      ```

   d. At the prompt

      ```
      'Enter the port at which HP OpenView SAM Bridge is running
      [8041]:'
      ```

      Press **Enter** to retain the default port or enter the port at which the Storage Area Manager bridge is running and press **Enter**.

e.  At the prompt

    `'Enter the HP OpenView SAM username[User]:'`

    Press **Enter** to retain the default Storage Area Manager username or enter
    an alternate Storage Area Manager user name and press **Enter**.

f.  At the prompt

    `'Enter the HP OpenView SAM password:'`

    Type the corresponding Storage Area Manager password and press **Enter**.

g.  Confirm the password by re-entering the password at the prompt

    `'Re-enter password:'`

---

**Note:** Service Discovery will not function correctly if the values for the user name and password are incorrect. If you do not know the user name and password, contact your System Administrator.

---

h.  At the prompt

    `'Enter the XML file name for the hmap service: [hmap.xml]'`

    Press **Enter** to retain the default name or enter a name of your choice.

i.  At the prompt

    `'Enter the XML file name for the lmap service: [lmap.xml]'`

    Press **Enter** to retain the default name or enter a name of your choice.

j.  At the prompt

    ```
    'Enter the poll time in seconds for getting the services
    [86400 secs.]:'
    ```

    Press **Enter** to retain the default polling interval or enter your choice of
    polling interval in seconds. The following messages are displayed:

    ```
    Writing information to
    /opt/OV/OVSAMSPI/ovsamsn/ovsamsnd.conf file.

    Done creating /opt/OV/OVSAMSPI/ovsamsn/ovsamsnd.conf file.

    Would you like to start the ovsamsnd daemon now: [y]/n?
    ```

k.  Press **Enter** to start daemon. The following messages are displayed:

    ```
    Adding ovsamsnd to inittab

    Entry added
    ```

3. If you did not start the daemon as described in the previous step, start the daemon. To start the daemon, do the following:

---

**Note:** Ensure that the Storage Area Manager bridge is up and running before starting the daemon.

---

a. From a terminal window, type `/opt/OV/OVSAMSPI/ovsamsn/ovsamsn start` and press **Enter**. The following messages are displayed:

```
Adding ovsamsnd to inittab

Entry added

Configuration for discovering services was done
successfully.
```

---

**Note:** By default, the Storage Area Manager service discovery daemon discovers new services once a day.

---

The daemon starts to run and creates a logfile at **/opt/OV/OVSAMSPI/ovsamsn/ovsamsnd.log**. The log file contains information for troubleshooting purposes.

---

**Note:** To stop the daemon from a terminal window, type **/opt/OV/OVSAMSPI/ovsamsn/ovsamsn stop**

---

Service discovery is now set up in your managed environment.

# Setting up automatic acknowledgement

The Storage Area Manager SPI has the ability to automatically acknowledge an event in the Storage Area Manager, if the corresponding event is acknowledged in the OVO message browser. To configure automatic acknowledgement:

1. Login to the OVO management server as user **root** and open a terminal window.

2. Type **/opt/OV/OVSAMSPI/acknowledge/ovsamack start** and press **Enter**.

3. At the prompt:

   ```
   Enter the HP OpenView SAM username [Administrator]:
   ```

   Press **Enter** to retain the default Storage Area Manager user name or enter an alternate Storage Area Manager user name and press **Enter**.

4. At the prompt:

   ```
   'Enter the HP OpenView SAM password:'
   ```

   Type the Storage Area Manager password and press **Enter**.

5. Confirm the password by re-entering the password at the prompt

   ```
   'Re-enter password:'
   ```

---

**Caution:** Automatic acknowledgement will not function correctly if the values for the user name and password are incorrect. Note that the username that you configure should have Write capabilities on the Storage Area Manager management server. If you do not know the user name and password, contact your System Administrator.

---

**Note:** HP recommends that you set up a Storage Area Manager user account specifically for this functionality and supply the user name and password to the person responsible for configuration of OVO.

If there are multiple management servers in your environment, you will need to create the same user account(s) on each.

---

6.  The following messages are displayed:

    ```
    Adding ovsameventackd to the inittab.
    Entry added.
    See Syslog for more details.
    ```

    **Note:**  Type **/opt/OV/OVSAMSPI/acknowledge/ovsamack stop** from a terminal window to stop automatic acknowledgement.

    Automatic acknowledgement is now set up in your managed environment.

# Using

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# The hp OpenView storage area manager SPI node groups

The installation of the Storage Area Manager SPI creates the following node groups:

■ OpenView-SAM_MgmtServer

■ Openview-SAM_HA-Windows

■ OpenView-SAM_HA-UX

■ OpenView-SAM_HA-NW

The figure below shows the Storage Area Manager SPI node groups in the VPO Node Group Bank.
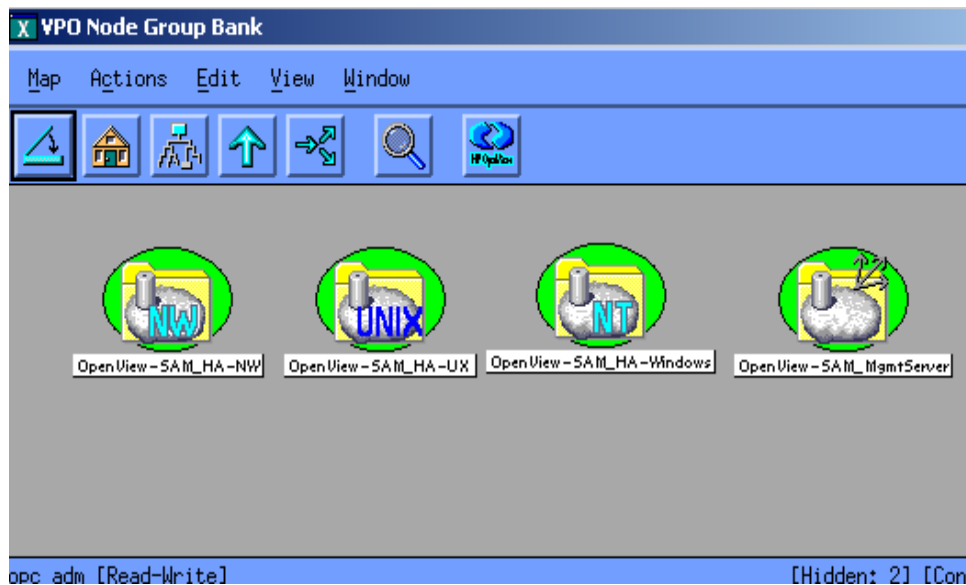


**Figure 8: The hp OpenView storage area manager SPI Node Groups**

The node groups are aimed at providing a logical grouping of managed nodes.

# The hp OpenView storage area manager SPI applications

The installation of the Storage Area Manager SPI creates the following application groups:

- ManagementServer
- HostAgent-Windows
- HostAgent-UX
- HostAgent-NW

These application groups are grouped under OpenView SAM in the application bank. The figure below shows the OpenView SAM application group.



**Figure 9: The OpenView SAM Application Group**

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The following figure shows a sample of applications supplied with the Storage Area Manager SPI.
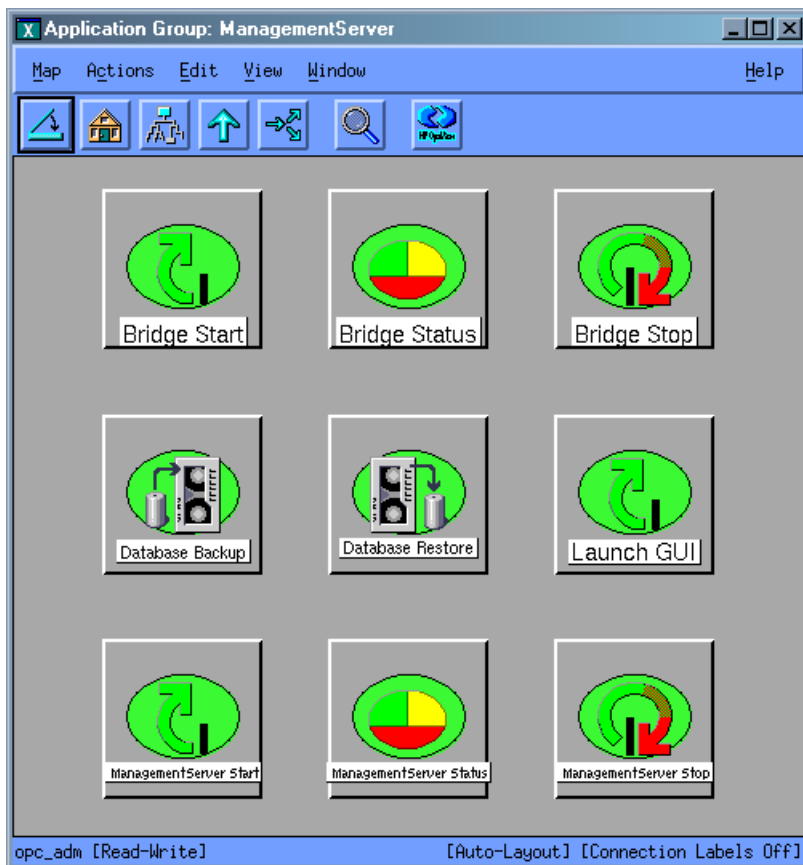


**Figure 10:  The OpenView SAM Application Group Sample**

The table below describes the functionality of the applications present in the Storage Area Manager application group.

**Table 11: Applications in hp OpenView storage area manager SPI Application Group**

| Application Name | Description |
|---|---|
| ManagementServer Start/ManagementServer Stop | The Management Server Start and Management Server Stop applications provide a convenient way to start and stop the HP OpenView SAM ManagementServer service and HP OpenView SAM Embedded DB service from the operator's console. |
| ManagementServer Status | The Management Server Status tool helps the administrator determine the status of the HP OpenView SAM ManagementServer service and the HP OpenView SAM Embedded DB service from the operator's console. |
| Database Backup/Database Restore | The Database Backup and Database Restore applications invoke the backup and restore commands of Storage Area Manager. |
| Launch GUI | The Launch GUI application enables the user to launch the Storage Area Manager GUI from the operator's console. |
| Bridge Start/Bridge Stop | The Bridge Start and Bridge Stop tools provide a convenient way to start and stop the HP OpenView SAM Bridge service from the operator's console. |
| Bridge Status | The Bridge Status tool helps the administrator determine the status of the HP OpenView SAM Bridge service from the operator's console. |
| HostAgent Start/HostAgent Stop | From the operator's system, you can start and stop the HostAgent service using HostAgent Start and HostAgent Stop applications. |

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**Table 11: Applications in hp OpenView storage area manager SPI Application Group**

| Application Name | Description |
|---|---|
| HostAgent Status | The HostAgent Status is a tool that lets the operator determine the status of the HostAgent service from the operator's console. |
| OpenDial Start/OpenDial Stop | OpenDial Start and OpenDial Stop applications provide a convenient way to start and stop the OpenDial service. |
| OpenDial Status | The OpenDial Status is a tool that lets the operator determine the status of the OpenDial service from the operator's console. |

# The hp OpenView storage area manager SPI message-source templates

The template group, OpenView SAM, contains all the message-source and monitor templates provided with the Storage Area Manager SPI, as illustrated in Figure 11.

The installation of Storage Area Manager SPI creates the following template groups:

- ManagementServer
- HostAgent-windows
- HostAgent-UX
- HostAgent-NW

The table below describes the functionality of the template groups.

**Table 12:  Functionality of Template Groups**

| Template Group Name | Description |
| --- | --- |
| ManagementServer | Contains templates to monitor the SAM management server services. |
| HostAgent-Windows | Contains templates to monitor SAM Host Agent and OpenDial services on nodes running Windows. |
| HostAgent-UX | Contains templates to monitor SAM Host Agent and OpenDial services on nodes running UNIX. |
| HostAgent-NW | Contains templates to monitor SAM Host Agent and OpenDial services on nodes running Novell Netware |

The template groups are also pre-assigned to the associated node groups. The following table describes the association of template groups to node groups. This ensures that the right templates are distributed to the managed nodes.

**Table 13:  Template Groups and the Corresponding Node Groups**

| Template Group | Node Group |
|---|---|
| ManagementServer | OpenView-SAM_MgmtServer |
| HostAgent-Windows | OpenView-SAM_HA-Windows |
| HostAgent-UX | OpenView-SAM_HA-UX |
| HostAgent-NW | OpenView-SAM_HA-NW |
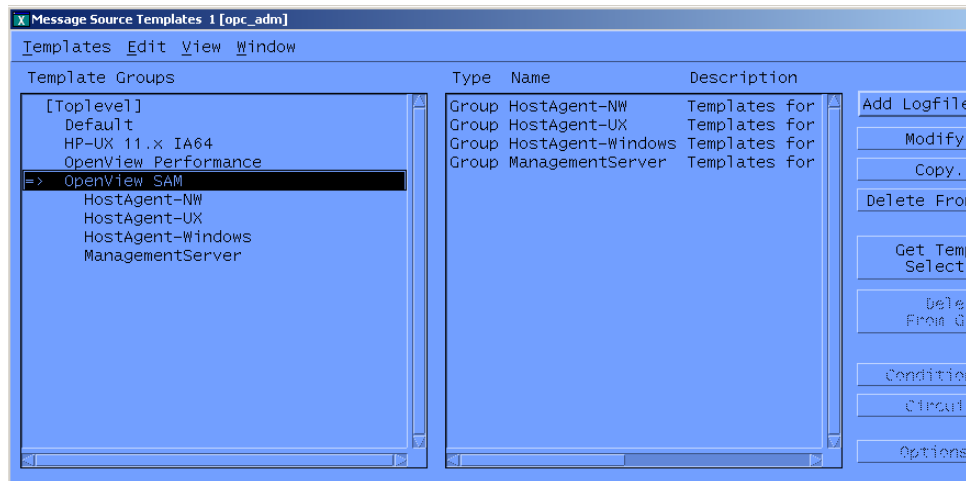


**Figure 11:  OpenView SAM Message-Source Template Group**

The Storage Area Manager SPI message-source templates intercept Storage Events, which are generated by various Storage Area Manager subsystems and storage devices themselves. The Storage Events are forwarded to the OVO using the **opcmsg ()** interface. Messages generated by the Storage Area Manager SPI templates pass through a filtration process and are then prioritized and assigned an OVO severity level as defined in the templates.

All the messages generated by all the Storage Area Manager SPI templates belong by default to the OpenView-SAM Message Group.

Additional monitor templates verify the status of the Storage Area Manager software services running on the Storage Area Manager management server and the Host Agent software running on the SAN hosts, and generate messages to indicate any change in status. The default templates provided with the Storage Area Manager SPI template group are listed in the table below.

The OpenView SAM template group contains the following templates

# The hp OpenView storage area manager SPI messages

**Table 14: Templates in OpenView SAM Template Group**

| Template Group | Template Type | Template Name | Description |
|---|---|---|---|
| Management Server | Logfile | Storage_Events_0300 | Analyzes and intercepts storage events from CS-EventExport.log file. |
| | Logfile | Acknowledge_Storage_Events_0300 | Analyzes and intercepts acknowledged storage events from CS-EventAckDelExport.log file. |
| | Monitor | Bridge_Service_0300 | Monitors the process named 'BridgeServer' and sends a message to the event browser if not running. |
| | Monitor | Management_Server_Service_0300 | Monitors the process named 'ManagementServer' and sends a message to the event browser if not running. |
| | Monitor | Embedded_DB_Service_0300 | Monitors the process named 'solid' and sends a message to the event browser if not running. |
| HostAgent-Windows | Monitor | HostAgent_Service_0300 | Monitors the process 'HostAgent' on Windows Storage Area Manager hosts and sends a message to the event browser if not running. |
| | Monitor | OpenDial_Service_0300 | Monitors the process 'OpenDial' on Windows Storage Area Manager hosts and sends a message to the event browser if not running. |

**Table 14: Templates in OpenView SAM Template Group**

| Template Group | Template Type | Template Name | Description |
|---|---|---|---|
| HostAgent-UX | Monitor | Hostwatchdog_Daemon_0300 | Monitors the process 'hostwatchdog' on UNIX Storage Area Manager hosts and sends a message to the event browser if not running. |
| | Monitor | HostAgent_Daemon_0300 | Monitors the process 'hostagent' on UNIX Storage Area Manager hosts and sends a message to the event browser if not running. |
| | Monitor | diald_Daemon_0300 | Monitors the process 'diald' on UNIX Storage Area Manager hosts and sends a message to the event browser if not running. |
| HostAgent-NW | Monitor | HostAgent_Module_0300 | Monitors the service 'hostagent' on Novell Netware Storage Area Manager hosts and sends a message to the event browser if not running. |
| | Monitor | diald_Module_0300 | Monitors the service 'diald' on Novell Netware Storage Area Manager hosts and sends a message to the event browser if not running. |

All events generated by Storage Area Manager SPI are grouped into the message group OpenView-SAM. The messages generated by the Storage Area Manager SPI templates appear in the Message Browser window and contain information that is vital for the understanding of the problems being reported. The interpretation of the message severities is provided in the table below.

**Table 15:  hp OpenView storage area manager Error Codes and OVO Severity Levels**

| OVO Message Severity Level | Storage Area Manager Severity Level | Storage Area Manager SPI Impact |
|---|---|---|
| Critical | Critical | A critical problem is detected that needs immediate attention. |
| Major | Major | A very significant event has occurred, where immediate attention is advised. Some parts of the system or device may have ceased functioning properly. |
| Minor | Minor | An event of some significance has occurred. Potential or impending problems have occurred that may escalate to become a serious problem. |
| Warning | Warning | A problem has been detected that should be corrected. This event is not likely to be escalated to a more severe condition. |
| Normal | Informational | A notable event has occurred, albeit one without any obvious detrimental effects. This is purely an informational event. |

The following figure shows the Message Browser window with a selection of messages generated by the Storage Area Manager SPI.

**Figure 12: Message Browser Window**

## hp OpenView storage area manager SPI messages in the message browser

The message headline can give an idea of the scope of the problem. In the Storage Area Manager SPI context, this information can be broken down in the following way:

**Node Name** - The name of the Storage Area Manager management server.

**Application** - The category of the message. Possible categories are Device, Performance, Capacity, Database, Allocater and Monitor. In the event of a process not running, the name of the process is used.

**Message Group** - The Message Group is OpenView-SAM.

**Message Text** - A single line description of the storage event.

**Object** - The source of the storage event.

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# Launching the hp OpenView storage area manager GUI from the message browser

In an environment where SAM 3.1/3.2 is managed, the operator has a choice of launching the Storage Area Manager GUI to further determine the cause of the problem and possibly correct it. To launch the Storage Area Manager GUI:

- Select the Storage Area Manager event

- Right-click the **event** and select **Action** -> **Perform Action -**> **Operator Initiated Action**

- If the Storage Area Manager client is installed on the management server, the Storage Area Manager GUI starts up with the window context set to the appropriate panel in Storage Area Manager

**Note:** The operator needs to enter the user name and password of the Storage Area Manager management server, when prompted by the Storage Area Manager GUI, in order to access Storage Area Manager resources.

# The hp OpenView storage area manager SPI users and user profiles

## OpenView SAM Admin user profile

The installation of the Storage Area Manager SPI software adds a new user profile called OpenView SAM Admin to the OVO User Profile Bank window. The figure below illustrates the OpenView SAM Admin user profile. The OVO administrator utilizes user profiles to simplify the process of assigning responsibilities to new OVO users.
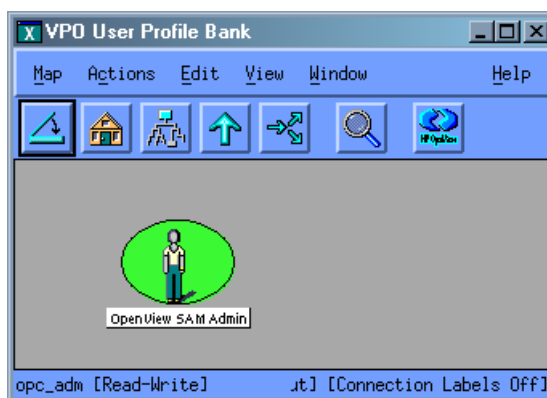


**Figure 13: OpenView SAM Admin**

**Note:** Responsibilities defined in an OVO user profile are *global* and, as a consequence, not visible in the individual user's responsibility matrix even after the user profile has been assigned. Similarly, responsibilities defined in an OVO user profile are *local* and are only visible in the individual user's responsibility matrix.

## storage_op user

The installation of the Storage Area Manager SPI software also creates a default user named storage_op. All Storage Area Manager applications/templates/message groups are assigned to this user and this user will receive messages originating from Storage Area Manager nodes. The default password for this user is Storage_Op**.** The login password for this user can be modified in the storage_op properties as shown in the figure.
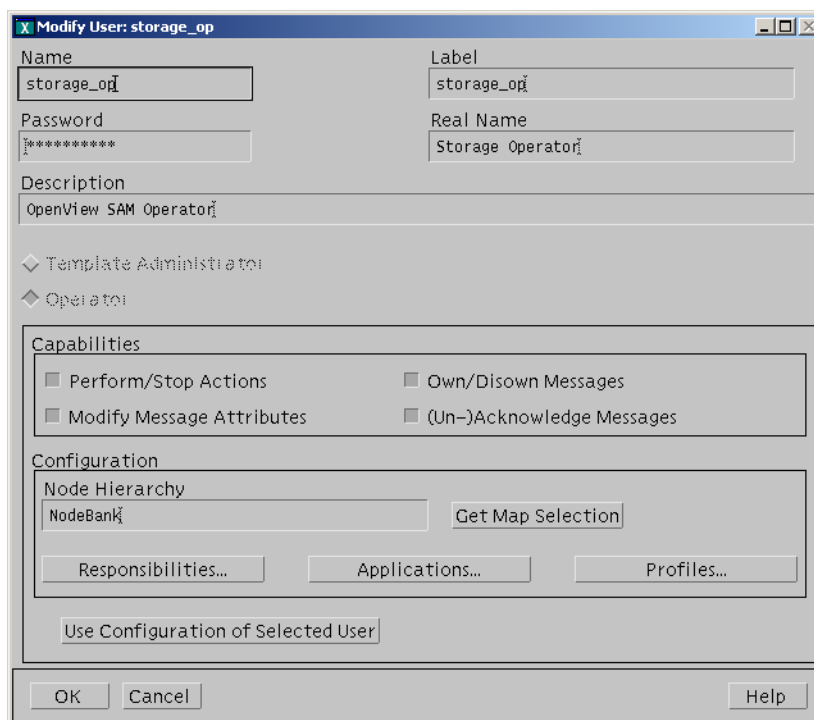


**Figure 14:  storage_op**

> **Caution:**  If you are planning to integrate hp OpenView Storage Area Manager with Service Desk, do not change the password of this user.

# The hp OpenView storage area manager SPI service views

The Storage Area Manager SPI integration with the OpenView Service Navigator provides the Storage Area Manager SPI user with the additional perspective of Service views. This feature is available only if the OpenView Service Navigator software is installed and running. This integration provides the following *Service* views:

■ OpenView SAM Service

■ Storage Links Service

The Storage Area Manager SPI discovers the services automatically and uses the discovered data to generate the services named OpenView SAM and Storage Links for the OpenView Service Navigator. The figure below shows the service views supported by the Storage Area Manager SPI.
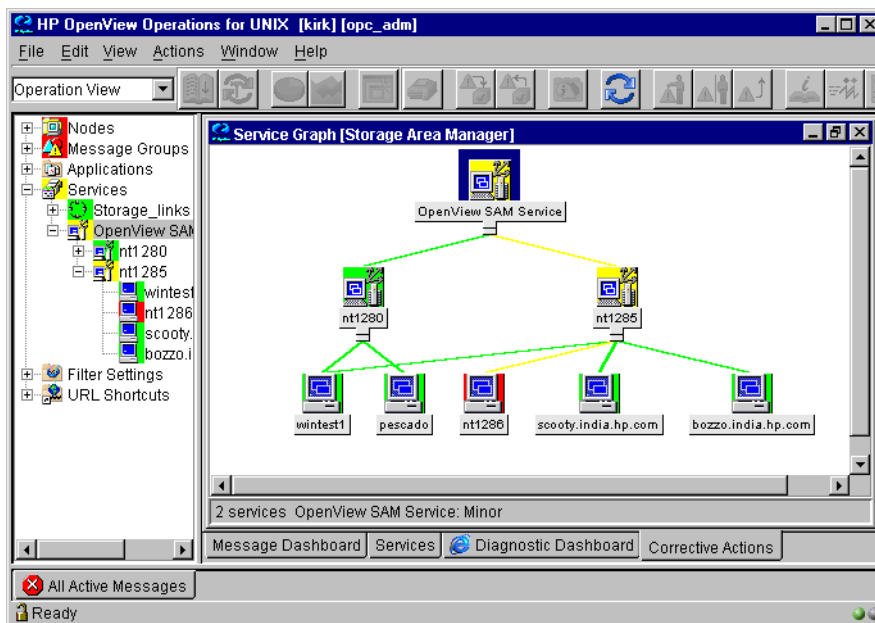


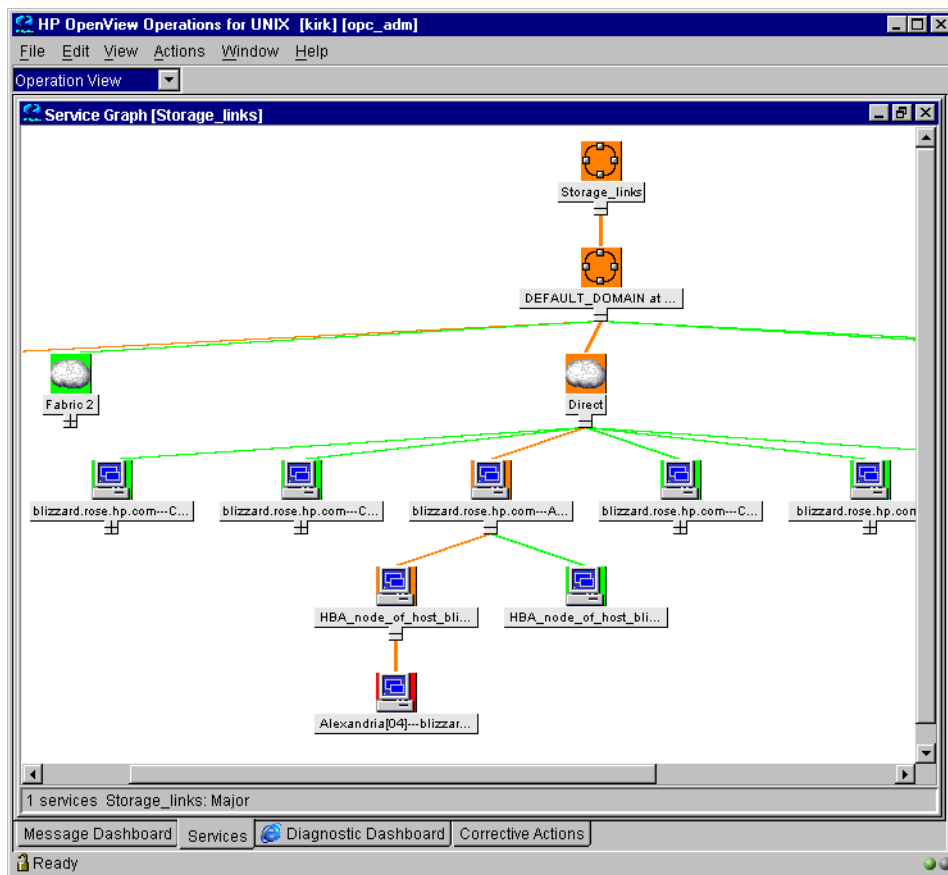Figure 15: OpenView SAM Service

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**Figure 16: Storage Links Service**

The combination of the two products allows root-cause analysis of any problems in the most crucial elements of the Storage Area Manager and the storage network being managed by Storage Area Manager. Propagation rules for the objects in the Storage Area Manager service tree are defined by default as *Unchanged*. This means that a parent service does not change the status of a child object by, for example, attaching a priority to it. Such a scenario would be feasible if a parent service considered the status of one child service to be more important than the status of another child service. Calculation rules for the Storage Area Manager service tree are set by default to *Most Critical*. This means that if a parent service has more than one child service, it assumes the status equal to the highest severity

of its child services. For more information about calculation and propagation rules, as well as how to go about modifying them, see the *HP OpenView Service Navigator Concepts and Configuration Guide.*

**Note:** OVO messages are associated with *all* the low-level services.

## Applying the hp OpenView storage area manager SPI services to a user

The Storage Area Manager SPI services are by default assigned to users **storage_op and opc_adm.**

To apply the Storage Area Manager SPI services to an additional user, enter the command:

```
opcservice -assign <username> SAM
opcservice -assign <username> Storage_links
```

## Starting the Service Navigator GUI

To start the Service Navigator GUI, run: ito_op and login with a user name.

**Note:** For instructions on how to install the Service Navigator console, refer to the *HP OpenView VantagePoint Operations for UNIX Administrator's Reference Volume II.*

## Viewing the service maps

To view the service maps, start the Navigator GUI as specified above. In the GUI, two service maps called OpenView SAM Service and Storage_links will be displayed. Click **OpenView SAM Service** to view the OpenView SAM Service map and **Storage_links** to view the Storage Links map.

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# Troubleshooting

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# Before you start

You should carry out the following basic checks to ensure that the Storage Area Manager SPI environment is correctly installed and configured, before you start investigating any problems that might happen while installing, configuring, or using the SPI.

■    Carry out the steps recommended in page 39.

This ensures that you have installed and configured the Storage Area Manager SPI software in the recommended manner and that the messages seen in the OVO events browser are:

—    generated by the Storage Area Manager.

—    intercepted by the Storage Area Manager SPI templates and monitors.

—    appearing in the OVO message browser in the form you expect.

If the preliminary check does not resolve the problems, go through the list of common problems and their solutions described below.

# OpenView SAM SPI messages not arriving on the OVO management server

| Symptom | Cause/Solution |
|---|---|
| No Storage Area Manager SPI messages arriving on the OVO management server | Make sure that the connection between the OVO management server and the Storage Area Manager management server is up and running. |
| | Ensure that the Storage Area Manager Services are running on the Storage Area Manager management server. |
| | Verify that the OVO agent has been correctly installed and configured on the Storage Area Manager management server and the OVO agent processes (and in particular the control agent) are running. |
| | Make sure that the Storage Area Manager SPI templates have been correctly distributed to the management server. |
| | Make sure that Storage Area Manager nodes are added to the appropriate node groups. For more information, see page 44. |
| | Ensure that you have logged into OVO as user **storage_op** or that the user you logged in as belongs to the user profile, OpenView SAM Admin. |
| | It is possible that the log file, **CS-EventExport.log** could have rolled over more than once in an interval of 1 minute. This will result in the loss of all events in the old log files. For optimum results, retain the default threshold limit for the log file size. This value is set to 4 MB in the Storage Area Manager management server in the file Loggers.prp available under **<ManagementRoot>\managementserver\config**. |

# No service maps on the navigator console

| Symptom | Cause/Solution |
|---|---|
| Cannot see service maps on the navigator console. | Ensure that Service Navigator is installed and configured on the OVO management server. |
| | If Service Navigator was installed on your OVO management server after Storage Area Manager SPI was installed, reinstall the fileset **HPSAMSPI-SN-INTEGRATION** and configure Service Discovery. For more information, refer to page 52. |
| | There may be a problem retrieving service maps from the HP OpenView SAM bridge. Check the log file at **/opt/OV/OVSAMSPI/ovsamsn/ovsamsnd.log** for any such errors. |
| | Ensure that the service maps are activated for the user that you login as. For more information, refer to page 75. |

# Messages in the annotation field

| Symptom | Cause/Solution |
| --- | --- |
| I get the following message in the Annotation field of events: "Service Desk integration is not present. Event would not be forwarded to Service Desk (SD)". | The Storage Area Manager SPI is tightly integrated with Service Desk, and the SPI will try to forward all events to Service Desk. The above message would be displayed if the SPI is unable to find the Service Desk integration. This message can be ignored if you do not intend to integrate Storage Area Manager with Service Desk.<br><br>**Note:** For details on how to integrate Storage Area Manager with Service Desk, refer to the *hp OpenView storage area manager Service Desk integration administrator's reference.* |

# Context Sensitive GUI launch is not working

| Symptom | Cause/Solution |
| --- | --- |
| Context Sensitive GUI launch is not working | Ensure that the hp OpenView storage area manager client is installed on the OVO management server from where you are launching the GUI. |
| | The OVO management server needs to be an authorized client to the Storage Area Manager management server where the event originated from. The OVO management server can be made an authorized client to the Storage Area Manager management server by adding a host entry in the authorizedClients.dat file on the Storage Area Manager management server. For details, refer to the *hp OpenView storage area manager administrator's guide.* |

# Automatic Acknowledgement is not working

| Symptom | Cause/Solution |
|---|---|
| Automatic Acknowledgement is not working | Ensure that the hp OpenView storage area manager client is installed on the OVO management server. |
| | Ensure that you have carried out the configuration steps. For more information, refer to page 55. |
| | The OVO management server needs to be an authorized client to the Storage Area Manager management server where the event originated from. The OVO management server can be made an authorized client to the Storage Area Manager management server by adding a host entry in the authorizedClients.dat file on the Storage Area Manager management server. For details, refer to the *hp OpenView storage area manager administrator's guide.* |
| | Automatic acknowledgement will not function correctly if the values for the username and password are incorrect. Note that the username that you configure should have Write capabilities on the Storage Area Manager management server. If you do not know the user name and password, contact your System Administrator. |

# Uninstalling

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# Uninstalling the OpenView SAM SPI from the OVO managed nodes

To uninstall Storage Area Manager SPI components from the managed nodes:

1. From the OVO Node Group Bank window, press the **Ctrl** key and select all the Storage Area Manager related node groups.

2. Select **Actions** -> **Agents** -> **Assign Templates...**

   The Define Configuration window opens.

3. Select the Storage Area Manager related Node Group and click **Remove Selected**.

4. Click **OK**.

5. From the OVO Node Group Bank window, press the **Ctrl** key and select all the Storage Area Manager related node groups.

6. Select **Actions** -> **Agents** -> **Install/Update SW & Config...** The Install/Update ITO Software and Configuration window is displayed.

7. In the window, click the following, if not already selected:

   — Templates

   — Actions

   — Monitors

   — Commands

   Finally, check the **Force Update** check box to ensure that the modifications are distributed.

8. Click **OK** to remove Storage Area Manager SPI components from the OVO managed nodes.

After you remove the Storage Area Manager SPI installation from the Storage Area Manager managed nodes, you can remove the Storage Area Manager managed nodes from the Node Bank Window in the OVO GUI if you no longer wish to manage these nodes from OVO.

# Uninstalling the OpenView SAM SPI from the OVO management server

To uninstall the Storage Area Manager SPI components from the OVO management server:

1. Login to the OVO management server as user **root** and open a terminal window.

2. Enter `swremove HPOVSAMSPI`

This will remove all the Storage Area Manager SPI components from the OVO management server.