

HP Server Automation

Ultimate Edition

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Storage Visibility and Automation Installation & Administration Guide

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- Server Automation Virtual Appliance (SAVA) is the Premium Edition of Server Automation. For more information about what SAVA includes, see the SAVA Release Notes and the SAVA at a Glance Guide.

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1 Introduction



Storage Essentials (SE) version 6.1.1 and later is required to view, report, or perform any Service Automation Visualizer (SAV) and Service Automation Reporter (SAR) operation on SAN objects, such as arrays, switches, volumes, and so on. SAN objects are discovered in Storage Essentials. To enable discovered SAN objects in the SA, SAV, and SAR products, the Server Automation SE Connector component must be installed and configured.

The following storage components for Storage Visibility and Automation must be installed and deployed:

- [Storage Host Agent Extension \(SHA\)](#)
- [Database Scanner for Oracle](#)
- [SE Connector](#)

Host storage supply chain information is discovered and collected by a Storage Host Agent Extension (SHA) in Storage Visibility and Automation. Storage asset information is discovered in Storage Essentials (SE) and then collected by Storage Scanners in Storage Visibility and Automation. This document explains how to install, configure, deploy, and manage Storage Host Agent Extensions and Storage Scanners in Storage Visibility and Automation.

- Information about a host storage supply chain is provided by a Storage Host Agent Extension (SHA). See [Storage Host Agent Extension \(SHA\)](#) on page 27 for more information about this component.
- Information about Oracle storage configurations in a SAN or Network Attached Storage (NAS) is collected by a component in Storage Visibility and Automation called the *Database Scanner for Oracle*. This Storage Scanner retrieves data about Oracle instance, tablespaces, and datafiles. See [Database Scanner for Oracle](#) on page 29 or [Storage Scanner Configuration and Operation](#) on page 38 for more information about this component.
- Information about storage arrays, switches, fabrics, and NetApp filers in your environment is collected by a component in SA called *SE Connector*. SE Connector retrieves data about the SAN infrastructure from SE. This storage data is transferred to the SA core and stored in the Model Repository. See [SE Connector](#) on page 17 or [Storage Scanner Configuration and Operation](#) on page 38 for more information about this component.

This guide is intended for system administrators and server administrators who are responsible for installing and configuring Storage Visibility and Automation. This documentation assumes that you are familiar with the operating systems on which this feature will be installed. It is also assumed that you have the required permissions to install this software on managed servers.

See the *SA Standard/Advanced Installation Guide* for information about how to install and configure Server Automation. See the *SA User Guide: Application Automation* for information about Service Automation Visualizer. See the *SAR User Guide* for information about Service Automation Reporter. See the *Storage Essentials Installation Guide* for information about how to install and configure Storage Essentials.

2 Installation & Deployment

The following table identifies the storage components for Storage Visibility and Automation that must be installed and deployed. This table also identifies the source required to install each storage component.

table 1 Required Storage Components

Storage Component	Installation Source
Storage Host Agent Extension (SHA)	Agent and Utilities DVD
Database Scanner for Oracle	Agent and Utilities DVD
SE Connector	SE Connector

The SHA, SE Connector, and Database Scanner for Oracle storage components are part of the Agent and Utilities DVD, which is commonly known as the *upload media*. These storage components are part of the `Software Repository - Content` in the upload media. The upload media contains the agents and utilities, such as the OS Provisioning Boot Agent, Agents for various operating systems, and so on. After the Server Automation (SA) core has been installed, these agents and utilities must be uploaded to the Software Repository.

When the Storage Visibility and Automation installation process is completed, you will have the following storage components in your SA core:

- [Storage Host Agent Extension \(SHA\)](#)
- [Database Scanner for Oracle](#)
- [SE Connector](#)

See [Storage Host Agent Extension \(SHA\)](#) on page 27, [Database Scanner for Oracle](#) on page 29, and [SE Connector](#) on page 17 for more information about these storage components.

Installation Transcript Example

The following is an example of the BSA Installer transcript that shows the sequence of user actions required to install the SHA and Database Scanner for Oracle storage components.

```
Welcome to the Opsware Installer.
Please select the components to upgrade.
1 ( ) Software Repository - Content (install once per mesh) [UP TO DATE]
2 ( ) OS Provisioning Linux Media Verification
Enter a component number to toggle ('a' for all, 'n' for none).
When ready, press 'c' to continue, or 'q' to quit.
```

Selection:

The SHA and Database Scanner for Oracle storage components are explicitly not shown in this example because they are included in the `Software Repository - Content`. These storage components are installed, upgraded, or uninstalled along with other Software Repository components.

During the installation process, the BSA Installer saves all transcript answers in a *response file* and provides the name and location of the response file.



For future use, specify the name of this response file to upgrade the Software Repository. When you specify the name of the response file, you do not need to repeatedly answer the same transcript questions.

When the `Software Repository - Content` is installed, you will have the following storage components in your SA core:

- [Storage Host Agent Extension \(SHA\)](#)
- [Database Scanner for Oracle](#)

See [Storage Host Agent Extension \(SHA\)](#) on page 27 and [Database Scanner for Oracle](#) on page 29 for more information about these storage components.

Storage Host Agent Extension (SHA)

For SHA, the installation process creates a server module named `com.opsware.storage.storex` in the `/Opsware/Tools/Server Modules/` folder. Typically, you will not have permission to access this server module.

You can access SHA (which is internally known as *storex*) by creating a snapshot specification for `storex`. This process is standard for any server module snapshot.

See [Storage Host Agent Extension \(SHA\)](#) on page 27 for more information about this storage component.

Database Scanner for Oracle

For the Database Scanner for Oracle, the installation process creates the following:

- An APX module named `APX Oracle database scanner` in the `/Opsware/Storage/Tools/DbScanner` folder.
- A server module named `com.opsware.server.module.storage.dbscanner.oracle` in the `/Opsware/Tools/Server Modules/` folder.
- An ASAS Agent named `OracleDBScanner` that provides a user interface for viewing and managing the login credentials.
- A secured namespace named `OPSW_SCANNER_ORACLE_INSTANCE` for login credentials.



This installation process also configures metadata that is used for the login credentials. To support different locales, this metadata is stored as a UTF-8 string.

SE Connector

The following processes are required to get the SE Connector executable to a managed server:

- The *installation process* prepares packages and software policies in the core.
- The *deployment process* copies the binaries to a managed server and then configures them.

Prerequisites

Server Automation 7.80 or later and Storage Essentials 6.1.1.x or later are required to install, configure, and deploy SE Connector.

Attaching and Remediating the SE Storage Scanner and SE Connector Update Policies

This section describes the steps to follow when you attach and remediate the SE Storage Scanner and SE Connector Update policies.

To attach and remediate:

1. Attach the software policy SE Storage Scanner to the managed server.
2. Remediate the server.
3. If your HP Storage Essentials management server is version 6.1.1, you do not need to follow any more steps.
4. If your HP Storage Essentials management server is version 6.2 or later, attach the software policy SE Connector Update for your version to the managed server.

Note: The version of the SE Connector Update must be compatible with the version of the Storage Essentials server, which means that the version numbers of the SE Connector Update libraries must be the same as the version of the Storage Essentials. For example, if you have SE 6.2, installed, you must install the SE Storage Scanner first, then install the SE Connector Update for SE 6.2.

Installation Process

The installation process creates the following:

- An `/Opsware/Storage/Agents/SE` folder that contains all required packages for SE Connector and software policies for all versions of SE Client Library. Based on the operating system, the following two types of packages are uploaded to the `SE` folder:

`OPSWsa-se-<OS>-xx.x.x.x.xx.zip`

This file contains the SE Connector code (binaries) for a certain operating system (<OS>).

Examples:

OPSWsa-se-linux-40.0.0.0.94.zip

OPSWsa-se-solaris-40.0.0.0.94.zip

OPSWsa-se-win-40.0.0.0.94.zip

OPSWsa-seclient-x.x.x.x-<OS>.zip

This file contains the default SE Client Library for a certain operating system (<OS>).

Examples:

OPSWsa-seclient-9.4.0.242-linux.zip

OPSWsa-seclient-9.4.0.242-solaris.zip

OPSWsa-seclient-9.4.0.242-win.zip



For each supported operating system, the installation process prepares two packages in the SE folder. The examples above show packages for Linux, Solaris, and Windows operating systems.

- A software policy named SE Storage Scanner in the /Opsware/Storage/SE folder.
- A software policy named SE Connector Update for <SE version> in the /Opsware/Storage/SE Connector Updates folder.
- Several common packages in the /Opsware/Storage/Agents folder.



You must install the SE Connector Update software policy *before* you uninstall the SE Storage Scanner software policy.

See [SE Connector](#) on page 17 for more information about this storage component.

Deployment Process

In the deployment process, the administrator selects the software policy for SE Connector and assigns managed servers to it. During deployment, all relevant packages are copied to a managed server and all pre- and post-install scripts are executed. To complete the deployment process, SE Connector must be configured and then (automatically) started.

To deploy SE Connector on a managed server:

- 1 In the navigation pane, select **Library > By Folder**.
- 2 Select **Opsware > Storage > Agents > SE** to open the SE folder.
- 3 Open the “SE Storage Scanner” software policy.
- 4 *(Optional)* Modify the post-install script. See [Modifying a Post-install Script](#) on page 15.
- 5 In the Views pane, select Server Usage.
- 6 Select **Actions > Attach Server**.
- 7 In the Attach Server dialog, select **All Managed Servers** to view a list of servers that meet the qualifications for an SE Scanner.
- 8 In the Attach Server content pane, select a managed server and then click **Attach**.
- 9 Complete the Attach Server wizard.
- 10 Wait until the job completes.

- 11 If the HP Storage Essentials management server is version 6.1.1, you do not need to follow any more steps.
- 12 If the HP Storage Essentials management server is version 6.1.1 or later, attach the software policy `SE Connector Update` for your version to the managed server:
 - a In the navigation pane, select **Library > By Folder**.
 - b Select **Opware > Storage > Agents > SE Connector Updates** to open the folder.
 - c Open the `SE Connector Update for <version>` software policy.
 - d Attach and remediate.

When remediation is finished, SE Connector is configured and running on the specified managed server.



The version of the SE Connector Update must be compatible with the version of the Storage Essentials server. This means that the version numbers of the SE Connector Update libraries must be the same as the version of the Storage Essentials. For example, if you have Storage Essentials 6.1.1 installed, you will have to install the SE Storage Scanner first, and then install the SE Connector Update for 6.1.1 and later.

Modifying a Post-install Script

If port 7050 or port 7034 (the default) are not available on the managed server, you must modify the post-install script of the main package of SE Connector (for the corresponding operating system). Post-install scripts are executed after the package is copied and unpacked on the managed server.

To modify a post-install script:

- 1 Open the “SE Storage Scanner” software policy.
- 2 In the Views pane, select Policy Items.
- 3 Select a package with a name similar to “OPSWsa-se-linux-40.0.0.0.94.zip”. This name must match the operating system name of the managed server.
- 4 Right-click and then select Open to display the package Properties.
- 5 Expand “Install Scripts” and then select the “Post-Install Script” tab.
- 6 In the script, find the USER PARAMETERS section, such as

```
##### USER PARAMETERS #####
SRQST_JNP_PORT=7050
HTTP_PORT_VALUE=7034
##### USER PARAMETERS #####
```

- 7 Change the value(s) and then save the package.

Deployed Components

The following filesystem layouts identify deployed storage components, by operating system.

Unix-like Operating System

```
/etc/opt/opsware/pam-se .. config files
/etc/opt/opsware/startup/pam-se start|stop|status

/opt/opsware/pam-se
  bin ..... start/stop scripts
  lib ..... jar-files, third party libraries
```

```

    jboss .....
    clientlib ..... common folder for all supported SE Client libs

/opt/opsware/pam-common/
  lib ..... common libraries (netmux.pyc)
  jdk .....

/var/log/opsware/pam-se/ ... log-files

/var/opt/opsware/pam-se
  data ..... Full sync
  security ..... DeviceAccessControls
  requests ..... ServiceRequests  OPTIONAL

```

Windows Operating System

```

%ProgramFiles%\Opware\pam-se
  bin ..... start/stop scripts
  lib ..... jar-files, third party libraries
  jboss .....
  clientlib ..... common folder for all supported SE Client libs

%ProgramFiles%\Common Files\Opware\etc\pam-se ... config
%ProgramFiles%\Common Files\Opware\log\pam-se ... log-files OPTIONAL
%ProgramFiles%\Common Files\Opware\pam-se
  data ..... Full/sync
  security ..... DeviceAccessControls
  requests ..... ServiceRequests  OPTIONAL
%ProgramFiles%\Common Files\Opware\pam-common ...
  lib ..... common libraries (netmux.pyc)
  jdk .....

```


3 SE Connector

SE Connector is the Storage Scanner that collects data from Storage Essentials (SE) about SAN elements and inventory, and their connectivity. These SAN elements include storage arrays, fabrics, switches, and NAS filers.

Prerequisites

Server Automation 7.80 or later and Storage Essentials 6.1.1.x or later are required to install, configure, and deploy SE Connector.

You must also authorize SE Connector before using it. Authorization enables SE Connector to accept different requests, such as start and stop. See [Authorizing a Storage Scanner](#) on page 39.

The identity of this Storage Scanner is defined by HP Server Automation Agent properties. This identity is not changed until the Storage Scanner is restarted. This means that you must always stop the Storage Scanner *before* an SA Agent is reinstalled on a server. See [Starting a Storage Scanner](#) on page 39, [Stopping a Storage Scanner](#) on page 40, and [Reassigning a Deployed SE Connector](#) on page 20.

Attaching and Remediating the SE Storage Scanner and SE Connector Update Policies

This section describes the steps to follow when you attach and remediate the SE Storage Scanner and SE Connector Update policies.

To attach and remediate:

- 1 Attach the software policy SE Storage Scanner to the managed server.
- 2 Remediate the server.
- 3 If your HP Storage Essentials management server is version 6.1.1, you do not need to follow any more steps.
- 4 If your HP Storage Essentials management server is version 6.2 or later, attach the software policy SE Connector Update for your version to the managed server.

Note: The version of the SE Connector Update must be compatible with the version of the Storage Essentials server, which means that the version numbers of the SE Connector Update libraries must be the same as the version of the Storage Essentials. For example, if you have SE 6.2, installed, you will have to install the SE Storage Scanner first, then install the SE Connector Update for 6.2.

Access Controls

The SE Connector Storage Scanner uses access controls to communicate with an instance of Storage Essentials for collecting information about SAN array, switch, fabric, and NetApp filer inventory.

To create an access control for SE Connector, the following information is required:

- IP address of the host where Storage Essentials is running
- Username of an existing user in Storage Essentials
- Password for the existing user in Storage Essentials



Do not collect the same set of devices from the same instance of Storage Essentials from different access controls.

- 1 In the Views pane, select **Management Console**.
- 2 Expand **SE** and then expand **Access Controls**.
- 3 Select **List** to display the access controls for SE Connector.

Creating Access Controls for SE Connector

To create access controls for SE Connector:

- 1 In the navigation pane, select **Administration > Storage Scanners**.
- 2 In the content pane, select a Storage Scanner and then select **Actions > Open**.



- 3 In the Views pane, select **Management Console**.
- 4 Expand **SE** and then expand **Access Controls**.
- 5 Select **Create New** to open the Create Access Control dialog for the SE Connector.
- 6 Enter values for the access control in the following fields:

Caption: A unique name that identifies the access control.



The Caption name must be unique and cannot contain spaces or the following symbols: \s\!:\:*?"<>|!@#\$\$%^&\. If an existing (duplicate) name is used to create an access control, the new access control properties will replace (overwrite) the existing access control properties.

Host Address: IP or DNS hostname of the SE Central Management Server (CMS)

User Name: The user name required to access the devices in SE

Password: Corresponding password

Or, for an HP Storage Essentials server that is integrated with HP Systems Insight Manager (SIM), enter values for the access control in the following fields:

Host Address: IP or DNS hostname of the HP Systems Insight Manager server

User Name: The user name required to access the devices in SIM and SE.

Syntax: domain-name\username

Where "domain-name" is the name of the server where the user is created or the domain of the user "username" is the name of the user who has access to the devices to collect with this Scanner.

Password: Corresponding password

- 7 Click **Create Access Control**.

Creating Multiple Access Controls to One Instance of Storage Essentials

You can configure multiple SE Connectors communicating to one instance of Storage Essentials; however, each access control must be configured to collect a unique set of devices from the Storage Essentials instance. This is done by first configuring users in Storage Essentials, each with restricted access to a unique set of storage devices. Then create each access control with a different user. The access control will collect only those devices that the individual user can access.

Configure users in Storage Essentials, each with restricted access to unique sets of storage devices. See the *Storage Essentials SRM Software User Guide* for information about adding users and adding them to roles and organizations.

To create access controls for SE Connector:

- 1 In the navigation pane, select **Administration > Storage Scanners**.
- 2 In the content pane, select a Storage Scanner and then select **Actions > Open**.
- 3 In the Views pane, select **Management Console**.
- 4 Expand **SE** and then expand **Access Controls**.
- 5 Select **Create New** to open the Create Access Control dialog for the SE Connector.
- 6 Enter values for the access control in the following fields:

Caption: A unique name that identifies the access control.



The Caption name must be unique. If an existing (duplicate) name is used to create an access control, the new access control properties will replace (overwrite) the existing access control properties.

Host Address: IP or DNS hostname of the SE Central Management Server (CMS)

User Name: User name required to access the unique set of devices in SE

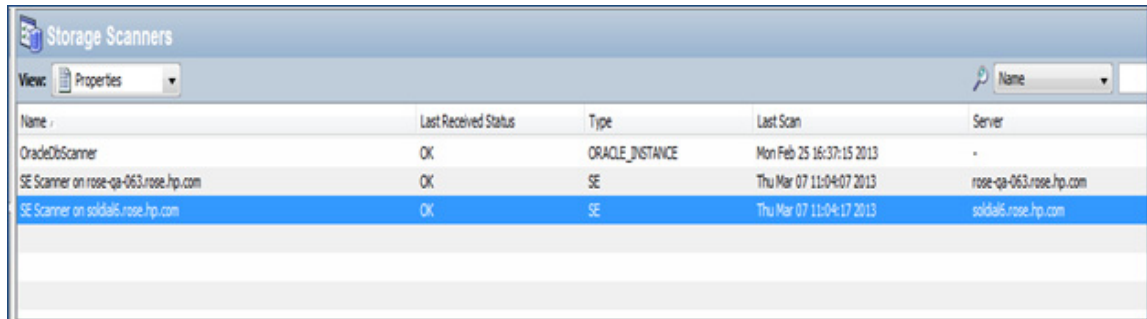
Password: Corresponding password

- 7 Click **Create Access Control**.

Viewing Storage Essentials Servers for SE Connector

To view the access controls and information about all Storage Essentials servers that an SE Connector communicates with:

- 1 In the navigation pane, select **Administration > Storage Scanners**.



The screenshot shows the 'Storage Scanners' window with a table of storage scanners. The table has five columns: Name, Last Received Status, Type, Last Scan, and Server. The third row is highlighted in blue.

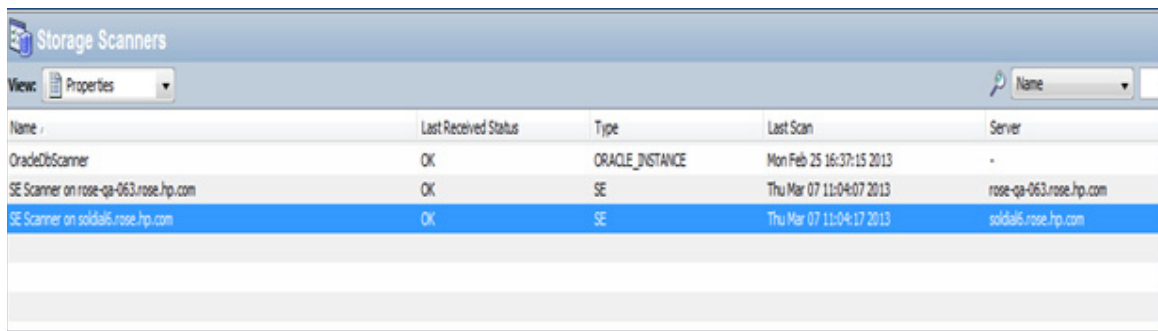
Name	Last Received Status	Type	Last Scan	Server
OracleDbScanner	OK	ORACLE_INSTANCE	Mon Feb 25 16:37:15 2013	-
SE Scanner on rose-ga-063.rose.hp.com	OK	SE	Thu Mar 07 11:04:07 2013	rose-ga-063.rose.hp.com
SE Scanner on solid5.rose.hp.com	OK	SE	Thu Mar 07 11:04:17 2013	solid5.rose.hp.com

- 2 In the content pane, open a Storage Scanner.
- 3 In the Views pane, select **Storage Essentials**.

Viewing Storage Essentials Servers Managed Elements for SE Connector

To view a list of managed elements discovered by each access control for the SE Connector:

- 1 In the navigation pane, select **Administration > Storage Scanners**.
- 2 In the content pane, open a Storage Scanner.



The screenshot shows the 'Storage Scanners' window with a table of storage scanners. The table has five columns: Name, Last Received Status, Type, Last Scan, and Server. The third row is highlighted in blue.

Name	Last Received Status	Type	Last Scan	Server
OracleDbScanner	OK	ORACLE_INSTANCE	Mon Feb 25 16:37:15 2013	-
SE Scanner on rose-ga-063.rose.hp.com	OK	SE	Thu Mar 07 11:04:07 2013	rose-ga-063.rose.hp.com
SE Scanner on solid5.rose.hp.com	OK	SE	Thu Mar 07 11:04:17 2013	solid5.rose.hp.com

- 3 In the Views pane, select **Storage Essentials**.
- 4 Select an access control in the right pane. The list of managed elements discovered by that access control displays in the bottom pane.

Reassigning a Deployed SE Connector

To reassign a managed server that has a deployed SE Connector (Storage Scanner) running on it to another core:

- 1 Save all access controls on the managed server to a temporary folder. Access controls are stored on the managed server where SE Connector is running. Based on the operating system running on the managed server, these access controls are located in the following directories:

On Unix: /var/opt/opsware/pam-se/security

On Windows: %ProgramFiles%\Common Files\Opsware\pam-se\security

- 2 Undeploy SE Connector from the managed server in Core A. See [Uninstalling SE Connector from a Managed Server](#) on page 23.
- 3 Deploy SE Connector on the managed server in Core B. See [Deployment Process](#) on page 14.
- 4 Authorize the Storage Scanner in Core B. See [Authorizing a Storage Scanner](#) on page 39.
- 5 Stop the Storage Scanner. See [Stopping a Storage Scanner](#) on page 40.
- 6 Copy the access controls that you saved in [step 1](#) on page 20.
- 7 Start the Storage Scanner. See [Starting a Storage Scanner](#) on page 39.

4 Uninstallation & Undeployment

You can uninstall or undeploy storage components as follows:

- [Uninstalling Components from a Core](#)
- [Uninstalling SE Connector from a Managed Server](#)
- [Removing SE Connector from the Model Repository](#)
- [Uninstalling the Database Scanner for Oracle](#)

Uninstalling Components from a Core

SHA and Database Scanner for Oracle Components

To uninstall the SHA and Database Scanner for Oracle storage components, run the BSA Installer `uninstall_opsware.sh` script. This script is part of the upload media. It is not part of the primary media. You cannot individually uninstall these storage components because they are part of the upload media. This action uninstalls the SHA and Database Scanner for Oracle storage components, including *all* Software Repository components. This script does *not* uninstall SE Connector from a core because SE Connector is not part of the upload media.

- ▶ You are not required to remove the SE Connector component from a core. If you find that it is necessary to remove this component from a core, contact HP Software Support for assistance.

Uninstalling SE Connector from a Managed Server

When you uninstall SE Connector from a managed server, the access controls and discovered data are deleted from the managed server. *Uninstalling SE Connector from a managed server* is also known as *undeploying SE Connector from a managed server*. You would typically undeploy SE Connector from a managed server when you need to repurpose that server. Because SE Connector implements common SA features (such as software policy and remediation) that are independently controlled by the user interface, you can selectively uninstall this storage component without affecting any other storage component.

- ▶ If you need the existing configured access controls for future use, be sure and save them before detaching the managed server from SE Connector. When you detach the server from the software policy, all SE Connector binaries and data will be removed from the managed server.

To uninstall (undeploy) SE Connector from a managed server:

- 1 In the navigation pane, select **All Managed Servers**.
- 2 Select the server that you want to undeploy SE Connector from.

- 3 From the View drop-down list, select **Software Policies**.
- 4 In the lower **Software Policies** pane, select the `SE Connector Update` software policy.
You must uninstall the `SE Connector Update` software policy *before* you uninstall the `SE Storage Scanner` software policy.
- 5 Right-click and then select **Detach**.
- 6 In the **Detach Software Policy** dialog, click **Detach**.
- 7 In the **Remediate** dialog, confirm your selection and then run or schedule the job.
- 8 Wait until the job completes.
- 9 In the lower **Software Policies** pane, select the `SE Storage Scanner` software policy.
You must uninstall the `SE Connector Update` software policy *before* you uninstall the `SE Storage Scanner` software policy.
- 10 Right-click and then select **Detach**.
- 11 In the **Detach Software Policy** dialog, click **Detach**.
- 12 In the **Remediate** dialog, confirm your selection and then run or schedule the job.
- 13 Wait until the job completes.

Or

- 1 In the navigation pane, select **Library > By Folder**.
- 2 Select **Opware > Storage > Agents > SE Connector Updates** to open the folder.
- 3 Open the `SE Connector Update for <version>` software policy.
- 4 Detach and remediate.
- 5 Select **Opware > Storage > Agents > SE** to open the SE folder.
- 6 Open the “`SE Storage Scanner`” software policy.
- 7 In the Views pane, select **Server Usage**.
- 8 In the **Server Usage** content pane, select a managed server, right-click, and then select **Detach Server**.
- 9 Click **Detach** to start the job and then wait until the job completes.

Removing SE Connector from the Model Repository

When you remove SE Connector, its entry is removed from the Model Repository.



This operation applies only to SE Connector. It does not apply to the Database Scanner for Oracle.

To remove SE Connector:

- 1 In the navigation pane, select **Administration > Storage Scanners**.
- 2 In the content pane, select **SE Scanner on <system name>**.
- 3 Right-click and then select **Remove**.

Uninstalling the Database Scanner for Oracle

The Database Scanner for Oracle component is uninstalled by running the BSA Installer `uninstall_opsware.sh` script.



During the uninstall process, you will be asked whether configured login credentials should be preserved. If you are planning to install the Software Repository again and repeat discovery for the same databases, it is recommended that you preserve these login credentials. When you confirm that you want to keep these credentials, the uninstall process continues without removing them.

To uninstall the Database Scanner for Oracle:

- 1 Insert the upload media.
- 2 Run the BSA Installer `opsware_installer/uninstall_opsware.sh` script.
- 3 Select `Software Repository - Content` and start the uninstall process. This process removes the Database Scanner for Oracle component.

5 Storage Host Agent Extension (SHA)

Storage Host Agent Extension (SHA) is a Server Automation (SA) server module that manages host storage. SHA provides the Web Services Data Access Engine with information about a host storage supply chain. This information includes, but is not limited to, the following artifacts:

- Fabric channel HBA assets—adapters and ports
- Fabric channel HBA devices—targets and logical units
- Disk devices—block, raw, and partitions
- Multipath I/O (MPIO) assets, configuration, and devices
- Volume manager (VM) assets, configuration, and devices
- Filesystems

This storage information is collected by a snapshot specification that you create.

See the *Storage Visibility and Automation Release Notes* for a list of operating systems SHA supports.

Prerequisites

The HP Server Automation(SA) core must be running when you install the SHA distribution. See the *SA Simple/Advanced Installation Guide* for information about installing and configuring an SA core.

Before installing a Storage Host Agent Extension (SHA) on an HP-UX system, verify that the operating system has all available updates and patches installed.

Upgrading a Storage Host Agent Extension

SHA is upgraded when an administrator needs to install SHA on an SA core that already contains an SHA module.



Before starting the upgrade process, verify that there are no storage inventory snapshot jobs running.

During the upgrade process, the HP BSA Installer removes all previous versions of the SHA module from the SA core before installing the new version. All existing snapshot specifications remain unchanged and are ready for execution with the upgraded SHA module.

To upgrade SHA on an SA core, use the `upgrade_opsware.sh` command.

To upgrade SHA on a managed server, use the SAS Web Client or run a Storage Inventory snapshot.

Creating a Storage Inventory Snapshot for Host & VMware Servers

You can create storage inventory snapshots for host (SHA) servers and VMware ESX and ESXi servers. SHA is a server module that you run on a managed server (or group of servers) by creating a snapshot specification that includes storage inventory information. VMware is part of the storage inventory snapshot for Unix operating systems, where the target is an ESX or ESXi server.

- ▶ In addition to creating storage inventory snapshots of an ESX server, you also need to create snapshots for all associated virtual machines defined on that ESX server in order to collect complete storage supply chain information for the machines. File system data for ESX and ESXi servers is not collected.

To create a snapshot specification:

- 1 In the navigation pane, select **Library > By Type > Audit and Remediation > Snapshot Specifications**.
- 2 In the expanded Snapshot Specifications folder, select the operating system that you are creating the snapshot specification for—Windows or Unix. For ESX hypervisors, select Unix.
- 3 From the Actions menu, select **New** to display the Snapshot Specification Properties window.
- 4 Enter a name for the storage inventory snapshot.
- 5 *(Optional)* Enter a description for the inventory snapshot.
- 6 Verify that the Perform Inventory option is checked. The default is unchecked.
- 7 In the Views pane, select Targets to display the Snapshot Specification Targets window.
- 8 Click **Add** to add the hosts or host groups that are to be included in the storage inventory snapshot.
- 9 In the Views pane, select **Rules > Storage** to display the Snapshot Specification Rules Storage window.
- 10 To request an Inventory snapshot, select Inventory in the Available for Snapshot Specification section.
- 11 Click the **+ >>** button to move Inventory to the Selected for Snapshot Specification section.
- 12 From the File menu, select **Save** or press **Ctrl-S**.
- 13 From the Actions menu, select **Run Snapshot Specification**.
- 14 Continue advancing through the Run Snapshot Specification steps until the job completes.
- 15 Click **Close** to close the Job Status window.

See the *Storage Visibility and Automation User Guide* for more information about Storage Host Agent Extension (SHA) and VMware ESX and ESXi support.

6 Database Scanner for Oracle

The Database Scanner for Oracle collects data about Oracle storage configurations in a SAN or Network Attached Storage (NAS), such as the Oracle instance, tablespaces, and datafiles.

Storage elements configured for an Oracle instance can be classified as *physical database storage* and *logical database storage*:

- **Physical database storage** includes datafiles and redo logs that directly consume system storage resources (filesystems or partitions) or are built on top of ASM Files.
- **Logical database storage** includes entities such as tablespaces that are created inside the instance consuming different physical and logical storage entities.

This Storage Scanner identifies relationships between the database elements and other storage assets as described in [Table 1](#).

table 1 Database Assets & SAN Relationships

Database Asset	External Storage Asset	Dependency	Description
SAN-based physical database storage	Server assets SAN array assets Fabric assets Switch assets	Block storage dependency	Provides the dependency chain between the database storage elements and SAN arrays through system (server) resources and fabrics.
NAS-based physical database storage	Server assets NetApp assets	NAS storage dependency	Provides the dependency chain between the database storage elements, server resources, and NetApp.

See [Storage Scanner Configuration and Operation](#) on page 38 for information about managing the Database Scanner for Oracle.

This section describes the following prerequisites for setting up the Database Scanner for Oracle:

- [Permissions](#)
- [Hardware Registration for the Model Repository](#)
- [Login Credentials](#)

Permissions



IMPORTANT: In order to monitor an Oracle 11G database with the SA Oracle Database Scanner, the XML DB and DBMS_NETWORK_ACL_ADMIN packageS must exist in the database. The SA Oracle DB Scanner needs access to these objects in order to grant privileges and access for itself. If the objects do not exist, then the `pamuserprivilege.sql` will fail and the DB Scanner cannot be run. An application may or may not install these objects in its Oracle 11G database.

The following error might be displayed under these circumstances:

```
PLS-00905: object SYS.DBMS_NETWORK_ACL_ADMIN is invalid.
```

Before executing the SA DB Scanner `pamuserprivilege.sql` in the Oracle database, first perform the following steps to install the XML DB and DBMS_NETWORK_ACL_ADMIN package in the Oracle 11G database.

```
1 cd $ORACLE_HOME/rdbms/admin
2 sqlplus /nolog
3 SQL> connect <sys_user>/<password> as sysdba
4 SQL> spool install_xml.log
5 SQL> @catqm xdb sysaux temp NO
6 SQL> @dbmsnacl.sql
7 SQL> spool off;
```

You must run the `pamuserprivilege.sql` script on each database to be scanned before the Database Scanner for Oracle can scan the inventory of the given database. The script creates a database account with read-only access to the schema objects required by the scanner. This script is installed along with the APX and is accessible in OGFS.

The `pamuserprivilege.sql` script is located in the following OGFS folder:

```
/opsw/apx/runtime/script/com.opsware.server.module.storage.dbscanner.oracle
```

See the *SA User Guide: Server Automation* for more information about OGFS.

To run the DBScanner snapshot on managed servers:

- 1 Run the Storex snapshot on the target managed server, where you configured the database instance.
- 2 Create and run the DB Scanners Snapshot - the run will fail at this time, but it will import the SQL scripts `pamuserprivilege.sql`, `configureXMLDB.sql` and `configureXMLDB_Windows.sql`.

- 3 Connect to the target managed server and execute the following commands.

```
Linux: cd /opt/opsware/dbscanner.oracle/lib/
Windows: cd C:\Program Files\Opware\dbscanner.oracle\lib
```

- 4 (Linux) Change the script permissions:

```
chmod 777 *
su - oracle
```

- 5 Connect to sqlplus and run the following commands and scripts:

```
$sqlplus / as sysdba
SQL>@configureXMLDB.sql (For Linux)
SQL>@configureXMLDB_Windows.sql (For Windows)
SQL>@pamuserprivilege.sql
```

- 6 Navigate to **Administration Panel > Storage Scanner > Oracle DBScanner > Add login credentials**.
- 7 Add the targeted managed server name mentioned in Step 1 and provide the database instance name (SID).
- 8 Rerun the DB Scanner snapshot you ran earlier.

Storage Host Agent Extension

Before running database discovery, a snapshot of the Storage Host Agent Extension (SHA) must be created for the managed server where the Oracle instance or database is.

Hardware Registration for the Model Repository

You must perform a hardware registration with the Model Repository so that the Storage Scanner (Database Scanner for Oracle) is able to collect information about Oracle databases. For more information about hardware registration, see *SA User Guide: Server Automation*.

Login Credentials

This section describes the login credentials for each database instance that the Database Scanner for Oracle will manage. A login credential contains values that direct the Database Scanner for Oracle to where a specific instance resides. [Table 2](#) describes the login credentials you must create before running the Database Scanner for Oracle for the first time.

table 2 Database Scanner for Oracle Login Credentials

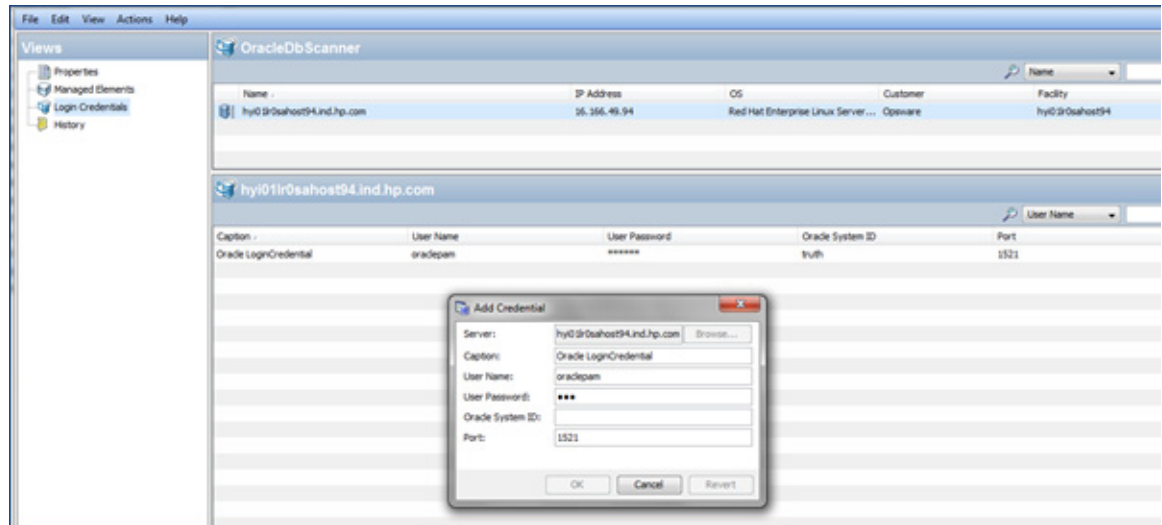
Login Credential	Description
Caption	An arbitrary name that identifies the login credential. The default is Oracle LoginCredential.
User Name	The Oracle user name that is authorized to access the Oracle database. The default is oraclepam.
User Password	The Oracle password that is authorized to access the Oracle database. The default is pam.
Oracle System ID	A unique name that identifies an Oracle instance on a managed server. This ID is provided by the database administrator.
Port	The TCP port that the Oracle listener uses. The Storage Scanner communicates with the Oracle instance through this port. The default is 1521.

Viewing & Creating Login Credentials

Login credentials are parameters that allow the Database Scanner for Oracle to connect to databases and run queries that discover software application storage.

To view or modify information about the login credentials for the Database Scanner for Oracle or to add or delete credentials:

- 1 From the navigation pane, select **Administration > Storage Scanners**.



The OracleDBScanner window is displayed.

- 2 In the content pane, open a Database Storage Scanner for Oracle.
- 3 From the Views pane, select **Login Credentials**.
- 4 In the content pane, select a server.
- 5 (Optional) Select a credential and then right-click and select one of the following options:
 - Add Credential
 - Edit
 - Delete

Viewing Login Credentials for a Server

To view the login credentials for a managed server:

- 1 From the navigation pane, select **Administration > Storage Scanners**.
- 2 In the content pane, open a Database Storage Scanner for Oracle.
- 3 From the Views pane, select **Login Credentials**. The content pane lists the managed servers that have at least one or more login credentials created. This list will be empty if there are no login credentials configured for any of the managed servers. An empty list is typical and expected when Storage Visibility and Automation has just been installed or upgraded in a datacenter.

Creating a Database Scanner Storage Inventory Snapshot

A Database Scanner for Oracle storage inventory snapshot can be scheduled or manually started. During the snapshot process, login credentials for every managed server specified in the snapshot are retrieved. The snapshot executes discovery for all of these login credentials.



An SHA storage inventory snapshot is required before you create a database storage inventory snapshot. See [Creating a Storage Inventory Snapshot for Host & VMware Servers](#) on page 28 for more information.

To create a snapshot specification:

- 1 From the navigation pane, select **Library > By Type > Audit and Remediation > Snapshot Specifications**.
- 2 From the expanded Snapshot Specifications folder, select the operating system that you are creating the snapshot specification for—Windows or Unix.
- 3 From the Actions menu, select **New** to display the Snapshot Specification Properties window.
- 4 Enter a name for the inventory snapshot.
- 5 *(Optional)* Enter a description for the inventory snapshot.
- 6 Verify that the Perform Inventory option is checked. The default is unchecked.
- 7 From the Views pane, expand Targets and then specify one or more targets.
- 8 Click **Add** to add the hosts or host groups that are to be included in the inventory snapshot.
- 9 From the Views pane, select **Rules > Database Scanner for Oracle** to display the Snapshot Specification Rules Storage window.
- 10 To request an Inventory snapshot, select Inventory in the Available for Snapshot Specification section.
- 11 Click the **+ >>** button to move Inventory to the Selected for Snapshot Specification section.
- 12 From the File menu, select **Save** or press Ctrl-S.
- 13 From the Actions menu, select **Run Snapshot Specification**.
- 14 Continue advancing through the Run Snapshot Specification steps until the job completes.

A successful snapshot job is one where all discoveries are successfully completed (Succeeded). If any discovery fails, the snapshot job status will indicate a failure. If there are no login credentials created for a managed server, the snapshot job status will be reported as Failed.
- 15 Click **Close** to close the Job Status window.

7 Administration

This section explains the user permissions required to view storage devices and related information, and how to manage the Storage Scanners.

Server Automation (SA) Permissions

SA permissions allow users to view storage devices and related data. [Table 3](#) specifies the permissions required by users to perform specific actions in the Storage Visibility and Automation feature. For storage administrators, this table answers the question: To perform a particular action, what permissions does a user need?

In [Table 3](#), most of the entries in the User Action column correspond to menu items in the SA Client. In addition to feature permissions, server permissions are required on the managed servers affected by the storage discovery operation.

table 3 Storage Visibility and Automation Permissions Required for User Actions

User Action	Required Feature	Required Permissions
Storage Systems		
Manage Storage Systems	Manage SE Storage Scanner	Read & Write
View Initiator Dependencies for Storage Systems	Manage SE Storage Scanner	Yes
View Target Dependencies for Storage Systems	Manage SE Storage Scanner	Yes
View Fabric Dependencies for Storage Systems	Manage SE Storage Scanner	Yes
Manage Public Device Group	Manage SE Storage Scanner	Yes
Start Inventory Scan	Manage SE Storage Scanner	Yes
View information for a storage array/NAS Filer	Manage SE Storage Scanner	Read
View inventory for a storage array/NAS Filer	Manage SE Storage Scanner	Read
Modify properties of a storage array/NAS Filer, such as updating a caption for a storage array/NAS Filer	Manage SE Storage Scanner	Read & Write
Delete (remove) a storage array/NAS Filer	Manage SE Storage Scanner	Yes
Fabrics		
Manage Fabrics	Manage SE Storage Scanner	Read & Write
View Server Dependencies for Fabrics	Manage SE Storage Scanner	Yes
View Storage Dependencies for Fabrics	Manage SE Storage Scanner	Yes
Manage Public Device Group	Manage SE Storage Scanner	Yes

table 3 Storage Visibility and Automation Permissions Required for User Actions (cont'd)

User Action	Required Feature	Required Permissions
Start Inventory Scan	Manage SE Storage Scanner	Yes
Application Storage Automation System		
Manage DB Scanner	Manage SE Storage Scanner	Yes
Manage Fabric Agent	Manage SE Storage Scanner	Yes
Manage Storage Agent	Manage SE Storage Scanner	Yes
Authorize SE Connector	Manage SE Storage Scanner	Yes
Start SE Connector	Manage SE Storage Scanner	Yes
Stop SE Connector	Manage SE Storage Scanner	Yes
Create access controls for SE Connector	Manage SE Storage Scanner	Read & Write
Modify login credentials for the Database Scanner for Oracle	Manage Database Agent	Read & Write
Issue a synchronization request	Manage SE Storage Scanner	Yes
Remove (unauthorize) SE Connector	Manage SE Storage Scanner	Yes
Checking the current state of SE Connector	Manage SE Storage Scanner	Yes
Modifying the settings for SE Connector	Manage SE Storage Scanner	Yes
View information for a database	Manage Databases	Read
View inventory for a database	Manage Databases	Read
Modify properties of a database, such as updating a caption for a database	Manage Databases	Read & Write
Delete (remove) a database	Manage Databases	Read & Write
Add a storage array/NAS Filer to a Public Device Group	Manage Public Device Group (Storage Systems)	N/A
Add a storage array/NAS Filer to a Public Device Group	Manage Public Device Group (Storage Systems)	N/A
View relationships of servers consuming storage using the fabrics/storage switches in a storage data path	View Fabric Dependencies for Servers	Read
View relationships for servers consuming storage from storage arrays/NAS Filers	View Storage Supply Chain for Servers	Read
View relationships between storage arrays/NAS Filers and servers	View Server Dependencies for Storage Systems	N/A

table 3 Storage Visibility and Automation Permissions Required for User Actions (cont'd)

User Action	Required Feature	Required Permissions
View relationships for storage arrays/NAS Filers providing storage using the fabrics/storage switches in a storage data path	View Fabric Dependencies for Storage Systems	N/A
View relationships between fabrics/storage switches in the storage data path for servers connected to them and consuming storage using them	View Server Dependencies for Fabric	N/A
View relationships between fabrics/storage switches in the storage data path for storage provided by storage arrays/NAS Filers	View Storage Dependencies for Fabric	N/A

In addition to the feature permissions listed in [Table 3](#), every user action also requires the Managed Servers and Groups feature permission.

A user or user group must also have the “Manage Storage Systems” and “Manage Fabrics” permissions to enable corresponding “View...” storage permissions. The “View...” permissions are valid only if the user or user group has read permission for that resource type, such as you must have the “Manage Storage Systems” permission to enable the “View Server Dependencies for Storage Systems” permission.

To run database discovery, the administrator must have the following permissions:

- Permissions to create and execute a snapshot
- “Managed Servers and Groups” permission. This privilege is granted in the OCC Web client.
- Additional Read & Write privileges for “Customers” and “Facilities” containing the target server (the server that contains the Oracle database). This privilege is granted in the OCC Web client.
- “Execute” permission for the `Opware/Storage/Tools/DbScanner` folder. This permission is granted from NGUI folder properties. The “Execute” permission must be granted through the same user group that has privileges for snapshot management.
- “Manage Database Scanner” permission

➤ By default, the Advanced Users group does not have permissions for `/Opware/Storage` and underlying folders. Members of this group will not be able to view or use any software policies in the folders. When permissions for this group are granted, they are based on the corresponding Storage Visibility and Automation features that are assigned to that group.

For more information about users, groups, and granting permissions, see the *SA User Guide: Application Automation*.

Viewing SA Permissions

To view SA permissions:

- 1 Log in to the SAS Web Client as an Administrator.
- 2 In the navigation pane, select **Administration > Users and Groups**. The View Groups pane appears.
- 3 Click the Groups tab.

- 4 Select a group. The group is displayed in the View Groups pane.
- 5 Click the Client Features tab.
If a user has no SA permissions, the SA Client will not display the SA Client item on the Tools menu.

Storage Scanner Configuration and Operation

Each Storage Scanner requires configuration and management tasks, such as creating access controls and login credentials, authorizing the Storage Scanner, starting and stopping the Storage Scanner, and modifying Storage Scanner settings.



To configure a Storage Scanner on a managed server, you must have read and write permission on that server.

See [SE Connector](#) on page 17 or [Database Scanner for Oracle](#) on page 29 for information that is specific to the type of Storage Scanner, such as access controls and login credentials.

Storage Scanner Settings

Storage Scanner settings (properties) manage SE Connector behavior. After you install and configure SE Connector (the Storage Scanner), you can adjust these settings.

You can modify the following Storage Scanner properties:

- `DataManager.properties`
- `JmsMessenger.properties`
- `Logging.properties`
- `RequestManager.properties`
- `SEPlugin.properties`
- `StatusManager.properties`



To conserve disk space, modify the maximum size of log files and the level of detail gathered for log messages. See [Log File Settings](#) on page 38. To tune system performance, adjust the intervals at which full synchronization runs.



If you need to modify thread pools, contact HP Support.

Log File Settings

To conserve disk space and control the types of log messages that Storage Visibility and Automation collects, you can adjust the maximum size of log files and the logging level. For troubleshooting, you can also adjust trace error messages.

- **File Level:**
 - Trace-messages: FINE, FINER, FINEST, INFO, SEVERE, WARNING
 - Log-messages: INFO, SEVERE, WARNING
 - Error messages: SEVERE, WARNING

- **File Count:** 10 (default)
- **File Limit:** the size of one file before rolling it out to another file
 - The default for error and log files is 1MB.
 - The default for debug (trace error) messages is 10 MB.

Modify the following settings to completely switch off corresponding messages:

- **Error File Enables:** True | False
- **Tracing Enabled:** True | False

Authorizing a Storage Scanner

The purpose of authorization is to provide a matching pair of security tokens—one token in the core and the other token on the managed server where the Storage Scanner (SE Connector) is deployed. When SE Connector is initially deployed to a managed server, you must authorize it so that messages from the Storage Scanner are accepted by the core server.

To authorize a Storage Scanner:

- 1 From the navigation pane, select **Administration > Storage Scanners**.
- 2 Open the Storage Scanner that needs to be authorized.
- 3 From the **Actions** menu, select **Authorize**.

Starting a Storage Scanner

When the Storage Scanner (SE Connector) starts for the first time, it begins collecting storage information and synchronizing device data. During this process, the Storage Scanner gathers information from various elements and reports that information to the Web Services Data Access Engine so that the device data is synchronized. Depending on the size of the element, device synchronization could require several hours.



For performance reasons, it is recommended that you start the Storage Scanner during off-peak hours.

To start a Storage Scanner on a managed server:

- 1 In the Storage Scanners content pane, select a Storage Scanner and then select **Actions > Open** to display its browser.
- 2 Select **Action > Start**.
- 3 Click the “Check current state” link to verify that the Storage Scanner is Running.



The start action does not apply to the Database Scanner for Oracle.

Starting the Storage Scanner on a Remote Windows Server

To start the Storage Scanner (SE Connector) on a remote Windows managed server:

- 1 From the Control Panel, select **Administrative Tools > Services**.
- 2 In the Services window, select **OpwareSEStorageScanner** and then select **Action > Start**.

Stopping a Storage Scanner

Before you modify any Storage Scanner (SE Connector) settings, you must stop the Storage Scanner. You should also stop and then restart the Storage Scanner after any storage element changes are made. This action does not interfere with any database changes that are in progress. You can stop the Storage Scanner by using the Storage Visibility and Automation Client on a managed server or by running a saved script on a remote managed server.

▶ After the Storage Scanner is stopped or undeployed, the status does not change.

To stop a Storage Scanner (SE Connector) on a managed server by using the Storage Visibility and Automation Client:

- 1 In the Storage Scanners content pane, select a Storage Scanner and then select **Actions > Open** to display its browser.
- 2 Select **Actions > Stop**.
- 3 Click the “Check current state” link to verify that the Storage Scanner is Not Running.

▶ The stop action does not apply to the Database Scanner for Oracle.

Stopping the Scanner on a Remote Windows Server

To stop the Storage Scanner (SE Connector) on a remote Windows managed server:

- 1 From the Control Panel, select **Administrative Tools > Services**.
- 2 In the Services window, select **OpwareSEStorageScanner** and then select **Action > Stop**.

Checking the Storage Scanner Status

When the Storage Scanner (SE Connector) starts, it begins the collection and synchronization process.

To check the status of this process:

- 1 From the navigation pane, select **Administration > Storage Scanners**.
- 2 Select a Storage Scanner.
- 3 From the View drop-down list, select Properties.
- 4 Click the “Check current state” link in the content pane to verify that the Storage Scanner is Running or Not Running.

▶ The check status action does not apply to the Database Scanner for Oracle.

Viewing Storage Scanner Properties & Current State

To view the properties for a Storage Scanner or check the current state of a Storage Scanner:

- 1 From the navigation pane, select **Administration > Storage Scanners**.

The screenshot shows the 'Storage Scanners' management console. At the top, there is a 'View:' dropdown menu set to 'Properties' and a search box labeled 'Name'. Below this is a table with the following data:

Name	Last Received Status	Type	Last Scan	Server
OracleDbScanner	OK	ORACLE_INSTANCE	Mon Feb 25 16:37:15 2013	-
SE Scanner on rose-qa-063.rose.hp.com	OK	SE	Wed Mar 06 16:39:40 2013	rose-qa-063.rose.hp.com
SE Scanner on solda65.rose.hp.com	OK	SE	Wed Mar 06 16:39:40 2013	solda65.rose.hp.com

Below the table, the 'SE Scanner on rose-qa-063.rose.hp.com' is selected, and its 'Management Information' is displayed:

Management Information
Name: SE Scanner on rose-qa-063.rose.hp.com
Description: HP Storage Scanner Information, SE Client Library Version: 9.4.0.242
Last Received Status: OK
Check current state: **Running**
Scanner Server: rose-qa-063.rose.hp.com
Type: SE
Version: 50.0.0.0
Created: 2013-03-06 16:28:52.0
Object ID: -1788530394471680677
Authorized: Yes

- 2 From the View drop-down list, select **Properties**.
- 3 In the content pane, open a Storage Scanner.
- 4 (Optional) Select the “Check current state” link to view the most recent status of the Storage Scanner, such as Running or Not Running.

Viewing Storage Scanner Managed Elements

This task applies to the SE Connector (Storage Scanner) and the Database Scanner for Oracle (Storage Scanner). You can view managed elements collected by a Storage Scanner and managed elements collected by an individual access control. The managed elements collected by an access control is a subset of the elements collected by the Storage Scanner.

To view the managed elements collected by the Storage Scanner:

- 1 From the navigation pane, select **Administration > Storage Scanners**.
- 2 In the content pane, open a Storage Scanner.

The screenshot shows the 'Storage Scanners' management console with the 'View:' dropdown menu set to 'Managed Elements'. The table below shows the managed elements:

Name	Last Received Status	Type	Last Scan	Server
OracleDbScanner	OK	ORACLE_INSTANCE	Mon Feb 25 16:37:15 2013	-
SE Scanner on rose-qa-063.rose.hp.com	OK	SE	Thu Mar 07 11:04:07 2013	rose-qa-063.rose.hp.com
SE Scanner on solda65.rose.hp.com	OK	SE	Thu Mar 07 11:04:17 2013	solda65.rose.hp.com

- 3 From the View drop-down list, select **Managed Elements**.

- ▶ Customer and Facility are determined based on similar properties of the managed server where the Storage Scanner is running. This is the Storage Scanner that discovered the managed device, such as an array, NetApp filer, and so on. Fabrics are excluded from this list of managed elements. To view managed elements for fabrics, see the next task.

To view the managed elements (such as fabrics) collected by an individual access control:

- 1 From the navigation pane, select **Administration > Storage Scanners**.
- 2 In the content pane, open a Storage Scanner.
- 3 From the Views pane, select **Storage Essentials**.
- 4 In the content pane, select an access control to view.

Viewing the Storage Scanner History Log

To view the history log for a Storage Scanner:

- 1 From the navigation pane, select **Administration > Storage Scanners**.
- 2 In the content pane, open a Storage Scanner.



Date	Event	User	Status
Wed Mar 06 16:38:26 2013	Discovery for AccessControl with Caption: SEcontopex , UserName: admin , Storage Ess...	system	Completed
Wed Mar 06 16:39:27 2013	Discovered: 9 new StorageSystem Key(s), 19 new Switch Key(s), 3 new Fabric Key(s), ...	system	Completed
Wed Mar 06 16:39:32 2013	Scheduled detailed data discovery for 31 newly discovered devices for AccessControl w...	system	Completed

- 3 In the View drop-down list, select **History**.
- 4 In the content pane, select an event from the history log and then select the following option from the Actions menu:
 - **View Event Details**—Displays detailed information about the event.Or
 - Right-click on the event and select **View Event Details**.

- ▶ Events in the history log are reported by the Storage Scanner while performing data synchronization.

8 Virtualization Permissions

This chapter discusses the four different kinds of permissions required to perform virtualization actions.

Actions Permissions

These permissions let you perform specific tasks, such as cloning a VM, deploying a VM from a VM template, and converting a VM to a VM template. Without action permissions, the corresponding menu items are not displayed in the Actions menu of the SA Client. For a complete list of action permissions, see the *SA Administration Guide*.

VS Container Permissions

These permissions give you access to the Virtualization Services and the containers under the VS. These containers can be datacenters, hypervisors, hosts, host groups, clusters, resource pools, and folders under the Virtualization Service

Server Resource Permissions

These permissions give you access to facilities, customers, and device groups where the VMs will run. For more information on server resource permissions, see the *SA Administration Guide*.

Folder Permissions

These permissions give you access to items in the SA Library needed by VMs such as OS Build Plans, patches and patch policies, software packages and software policies, application configurations, audit policies, and reports. For more information on folder permissions, see the *SA Administration Guide*.

Granting Permissions

The permissions discussed in this chapter are granted through user groups. SA provides a set of user groups, based on typical user roles, that are intended to help you to set up your own user groups specific to your environment.

User group names:

- Virtualization Administrators
- VM Lifecycle Managers
- VM Template Deployers
- VM Template Managers

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