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1 SA Installation Overview

This guide provides the requirements and procedures for Simple and Advanced installations of:

- **SA First Cores, Standalone Cores with distributed components and Single-Host Cores**

An SA First Core can be installed either as a standalone core (with or without distributed components) or as the first SA Core for a Multimaster Mesh.

- **Subsequent SA Cores** (Multimaster Mesh)

After an SA First Core is installed, you can add subsequent SA Cores to create a Multimaster Mesh in which the cores can communicate with each other and centrally manage the servers managed by each SA Core.

- **SA Satellites**

A Satellite installation is typically installed for remote sites that do not have a large enough number of potential SA Managed Servers to justify a full SA Core installation. You can install only the necessary SA Core Components for the remote site to function as a Satellite.

It also describes all necessary prerequisites and provides useful pre-installation information.

Installation Methods

SA provides three typical installation levels:

- **Single Host**

This installation method allows you to install SA on a single host with a local Model Repository (Oracle). This installation is described in the *SA Single-Host Installation Guide*.

- **Simple**

This installation allows you to distribute SA Core Components over multiple hosts and allows the use of a remote Model Repository (Oracle) installation. Because distributing SA Core Components requires detailed design and preparation, this method is recommended only for advanced SA administrators.

- **Advanced**

This installation provides the flexibility of the Simple installation but also allows you to have finer control over many advanced SA configuration parameters.

SA also provides an expert-level installation method that allows control over all SA configuration parameters, however this method is recommended only for HP technical support staff.

2 SA System Requirements

This section describes the supported operating systems for SACore Servers, Managed Servers, and the Java™ based SA Client. This chapter also describes the hardware requirements for the servers running an SA Core and provides guidelines on how to distribute SA Core Components across one or more servers.

Copying the DVDs to a Local Disk

HP recommends that you copy the contents of the SA DVDs to a local disk or to a network share and run the Installer from that location.

Dual Layer DVD Requirements

All SA installation DVDs require a DVD drive that supports dual layer.

Supported Operating Systems for SA Cores, Agents, and Satellites

For a complete listing of all platforms supported for SA Cores, Agents (managed servers), Satellites, and Clients (SA Client and SAS Web Client), see *SA Supported Platforms* provided in the documentation directory of the distribution media or available for download at

http://support.openview.hp.com/sc/support_matrices.jsp

SA Cores on VMs

SA Cores are certified for VMware VMs running Red Hat Linux 4AS (update 6 or later) and Red Hat 5 (update 2 or later) as the guest operating system. The following sections describe the requirements for installing an SA Core on a VMware VM and provide instructions for doing so.

Supported Hypervisor and Guest Operating Systems

See *SA Supported Platforms* provided in the documentation directory of the distribution media or available for download from:

http://support.openview.hp.com/sc/support_matrices.jsp



The Model Repository must be installed on a physical server while the rest of the Core Components can be installed on the VM. For a list of supported Oracle versions for the Model Repository, see [Oracle Setup for the Model Repository](#) on page 165.

VM CPU and Memory Requirements

Table 1 shows the minimum number of CPUs and required memory to run SA Cores on VMs:

Table 1 VM CPU and Memory Requirements

| Number of VMs | Number of CPUs and RAM for each VM | | Number of Managed Servers |
|---------------|---|--------------------------|---------------------------|
| 1 | 4 CPUs 16GB RAM | 4 CPUs 16GB RAM | 960 |
| | Infrastructure Component bundle OS Provisioning bundle Slice Component bundle | | |
| 2 | Infrastructure Component bundle OS Provisioning bundle Slice 0 Component bundle | Slice 1 Component bundle | 2250 |
| | | | |



SA supports core components installed on VMs only when your VM configurations follow VMware best practices for managing resource allocation and overall workload. You must ensure that other VMs sharing the same ESX hypervisor do not significantly impact the resources available to the VM hosting the SA Core. Should you have performance issues, for troubleshooting purposes, HP support may require you to replicate these issues in an environment in which the VM supporting the SA Core is the sole VM active within the ESX hypervisor.



It is essential that you avoid over-commitment of physical resources (CPU and physical memory) to ensure proper functioning of the VMs. Over-commitment of these resources can lead to performance issues as well as time synchronization issues.

SA Satellite Memory Requirements

Table 2 lists provides the minimum number of CPUs and required memory to run SA Satellites on VMs:

Table 2 Satellite CPU and Memory Requirements

| Number of VMs | Number of CPUs and RAM for each VM | Number of Managed Servers |
|---------------|------------------------------------|---------------------------|
| | 2 CPUs 2 GB RAM | |
| 1 | Satellite Components | 1500 |

Hardware Performance Issues

The hardware requirements for Hypervisors running SA Core VMs can vary based on these factors:

- The availability of the physical CPUs and memory in the Hypervisor to support the recommended SA Core VM configuration.
- The number of VMs running concurrently on the physical server.
- The number of servers that the SA Core manages.
- The number and complexity of your concurrent operations.
- The number of concurrent users who can access the SA Command Center.
- The number of facilities in which the SA Core operates.

For more information about improving performance see:

http://www.vmware.com/pdf/VI3.5_Performance.pdf

VMware Virtual Center Requirements

Use of the following Virtual Center features with an SA Core installed on a VM has not been validated and could make it difficult for HP support to diagnose possible problems with your installation if required:

- Snapshots
- Distributed Resource Scheduling (DRS)
- VMotion
- Storage VMotion
- Fault Tolerance
- High Availability (HA)

HP is continuing to validate these advanced Virtual Center features and will announce support when available

SA Core Component VMs on SAN or NAS Devices

Running SA Core Components on VMs is supported if the VM images are run from a local disk or SAN. Running SA Core Components on VMs is not supported if the VM images are stored on NAS devices.

VMware VM Timekeeping Issues

You should be familiar with the guidelines about different timekeeping solutions in the VMware, Inc. document, *Timekeeping in VMware Virtual Machines (VMware® ESX 3.5 / ESXi 3.5, VMware Workstation 6.5)*. You should also avoid CPU pressure on VMs as described in that white paper.

VMware Tools

VMware Tools can be installed in the VMs that run SA, but the VMware Tools periodic time synchronization option must be disabled.

Conflicts due to Timekeeping Issues

If the time on the SA Cores in a VMware VM-based Multimaster Mesh get out of synchronization due to the time skew described in the VMware white paper described in [VMware VM Timekeeping Issues](#), conflicts can occur in the Mesh.

If you find conflicts in your Mesh, you should

- Ensure that you have enabled/configured the Timekeeping solution described in the VMware white paper described in the next section.
- Ensure that your VMware Timekeeping implementation is correctly configured.

For more information about resolving conflicts, see “Model Repository Multimaster Component Conflicts” in the *SA Administration Guide*.

Avoiding Conflicts

You can customize your own timekeeping solution based on the VMware, Inc. document, *Timekeeping best practices for Linux* which can be found at:

http://kb.vmware.com/selfservice/microsites/search.do?language=en_US&cmd=displayKC&externalId=1006427

We attempt to supply valid URLs but, if this URL has been changed or is unavailable, you can search for the paper by title at <http://www.vmware.com>.

Alternatively, you can use the configuration shown below which has been tested and been shown to work in an SA Core/VMware VM environment.

NTP Settings

- 1 Add the following entries to the `ntp.conf` file:

- a `tinker panic 0`

Instructs NTP not to give up if it sees a large jump in time. This entry must be at the top of the `ntp.conf` file.

- b `restrict 127.0.0.1`

Do not use the local clock as a time source.

- c `restrict default kod nomodify notrap`

- d `server <NTP_server>`

(for example, `ntp.dev.opsware.com`)

- e `driftfile /var/lib/ntp/drift`

- 2 Comment out the following lines:

```
server 127.127.1.0
fudge 127.127.1.0 stratum 10
```

- 3 Restart the NTP daemon:

- 4 Ensure that either VMware Tools periodic time synchronization is disabled or VMware VMtools is not installed (you will still need a method of ensuring the time on the VMs is synchronized).

Installation Procedure for SA Cores Under VMware VMs

SA Core pre-installation requirements, disk space requirements, installation, and post-installation requirements under VMware VMs are the same as those for installation on a physical server. You can use the instructions described in this guide to install an SA Core on an existing VMware VM.



The Model Repository must be installed on a physical server while the rest of the Core Components can be installed on the VM.

Agent Installation on Windows Server 2000, Windows Server 2003, and Windows Server 2008

Installation of an SA Agent on a managed server requires the Windows Update service to be installed.

- The Windows Update Service Startup Type configuration should be set to *automatic*.
- If the Windows Update Service Startup Type configuration is set to *manual*, the agent must start the service each time it registers software, performs compliance scans, or remediates packages or patches.
- If the Windows Update Service Startup Type configuration is *disabled*, the agent will not start the service and it will be unable to detect installed and needed patches on the managed server, resulting in a *Scan Failed* during Windows patch compliance scans.

The Windows Event Log may contain an {E60687F7-01A1-40AA-86AC-DB1CBF673334} error as described here:

<http://support.microsoft.com/kb/896224>

Veritas File System (VxFS)

SA supports the Veritas File System (VxFS) for Linux AS4 x86_64 and Linux Server 5 x86_64. VxFS *is not* supported for other operating systems. If you attempt to install SA components on a non-supported operating system running VxFS, the installation will fail and will need to be backed out. The SA Installer Prerequisite Checker validates VxFS for SA Cores and satellites and in cases where prerequisites are not met, the installation will fail before SA is installed. VxFS is not validated for Oracle hosts, therefore, if Oracle is installed on the same host as SA Core Components, the Oracle installation may succeed and the core install subsequently fail.

The SA Prerequisite Check

SA now performs validation of a minimum baseline requirement for an SA Core installation. This validation is performed automatically by the SA Installer during an SA Core installation. You can also run this check as a standalone utility prior to installation to verify the suitability of a server as an SA Core host before attempting an installation.



If the validation finds a requirement that is not met by your server, the installation stops and you must correct the problem before continuing the installation. If a recommended configuration is not met, you will see a warning, but can continue with the installation.

The prerequisites that are validated during the check include:

- **Host Physical Characteristics**
 - Physical memory
 - Number of CPUs (cores or physical)

- Loopback driver MTU (Linux only)
- IDE disk drive optimizations
- **Oracle Database** - disk space, parameter, tablespace requirements (*existing Oracle installations only*)
 - Supported Oracle version is installed
 - Required Oracle patches are installed
 - Supported operating system configuration
 - Swap space size
 - Temp space
 - User `oracle` defined
- **Required Packages** - packages that must be installed
- **Required Patches** - patches that must be installed (SunOS only)
- **Recommended Packages** - packages that should be installed
- **Unsupported Packages** - packages that must not be installed
- **Reserved Ports** - ports that must be open and available
- **Diskspace Requirements** - checks that minimum disk space required for installation available (*fresh installation only*)
- **Operating System Configuration:**
 - Hostname is a fully qualified domain name (FQDN) and is resolvable
 - File system (links maintained, case sensitive)
 - Ability to create new users and groups
 - Allocated swap space
 - Timezone setting (UTC) and locale (`en_US.UTF-8` or equivalent)
 - Run level (Linux only)
 - NFS versions
 - No VxFS (Linux 3AS and SLES only)
 - Sufficient `temp` space is available
 - Translations for `localhost` are available (Linux only)
 - `/etc/inet/hosts` and `/etc/hosts` are both plain text files (SunOS only)
 - Selinux running (Linux 3AS, 4AS, and 5Server only)
 - Verification that no critical file paths contain symbolic links
 - Red Hat update 5 or later (Linux 4AS only)
 - `gzip` installed (SunOS only)



The prerequisite check requires root privileges and validates both required and recommended items. Required items, such as required packages and Oracle settings, must be corrected if the validation fails, however, if you have business requirements that override recommendations, such as number of CPUs, you can still perform an SA Core installation.

The prerequisite check validates both required and recommended items. Required items, such as required packages and Oracle settings, must be corrected if the validation fails.

Prerequisite Validation of Non-HP-Supplied Oracle Installations

If you intend to use an existing Oracle installation rather than the HP-supplied Oracle database, that database must meet the requirements described in [Oracle Setup for the Model Repository](#) on page 165. When you begin an SA Core installation and an existing database installation, the prerequisite checker will validate the Oracle requirements as well as the core server requirements.

SA Core Server Validation

After you have initiated an SA Core installation, the installer performs the prerequisite check before installation of the Oracle database and before installation of the SA Core Components. The validation progress is displayed on screen showing the items being validated and the results of the validation. The display during validation will be similar to this:

```
Processing on Linux/4AS-X86_64 using
/tmp/OPSWprereqs-40.0.0.0.54/Linux_oracle_rqmts.conf
  Checking 'required' packages for Linux/4AS-X86_64
  Checking 'required' patches for LINUX/4AS-X86_64
  Checking 'recommended' packages for LINUX/4AS-X86_64
  Checking 'absent' packages for LINUX/4AS-X86_64
  Testing memory size
  Testing for number of CPUs
  Testing hostname for FQDN
  Testing swap space allocated
  Verify timezone is UTC
[...]
```

If the validation indicates that your system does not meet the recommended configuration, you can either stop the installation, take measures to meet the recommendations, and restart the installation or you can choose to continue the installation without changes.

Manual Prerequisite Check

You can run the SA Prerequisite Check manually using the instructions in this section. When run manually before the Oracle RDBMS is installed, the following is validated:

- CPU requirements
- Disk space requirements

When the SA Prerequisite Check is run manually after Oracle RDBMS installation but before SA Core Component installation, the following is validated:

- When the Oracle RDBMS is installed locally, the required RDBMS version and patches.



If the Oracle database is installed remotely, prerequisite testing will extract database access information from the response file of the current core install. If the database is accessible, it will be tested in a remote mode using Oracle's Translation Name Service (TNS). Accessibility depends on the availability of SQL*Plus which is installed as part of the database or as Oracle's InstantClient.

You invoke the prerequisite check from the command line on the server on which you plan to host the SA Core.

Locate the file:

```
<distro>/opsware_installer/OPSWprereqs-<version>.zip
```

Unzipping this file will create a sub-directory, OPSWprereqs-<version> which contains the script `preinstall_requisites.sh`.

Usage

```
.../preinstall_requisites.sh <phase> [--upgrade] [--resp_file=<path>]  
[--verbose | --silent]
```

where:

Table 3 Prerequisite Check Script Arguments

| Argument | Description |
|----------------------|---|
| <phase> | Specifies an Oracle database validation or SA Core host validation Valid Values: Oracle, core_inst, or satellite |
| <path> | The fully qualified path to a valid SA Installer response file |
| --upgrade | Specifies an upgrade and suppresses the disk space checks. If not specified, fresh install is assumed and disk space checks are run assuming that no SA components are currently installed. |
| --resp_file | Specifies the path to a valid Installer response file for the current installation. When specified, certain values that might be specified during the install process are taken from the response file, such as Oracle installation values. |
| --verbose --silent | verbose displays additional output, silent displays no output. |



You must have root privileges to run the script. There is a test to see if the logged in user can create users and groups. Therefore, the user running the SA Prerequisite Check must be capable of creating users and groups, but the current user must be the same user that will be running the installer.

Required Solaris and Linux Packages for SA Core Servers

This section describes platform-specific packages and utilities that must be installed for the operating system on the server that will host an SA Core.

Required Solaris Packages

If you will be installing an SA Core Server under Solaris, you must ensure that the packages listed in Table 4 are installed. Table 4 lists recommended packages and Table 5 lists packages that must *not* be installed.

Table 4 Packages Required for Solaris

| Required Packages for Solaris | | |
|-------------------------------|-----------|-----------|
| SUNW5xmft | SUNWeudlg | SUNWjxmft |
| SUNWadmap | SUNWeudmg | SUNWkxmft |
| SUNWadmc | SUNWeuezt | SUNWlibC |
| SUNWadmfw | SUNWeuhed | SUNWman |
| SUNWarrf | SUNWeuluf | SUNWntpr |
| SUNWbash | SUNWeuodf | SUNWntpu |
| SUNWcxmft | SUNWeurf | SUNWsacom |
| SUNWdoc | SUNWeuxwe | SUNWscpu |
| SUNWesu | SUNWi13rf | SUNWswmt |
| SUNWeu8df | SUNWi15rf | SUNWtesh |
| SUNWeu8os | SUNWi2rf | SUNWtoo |
| SUNWeudba | SUNWi4rf | SUNWtxfnt |
| SUNWeudbd | SUNWi5rf | SUNWucbt |
| SUNWeudda | SUNWi7rf | SUNWuiu8 |
| SUNWeudhr | SUNWi8rf | SUNWuium |
| SUNWeudhs | SUNWi9rf | SUNWulcf |
| SUNWeudis | SUNWinst | SUNWuxlcf |
| SUNWeudiv | SUNWinttf | |

Table 5 Packages That Must Be Removed from Solaris

| Packages That Must Be Removed From Solaris |
|--|
| SUNWCpm |

Other Solaris Requirements

The SA Core Server must also meet the following requirements:

- On the server where you will install the SAS Web Client component, you must install the J2SE Cluster Patches for Solaris. To download these patches, search for “J2SE Cluster Patches” for your version of Solaris at <http://www.sun.com/>.
- On all core servers, verify that the Network File System (NFS) is configured and running.

- For Daylight Saving Time (DST) on Solaris 10 servers, you must install the time zone patch 122032-03 or later, and libc patch 119689-07 or later. To download these patches, search for the patch ID at <http://www.sun.com/>.

For more information about DST changes, search for “Daylight Saving Time (DST)” at <http://www.sun.com/>.

Required Linux Packages

For Red Hat Linux AS 3 32-bit x_86, an SA Core Server must have the packages listed in Table 6 installed. For Red Hat Linux AS 4 32-bit x86 an SA Core Server must have the packages listed in Table 7 installed. For Red Hat Linux Server 5 x_86 an SA Core Server must have the packages listed in Table 8 installed. For both and Red Hat Linux AS4 32-bit x86 and Red Hat Linux AS4 64-bit x86, the packages listed in Table 9 must *not* be installed.



Due to a known Linux AS4 64-bit x86 kernel bug, you must have Update 5 or later installed on all servers that will host an SA Core

Table 6 Required Packages For Linux As3 32-bit x_86

| Required Packages | Architecture |
|---|--------------|
| at | 32-bit x86 |
| compat-db | 32-bit x86 |
| compat-libstdc++ | 32-bit x86 |
| coreutils | 32-bit x86 |
| cpp | 32-bit x86 |
| expat | 32-bit x86 |
| gcc | 32-bit x86 |
| glibc-devel | 32-bit x86 |
| glibc-headers | 32-bit x86 |
| glibc-kernheaders | 32-bit x86 |
| iptables | 32-bit x86 |
| kernel-source | 32-bit x86 |
| libaio | 32-bit x86 |
| libcap | 32-bit x86 |
| libstdc++ | 32-bit x86 |
| libxml2-python | 32-bit x86 |
| mkisofs * | 32-bit x86 |
| ncompress (contains uncompress utility) | 32-bit x86 |
| nfs-utils | 32-bit x86 |

Table 6 Required Packages For Linux As3 32-bit x_86

| Required Packages | Architecture |
|--------------------|--------------|
| ntp | 32-bit x86 |
| patch | 32-bit x86 |
| patchutils | 32-bit x86 |
| sharutils | 32-bit x86 |
| strace | 32-bit x86 |
| unzip | 32-bit x86 |
| XFree86-libs | 32-bit x86 |
| XFree86-libs-data | 32-bit x86 |
| XFree86-Mesa-libGL | 32-bit x86 |
| xinetd | 32-bit x86 |
| zip | 32-bit x86 |

* mkisofs is used for premastering ISO 9660 file systems used on CDROMs. It is open source and available at <http://freshmeat.net>, search for “mkisofs”.

Table 7 Packages Required for Linux AS 4 x_64

| Required Packages | Architecture |
|--------------------|--------------|
| binutils | x86_64 |
| chkfontpath | x86_64 |
| compat-db | i386 |
| compat-db | x86_64 |
| cpp | x86_64 |
| desktop-file-utils | x86_64 |
| expat | i386 |
| expat | x86_64 |
| gamin-devel | x86_64 |
| gcc | x86_64 |
| gcc-c++ | x86_64 |
| glibc | i686 |
| glibc | x86_64 |
| glibc-common | x86_64 |
| glibc-devel | i386 |

Table 7 Packages Required for Linux AS 4 x_64 (cont'd)

| Required Packages | Architecture |
|--------------------------|---------------------|
| glibc-devel | x86_64 |
| glibc-headers | x86_64 |
| glibc-kernheaders | x86_64 |
| iptables | x86_64 |
| kernel-smp | x86_64 |
| kernel-smp-devel | x86_64 |
| libaio | i386 |
| libaio | x86_64 |
| libcap | i386 |
| libcap | x86_64 |
| libgcc | i386 |
| libgcc | x86_64 |
| libpng | i386 |
| libpng | x86_64 |
| libpng10 | i386 |
| libpng10 | x86_64 |
| libstdc++ | i386 |
| libstdc++ | x86_64 |
| libtermcap | i386 |
| libtermcap | x86_64 |
| libxml2 | i386 |
| libxml2 | x86_64 |
| libxml2-python | x86_64 |
| make | x86_64 |
| mkisofs | x86_64 |
| ncompress | x86_64 |
| nfs-utils | x86_64 |
| ntp | x86_64 |
| patch | x86_64 |
| patchutils | x86_64 |
| pdksh | x86_64 |

Table 7 Packages Required for Linux AS 4 x_64 (cont'd)

| Required Packages | Architecture |
|--------------------------|---------------------|
| popt | i386 |
| popt | x86_64 |
| readline | i386 |
| readline | x86_64 |
| rpm-build | x86_64 |
| sharutils | x86_64 |
| strace | x86_64 |
| sysstat | x86_64 |
| tcp_wrappers | i386 |
| tcp_wrappers | x86_64 |
| ttmkfdir | x86_64 |
| unzip | x86_64 |
| xinetd | x86_64 |
| xinitrc | noarch |
| xorg-x11 | x86_64 |
| xorg-x11-Mesa-libGL | i386 |
| xorg-x11-Mesa-libGL | x86_64 |
| xorg-x11-Mesa-libGLU | i386 |
| xorg-x11-Mesa-libGLU | x86_64 |
| xorg-x11-Xvfb | x86_64 |
| xorg-x11-deprecated-libs | i386 |
| xorg-x11-deprecated-libs | x86_64 |
| xorg-x11-font-utils | x86_64 |
| xorg-x11-libs | i386 |
| xorg-x11-libs | x86_64 |
| xorg-x11-xauth | x86_64 |
| xorg-x11-xf86 | x86_64 |
| xterm | x86_64 |
| zip | x86_64 |
| zlib | i386 |
| zlib | x86_64 |

Table 8 Packages Required for Linux AS 5 x_64

| Required Packages | Architecture |
|--------------------------|---------------------|
| binutils | x86_64 |
| chkfontpath | x86_64 |
| compat-db | i386 |
| compat-db | x86_64 |
| cpp | x86_64 |
| desktop-file-utils | x86_64 |
| elfutils-libelf | x86_64 |
| elfutils-libelf-devel | x86_64 |
| expat | i386 |
| expat | x86_64 |
| gamin-devel | x86_64 |
| gcc | x86_64 |
| gcc-c++ | x86_64 |
| glibc | i686 |
| glibc | x86_64 |
| glibc-common | x86_64 |
| glibc-devel | i386 |
| glibc-devel | x86_64 |
| glibc-headers | x86_64 |
| iptables | x86_64 |
| kernel | x86_64 |
| kernel-devel | x86_64 |
| kernel-headers | x86_64 |
| libaio | i386 |
| libaio | x86_64 |
| libaio-devel | x86_64 |
| libcap | i386 |
| libcap | x86_64 |
| libgcc | i386 |
| libgcc | x86_64 |

Table 8 Packages Required for Linux AS 5 x_64 (cont'd)

| Required Packages | Architecture |
|--------------------------|---------------------|
| libpng | i386 |
| libpng | x86_64 |
| libstdc++ | i386 |
| libstdc++ | x86_64 |
| libstdc++-devel | x86_64 |
| libtermcap | i386 |
| libtermcap | x86_64 |
| libxml2 | i386 |
| libxml2 | x86_64 |
| libxml2-python | x86_64 |
| make | x86_64 |
| mesa-libGL | i386 |
| mesa-libGL | x86_64 |
| mesa-libGLU | i386 |
| mesa-libGLU | x86_64 |
| mkisofs | x86_64 |
| ncompress | x86_64 |
| nfs-utils | x86_64 |
| ntp | x86_64 |
| openmotif | i386 |
| openmotif | x86_64 |
| patch | x86_64 |
| patchutils | x86_64 |
| popt | i386 |
| popt | x86_64 |
| readline | i386 |
| readline | x86_64 |
| rpm-build | x86_64 |
| sharutils | x86_64 |
| strace | x86_64 |
| sysstat | x86_64 |

Table 8 Packages Required for Linux AS 5 x_64 (cont'd)

| Required Packages | Architecture |
|---------------------------|--------------|
| tcp_wrappers | i386 |
| tcp_wrappers | x86_64 |
| ttmkfdir | x86_64 |
| unzip | x86_64 |
| xinetd | x86_64 |
| xorg-x11-font-utils | x86_64 |
| xorg-x11-server-Xvfb | x86_64 |
| xorg-x11-xauth | x86_64 |
| xorg-x11-xinit | x86_64 |
| xorg-x11-xf86-inputdev | x86_64 |
| xorg-x11-xf86-video-intel | x86_64 |
| xterm | x86_64 |
| zip | x86_64 |
| zlib | i386 |
| zlib | x86_64 |

Table 9 Packages That Must Be Removed for Red Hat Linux

| Packages | | |
|----------|-------|--------------------------------|
| samba | rsync | tftp (AS 4 only)** |
| apache | httpd | tftp-server (AS 5 only) dhcp** |

** Existing versions of the `tftp` and `dhcp` packages cannot reside on the same server as the OS Provisioning Boot Server component; however, they can reside on SA Core Servers that do not have the OS Provisioning Boot Server component.

To verify that the `samba` package, for example, is installed, enter the following command:

```
# rpm -qa | grep samba
```

You can obtain the latest versions of these packages from the Red Hat errata web site.

To remove packages, enter the following command:

```
# rpm -e package_name
```

Some packages in this list may be depended on by other packages that are installed on your system. For example, the default Red Hat installation includes `mod_python` and `mod_perl` that depend on `httpd` being installed. In order to remove packages that fulfill dependencies, you must simultaneously remove the packages that create the dependencies. In this example, you would need to enter the following command:

```
# rpm -e httpd mod_python mod_perl
```

If `rpm` identifies an additional dependency, it will note which packages have dependencies on the components to be removed and fail. These packages must be added to the `uninstall` command line. If the chain of dependencies cannot be suitably resolved, enter the `rpm -e --nodeps` command to remove the desired packages without considering dependencies.

Additional Linux Requirements

For Linux systems, you must also adhere to the following requirements:

- Red Hat Enterprise Linux 4 AS must be at least Update 5.
- You must specify the server's initial run level as level 3 in the `/etc/inittab` file.
- If the server uses Integrated Drive Electronics (IDE) hard disks, you must enable Direct Memory Access (DMA) and some other advanced hard disk features that improve performance by running the following script as `root` on the server and then reboot the server:

```
# cat > /etc/sysconfig/harddisks << EOF
USE_DMA=1
MULTIPLE_IO=16
EIDE_32BIT=3
LOOKAHEAD=1
EOF
```

- Due to a bug in the Linux kernel, you must configure the loopback interface to use a Maximum Transmission Unit (MTU) size of 16036 bytes or less. To make this change, perform the following tasks:
 - a Run the `ifconfig lo mtu 16036` command. This sets the MTU of the running kernel.
 - b Add the line `MTU=16036` to the end of the `/etc/sysconfig/network-scripts/ifcfg-lo` file. This causes the MTU to be properly set when the system is booted.
- Disable the Security-Enhanced Linux kernel (SELinux) on all core servers running Linux AS4 64-bit x86.
- For Daylight Saving Time (DST) on Red Hat Enterprise Linux AS 3 and AS 4, you must install the latest time zone data. You can download these time zone updates from the following location:
<https://rhn.redhat.com/errata/RHEA-2006-0745.html>
- For Daylight Saving Time (DST) on SUSE Linux Enterprise Server 9, you must install the latest time zone data. You can download these updates from the following location:
<http://www.novell.com/support/>
- For Daylight Saving Time (DST) on Sun Solaris, you must install the latest time zone data. You can download these updates from *<http://www.sun.com>*.
- If you are using a Linux NFS server, be aware that, by default, Linux enables NFSv3, which prevents Solaris servers from entering the server pool. You can either disable NFSv3 on the Linux NFS server or you can add DHCP options to force Solaris 10 to use NFSv2:
 - To force the Solaris `miniroot` to use NFSv2, add the following lines to your DHCP configuration file:

- In the generic section of the DHCP configuration file, add the following lines:


```
# added for nfs 2 miniroot
option SUNW.SrootOpt code 1 = text;
# end of nfs 2 miniroot stuff
```
- In the solaris-sun4u, solaris-sun4us, and solaris-specific-kernel classes, add the following lines:


```
# added for nfs 2 miniroot
option SUNW.SrootOpt "vers=2";
# end of nfs 2 miniroot stuff
```

- To disable NFSv3 on the Linux NFS server add the following lines to the /etc/sysconfig/nfs file and then restart NFS:

```
MOUNTD_NFS_V3=no
MOUNTD_NFS_V2=yes
RPCNFSDARGS='--no-nfs-version 4'
```

Required SUSE Linux Enterprise Server 10 Packages

For SUSE Linux Enterprise Server 10 64-bit x_86, an SA Core Server must have the packages listed in [Table 10](#) installed.

Table 10 SUSE Linux Enterprise Server 10 Required Packages

| Required Packages | Architecture |
|--------------------|--------------|
| binutils | x86_64 |
| cpp | x86_64 |
| desktop-file-utils | x86_64 |
| expat | x86_64 |
| gcc-c++ | x86_64 |
| gcc | x86_64 |
| glibc | x86_64 |
| glibc-32bit | x86_64 |
| glibc-devel | x86_64 |
| glibc-devel-32bit | x86_64 |
| iptables | x86_64 |
| kernel-smp | x86_64 |
| kernel-source | x86_64 |
| libaio | x86_64 |
| libaio-32bit | x86_64 |
| libaio-devel | x86_64 |
| libcap | x86_64 |

Table 10 SUSE Linux Enterprise Server 10 Required Packages

| Required Packages | Architecture |
|--------------------------|---------------------|
| libcap-32bit | x86_64 |
| libelf | x86_64 |
| libgcc | x86_64 |
| libstdc++ | x86_64 |
| libstdc++-devel | x86_64 |
| libpng | x86_64 |
| libpng-32bit | x86_64 |
| libxml2 | x86_64 |
| libxml2-32bit | x86_64 |
| libxml2-python | x86_64 |
| make | x86_64 |
| mDNSResponder-lib | x86_64 |
| mkisofs | x86_64 |
| ncompress | x86_64 |
| nfs-utils | x86_64 |
| patch | x86_64 |
| popt | x86_64 |
| popt-32bit | x86_64 |
| readline | x86_64 |
| readline-32bit | x86_64 |
| rpm | x86_64 |
| sharutils | x86_64 |
| strace | x86_64 |
| sysstat | x86_64 |
| termcap | x86_64 |
| unzip | x86_64 |
| vim | x86_64 |
| xinetd | x86_64 |
| xntp | x86_64 |
| xorg-x11-libs | x86_64 |
| xorg-x11-libs-32bit | x86_64 |

Table 10 SUSE Linux Enterprise Server 10 Required Packages

| Required Packages | Architecture |
|-------------------|--------------|
| xorg-x11 | x86_64 |
| xterm | x86_64 |
| zip | x86_64 |
| zlib | x86_64 |
| zlib-32bit | x86_64 |

Table 11 shows packages *must not* be installed on a SUSE Linux Enterprise Server 10 hosting an SA Core:

Table 11 Packages Not Supported on SUSE Linux Enterprise Server 10 Core Hosts

| Package | Package |
|-------------|--------------------|
| rsync | yast2-dhcp-server |
| samba | yast2-samba-server |
| samba-32bit | yast2-tftp-server |



These packages are reinstalled during an operating system upgrade from SUSE Enterprise Linux SP2 to SP3 and therefore must be removed for proper SA Core operation after upgrade.

Requirements for Installing Oracle 11g using the SA Installer

The Model Repository requires an installed Oracle database. You can use the SA Installer to install the HP-supplied Oracle 11g database on a Solaris 10 x86_64 server or on a Red Hat Enterprise Linux 4 AS x86_64, Red Hat Enterprise Linux 5 AS x86_64, or SUSE Linux Enterprise Server 10 x86_64 server. You can also use a pre-existing Oracle installation. Whatever method you choose, you should see [Oracle Setup for the Model Repository](#) on page 165 for more information.

Disk Space Requirements

An *SA Core Server* is a computer hosting one or more *SA Core Components*. You have the option to install all of the SA Core Components on a single server or distribute them across multiple servers. This section describes the hardware requirements for any SA Core Server.

Core Server Disk Space Requirements

On each Core Server, the root directory must have at least 72 GB available hard disk space. SA components are installed in the `/opt/opsware` directory. [Table 12](#) lists the recommended disk space requirements for installing and running SA Core Components. These sizes are recommended for the primary production data. Additional storage for backups must be calculated separately.

Table 12 SA Disk Space Requirements

| SA Component Directory | Recommended Disk Space | Requirement Origin |
|---|------------------------|---|
| <code>/etc/opt/opsware</code> | 50 MB | Configuration information for all SA Core services. (Fixed disk usage) |
| <code>/media*</code> | 15 GB | OS Provisioning: The media directory holds the OS installation media that is shared over NFS or CIFS. The initial size for this directory depends on the total size of all OS installation media sets that you plan on provisioning, such as Windows Server 2003 CD (700mb), Red Hat AS3 CDs (2GB), and SUSE 9 SP3 (10GB). The network OS install shares do not need to reside on SA core systems and are typically dispersed across multiple servers as the Multimaster Mesh grows. (Bounded disk usage that grows quickly in large increments) |
| <code>/opt/opsware</code> | 15 GB | The base directory for all SA Core services. (Fixed disk usage) |
| <code>/u01/oradata</code> <code>/u02/oradata</code> <code>/unn/oradata ...</code> | 20 GB | The Oracle tablespace directory that contains all model and job history information. Known sizes range from 5GB to 50GB of space, depending on the frequency and type of work, the amount of software and servers managed, and the garbage collection frequency settings. (Bounded disk usage that grows slowly in small increments) |
| <code>/var/log/opsware</code> | 10 GB | The total log space used by all SA Core Components. (Fixed disk usage) |
| <code>/var/opt/opsware</code> | 10 GB | The total run space used by all SA Core Components, including instances, pid files, lock files, and so on. (Fixed disk usage) |
| <code>/var/opt/opsware/word*</code> | 80 GB | The total disk space used by software that is imported into SA. Theoretically, this is infinite disk usage depending on how much software you import. Initial size calculation is based on the total size of all packages and patches that you want managed by SA. Known sizes range from 10GB to 250GB. |
| <code>/var/opt/opsware/ogfs/export/store</code> | 20 GB | The home directory for the Global File System (OGFS) enabled SA user accounts. |



* The entries in [Table 12](#) marked with an asterisk are directory path defaults that you can change during the installation process. The recommended disk space for these directories is based on average-sized directories, which could be smaller or larger, according to usage.



For performance reasons, you should install the SA Components on a local disk, not on a network file server. However, for the Software Repository, you can use a variety of storage solutions, including internal storage, Network Attached Storage (NAS), and Storage Area Networks (SANs).

Model Repository (Database) Disk Space Requirements

Additional disk space is required for the Oracle software and the Model Repository data files. Keep in mind that storage requirements for the database grow as the number of managed servers grows.

As a benchmark figure, you should allow an additional 3.1 GB of database storage for every 1,000 servers in the facility that SA manages. When sizing the tablespaces, follow the general guidelines described in [Table 13](#). If you need to determine a more precise tablespace sizing, contact your technical support representative.

Table 13 Tablespace Sizes

| Tablespace | MB/1000 Servers | Minimum Size |
|------------|-----------------|--------------|
| AAA_DATA | 256 MB | 256 MB |
| AAA_INDX | 256 MB | 256 MB |
| AUDIT_DATA | 256 MB | 256 MB |
| AUDIT_INDX | 256 MB | 256 MB |
| LCREP_DATA | 3,000 MB | 1,500 MB |
| LCREP_INDX | 1,600 MB | 800 MB |
| TRUTH_DATA | 1,300 MB | 700 MB |
| TRUTH_INDX | 400 MB | 400 MB |
| STRG_DATA | 1,300 MB | 700 MB |
| STRG_INDX | 400 MB | 400 MB |

Software Repository Disk Space Requirements

The Software Repository contains software packages and other installable files and is part of the *Slice Component bundle*. Typical installations start with approximately 300 GB allocated for the server hosting the Software Repository. However, more space might be required, depending on the number and size of the packages, as well as the frequency and duration of configuration backups.

Media Server Disk Space Requirements

Dependent on your OS Provisioning requirements. This component requires sufficient disk space for the OS media for all the operating system versions you intend to provision.

SA Core Performance Scalability

You can vertically scale the SA Core Components, by adding additional CPUs and memory, or horizontally, by distributing the Core Components to multiple servers.

[Table 14](#) and [Table 15](#) list the recommended distribution of SA components across multiple servers. In both tables, the bundled SA Core Components are distributed in the following way:

- MR: Model Repository
- INFRA: Infrastructure Component
 - Model Repository Multimaster Component
 - Management Gateway
 - Primary Data Access Engine
- Slice(x):
 - Agent Gateway
 - Core Gateway
 - Command Engine
 - Software Repository
 - Command Center
 - Build Manager
 - Web Services Data Access Engine
 - Secondary Data Access engine)
 - Global File System

Core Component Distribution

The introduction of bundled components requires that you consider how to distribute the SA Core components based on the hardware and memory you have available. A typical SA 7.5 installation now has three main components. The Model Repository, the Infrastructure Component bundle and one Slice Component bundle in addition to the Media Server and Boot Server. Since the Media Server and Boot Server do not generate much load and often have environmental dependencies they are not listed in the tables below.

There is no infallible way to select hardware for an SA installation. However, below are some recommended SA Core Component layouts that should perform well. As you can see, scaling a core requires adding slices. Each slice adds highly available UI, API, OGFS, Build Manager and Gateway resources. Consider that, when you have a small number of core servers, it may be best to begin with two larger servers, then grow the capacity of the core by adding additional slices. In [Table 14](#) and [Table 15](#), the following shorthand is used:

MR — Model Repository

INFRA — Infrastructure Component bundle

Slice <X> — Slice Component bundle

OS Prov — Operating System Provisioning Component bundle. :

Table 14 Small-to-Medium SA Deployment (SA 7.80 and later)

| Managed Servers | SA Component Distribution by Server | |
|-----------------|-------------------------------------|----------------------------|
| | Server 1 | Server 2 |
| 500 | MR, Infra, Slice 0, OS Prov | N/A |
| 1000 | MR | Infra, Slice 0, OS Prov |

Server Configuration: 4 CPU cores, 8 GB RAM, 1 GB/s network

Table 15 Medium-to-Large SA Deployment (SA 7.80 and later)

| Managed Servers | SA Component Distribution by Server | | | | |
|-----------------|-------------------------------------|----------------------------|-----------|-----------|-----------|
| | Server 1* | Server 2* | Server 3* | Server 4* | Server 5* |
| 2000 | MR | Infra, Slice 0, OS Prov | N/A | N/A | N/A |
| 4000 | MR | Infra, Slice 0, OS Prov | Slice 1 | N/A | N/A |
| 6000 | MR | Infra, Slice 0, OS Prov | Slice 1 | Slice 2 | N/A |
| 8000 | MR | Infra, Slice 0, OS Prov | Slice 1 | Slice 2 | Slice 3 |

* Server Configuration: 8 CPU Cores, 8 GB RAM, 1 GB/s network

Factors Affecting Core Performance

The hardware requirements for SA vary based on these factors:

- The number of servers that SA manages
- The number and complexity of concurrent operations
- The number of concurrent users accessing the Command Center
- The number of facilities in which SA operates

Multimaster Mesh Scalability

To support global scalability, you can install an SA Core in each major facility, linking the cores in a Multimaster Mesh. The size of the SA Core in each facility can be scaled according to local requirements.

Multimaster Mesh Availability

In addition to Model Repository replication, a Multimaster Mesh supports the replication and caching of the packages stored in the Software Repository. Typically, the core in each facility owns the software that is uploaded to the core's Software Repository. To support availability, multiple copies of the packages can be maintained in remote Software Repositories. See the *SA Administration Guide* for more information.

The bundling of the Software Repository with the Slice Component bundle and the Software Repository Store with the Infrastructure Component bundle does not affect availability. The Software Repository reads the replicator configuration file to determine how to serve files from backed up directories.

Satellite Core CPU/Memory Requirements

Servers hosting SA Satellite Core installations must meet the following minimum requirement:

- 2 CPUs and 2 GB RAM per 1,500 managed servers per Satellite Core up to 4 CPUs and 4 GB RAM for 3000 managed servers per Satellite Core

The capacity of a server hosting an SA Satellite can be increased to support additional managed servers as indicated above. Workload characteristics across SA environments can vary dramatically and the carrying capacity of a given SA satellite under those workloads can vary as well. For deployments that require more than 3,000 devices behind an SA Satellite, HP recommends that you consider deploying additional SA satellites in the same realm. This solution provides increased redundancy and additionally avoids reaching the point of diminishing return from a single SA Satellite host server which requires you to continuously increase its capacity in order to support increasing load demands.

Load Balancing Additional Instances of Core Components

If SA must support a larger operational environment, you can improve performance by installing additional instances of the *Slice Component bundle* which provides you with these additional components per installation:

- Agent Gateway
- Core Gateway
- Command Center
- Software Repository
- Build Manager
- Web Services Data Access Engine
- Secondary Data Access engine
- Global File System

If you have installed multiple instances of the Slice Component bundle, load balancing between the instances occurs automatically as requests for load services are received by the Core Gateway. The Core Gateway handles incoming client connections and load balances them across the Slice Component bundles in the core.

You can also deploy a hardware load balancer for the servers that run additional instances of the Slice Component bundle. You can configure the load balancer for SSL session persistence (stickiness) with the least connections algorithm.

You can also put a load balancer in front of the Core Gateways, however, this will only load balance the Gateways, but with the added benefit that clients would have only one address to connect to and would failover gracefully in the event of a Slice Component bundle host failure.

Load Balancing does not affect validation of `httpProxy` certificates since the identity of the core is based on the address the clients use to connect, not the identity of the server that ultimately serves the request. All Slice Component bundles should be issued the same certificate and the hostname referenced in the certificate should match the DNS hostname that external clients use to connect. If a load balancer is used, this should be the hostname of the load balancer.

Network Requirements

This section discusses the network requirements within a facility, open ports required for Core Components, and name resolution requirements. These requirements must be met for both First Cores, Multimaster Mesh installations, and Satellite cores.

Network Requirements within a Facility

Before running the Installer, your network environment must meet the following requirements:

- All SA Core Servers must be on the same Local Area Network (LAN or VLAN).
- There must be full network connectivity between all SA Core Servers and the servers that the SA Core will manage.
- Core Servers expect user accounts to be managed locally and cannot use the Network Information Service (NIS) directory to retrieve password and group information. During installation of the Core Components, the installer checks for the existence of certain target accounts before creating them. If you are using NIS, this check will fail.
- If you plan to use network storage for Core Components, such as the Software Repository or OS Provisioning Media Server, you must ensure that the `root` user has write access over NFS to the directories where the components will be installed.
- The speed and duplex mode of the Core's and Managed Servers' NIC adapters must match the switch they are connected to. A mismatch will cause poor network performance between the Core and Managed Servers.

Open Ports

You must configure any firewalls protecting your Core Servers to allow the ports shown in [Table 16](#) to be open. Note that the ports numbers listed in the table are the default values which can be changed during the installation, so ensure you are leaving the correct ports open.

Table 16 Open Ports on a Firewall Protecting an SA Core

| Port | Component | Purpose |
|-----------------|---|--|
| 80 (TCP) | Command Center | HTTP redirector |
| 443 (TCP) | Command Center | HTTPS Proxy for SAS Web Client UI, SAS Client, SA Web Services (2.2) |
| 1003 (TCP) | Software Repository (word) | Core Communications |
| 1004 (TCP) | Data Access Engine (spin) | Core Communications |
| 1018 (TCP) | Command Engine (way) | Core Communications |
| 1032 (TCP) | Web Services Data Access Engine (twist) | Core Communications |
| 1521 (TCP)* | Model Repository (truth) | Database Communications <i>This port is user configurable.</i> |
| 2001 (TCP) | Management Gateway/Core Gateways | Inbound tunnels from other Gateways (If Port 2001 is in use, rolls over to 2003) <i>This port is user configurable</i> |
| 2222 (TCP) | Global File System | Global shell session from an SSH client |
| 8017 (UDP, TCP) | Agent Gateway | Interface to the Build Manager |
| 8080 (TCP) | Command Center | Load Balancing Gateway for the SA Client |

* Port 1521 is the default Oracle listener (`listener.ora`) port, but you can specify a different port in your Oracle configuration. In case your installation has been modified to use a port other than 1521, you should verify the port number from the Oracle listener status and ensure that your firewall is configured to allow the correct port to be open for the Oracle listener.



SA's data access layers (infrastructure) use connection pooling to the database. The connections between the database and the infrastructure layer must be maintained as long as SA is up and running. Ensure that your firewall is configured so that these connections do not time-out and terminate the connections between the database and the infrastructure layers.

Table 17 shows the ports used by the OS Provisioning components that are accessed by servers during the provisioning process. (In SA, OS provisioning refers to the installation of an operating system on a server.)

Table 17 Open Ports for the OS Provisioning Components

| Port | Component | Service |
|-----------------|---------------------------|------------------------------------|
| 67 (UDP) | Boot Server | DHCP |
| 69 (UDP) | Boot Server | TFTP |
| 111 (UDP, TCP) | Boot Server, Media Server | RPC (portmapper), required for NFS |
| Dynamic/Static* | Boot Server, Media Server | rpc.mountd, required for NFS |
| 2049 (UDP, TCP) | Boot Server, Media Server | NFS |
| 8017 (UDP, TCP) | Agent Gateway | Interface to the Build Manager |
| 137 (UDP) | Media Server | SMB NetBIOS Name Service |
| 138 (UDP) | Media Server | SMB NetBIOS Datagram Service |
| 139 (TCP) | Media Server | NetBIOS Session Service |
| 445 (TCP) | Media Server | MS Directory Service |

* By default, the `rpc.mountd` process uses a dynamic port, but it can be configured to use a static port. If you are using a dynamic port, the firewall must be an application layer firewall that can understand RPC requests that clients use to locate the port for `mountd`.



The OS Provisioning Boot Server and Media Server run various services (such as `portmapper` and `rpc.mountd`) that could be susceptible to network attacks. It is recommended that you segregate the OS Provisioning Boot Server and Media Server components onto their own DMZ network. When you segregate these components, the ports listed in Table 17 should be opened to the DMZ network from the installation client network. Additionally, the Boot Server and Media Server should have all vendor-recommended security patches applied.

Table 18 shows the Managed Server port that must be open for SA Core Server connections.

Table 18 Open Ports on Managed Servers

| Port | Component |
|------------|-----------|
| 1002 (TCP) | SA Agent |

Host and Service Name Resolution Requirements

SA must be able to resolve Core Server host names and service names to IP addresses through proper configuration of DNS or the `/etc/hosts` file.

Previous Releases

If you plan to install the Core Components on a server that had a previous SA installation (for example, version 6.x or 7.0), you must verify that the host names and service names resolve correctly for the new installation.

Core Servers and Host/Service Name Resolution

During the installation, the `/etc/hosts` file on machines where the *Slice Component bundle* is installed will be modified to contain entries pointing to the *Secondary Data Access Engine*, the *Command Center*, the *Build Manager*, and the fully qualified domain name of the `localhost`.

All other servers hosting Core Components must be able to resolve their own valid host name and the valid host name of any other SA Core Server (if you will be using a multiple core installation or Multimaster Mesh). A fully qualified name includes the subdomain, for example, `myhost.acct.buzzcorp.com`. Enter the `hostname` command and verify that it displays the fully qualified name found in the local `/etc/hosts` file.

In a *typical* component layout, the Software Repository Store is installed as part of the Infrastructure Component bundle and the Slice Component bundle must be able to map the IP of the Infrastructure host to its hostname. In a *custom* component layout, the Software Repository Store may be installed separately on any host, therefore the Slice Component bundle must be able to map the IP of that host to its hostname. It is a common practice, but not a requirement, to host the Software Repository Store and the OGFS `home/audit` directories on the same server.

OS Provisioning: DHCP Proxying

If you plan to install your OS Provisioning components on a separate network from the Core Components, you must set up DHCP proxying to the DHCP server (for example, using Cisco IP Helper). If you use DHCP proxying, the server/router performing the DHCP proxying must also be the network router so that PXE can function correctly.

The OS Provisioning Boot Server component provides a DHCP server, but does not include a DHCP proxy. For DHCP server configuration information, see [DHCP Configuration for OS Provisioning](#) on page 109.

Windows Patch Management Requirements

The SA Windows Patch Management feature requires that, before running the Installer, you obtain several files from the Microsoft software download repository and copy them to a directory that will be accessible during the SA installation. During the installation process, the Installer will prompt you to enter the fully qualified path to the Microsoft files in this directory and will fail if the files do not exist at the specified location.

Supported Platforms

- Windows 2000
- Windows XP
- Windows Server 2003 x86 and x64
- Windows Server 2008 x86 and x64
- Windows Server 2008 x86 Server Core and Windows 2008 x64 Server Core

In order to apply patches to Managed Servers running Windows Server 2000 SP4 and Windows Server 2003 RTM, you must first ensure that the Microsoft update MS04-011 (or a subsequent update) has been applied to those servers. This update is required for MBSA 2.1 to run properly.

Requirements

The Managed Servers meet the following Windows patching requirements:

- Windows Installer 3.1 must be installed
- MSXML 3+ must be installed
- The Windows Update Agent must be installed
- The Windows (Automatic) Update service must *not* be disabled but must be set to *never* check for updates.



As of Windows Server 2008, the Automatic Update service was renamed the Windows Update service.

Installing MBSA 2.1 for SA 9.0

To obtain the required Windows patch management files, perform the following tasks:

- 1 Obtain the following files from Microsoft:
 - `qchain.exe`

The `qchain.exe` utility is a command-line program that chains hotfixes together. When you chain updates, you install multiple updates without restarting the computer between each installation.

To download the package containing `qchain.exe`, search for “`qchain.exe`” at <http://www.microsoft.com>. Install the package on a Windows machine and note the location of the `qchain.exe` file.

- WindowsUpdateAgent-x86.exe

The WindowsUpdateAgent30-x86.exe file is required by the mbsaccli.exe utility. To download the package containing WindowsUpdateAgent30-x86.exe, search for "Windows Update Agent" at <http://www.microsoft.com>. After downloading, you must rename the file "WindowsUpdateAgent-x86.exe".

- WindowsUpdateAgent-x64.exe

The WindowsUpdateAgent30-x64.exe file is required by the mbsaccli.exe utility. To download the package containing WindowsUpdateAgent30-x64.exe, search for "Windows Update Agent" at <http://www.microsoft.com>. After downloading, you must rename the file "WindowsUpdateAgent-x64.exe".

- WindowsUpdateAgent-ia64.exe

The WindowsUpdateAgent30-ia64.exe file is required by the mbsaccli.exe utility. To download the package containing WindowsUpdateAgent30-ia64.exe, search for "Windows Update Agent" at <http://www.microsoft.com>. After downloading, you must rename the file "WindowsUpdateAgent-ia64.exe".

- 2 Copy the files you obtained in the preceding steps to a directory that will be accessible by the SA Installer during the Software Repository installation. For example, you might copy the files to the following directory:

```
/opsw/win_util
```

- 3 Verify that the destination directory contains all these files:

```
WindowsUpdateAgent-x86.exe  
WindowsUpdateAgent-x64.exe  
WindowsUpdateAgent-ia64.exe  
qchain.exe
```

- 4 Write down the name of the directory containing the Windows Update Agent files. You will need this location when you run the SA Installer and are prompted to provide the fully qualified directory path to the WUA files. You can also find the WUA file location by checking the SA parameter, windows_util_loc.

These patch management files will be copied to all Windows servers during SA Agent deployment. If you upload newer versions of the WUA files to the Software Repository later, they will be downloaded to all managed Windows servers during software registration. After the core is installed and running, you can upload new versions of these files with the Patch Settings window of the SA Client.

For more information on Windows Patch Management, see the *SA User's Guide: Application Automation*.

Configuration Tracking Requirements

The Configuration Tracking feature tracks, backs up, and recovers critical software and system configuration information across Unix and Windows servers. When you enable the SA Configuration Tracking feature for a facility, by default, a separate partition is created on the server running the Software Repository. That partition will contain this Configuration Tracking backup directory:

```
/var/opt/opsware/word/<facility-name>/acsbar
```

You can optionally specify that the backup directory be created under the Software Repository root directory during SA installation.

The Configuration Tracking feature uses this directory to store backups of tracked configuration files and databases. The configuration tracking backup directory is relative to the Software Repository root directory:

```
<word_root>/<facility_name>/acsbar
```

Global File System (OGFS) Requirements

This section discusses requirements for the Global File System (OGFS).

OGFS Store and Audit Hosts

When you run the SA Installer interviewer in advanced mode, you can specify values for the `ogfs.store.host.ip` and `ogfs.audit.host.ip` parameters. (See [Global File System Prompts](#) on page 96.) If you set either of these parameters to point to a host that does not run the Slice Component bundle (which contains OGFS and the Software repository), then perform the following steps on the host you do specify:

- 1 With `mkdir`, create the directories that you specified for the `ogfs.store.path` and `ogfs.audit.path` parameters.
- 2 Modify the export tables.



In these examples, the Slice Component bundle is installed on two separate hosts within the same core.

- o On a Solaris host, modify the `/etc/dfs/dfstab` file, similar to this:

```
# Begin Opsware ogfs export
share -F nfs -o anon=0,rw=1.2.3.4:1.2.3.5 /export/ogfs/store
share -F nfs -o anon=0,rw=1.2.3.4:1.2.3.5 /export/ogfs/audit
# End Opsware ogfs exports
```

where 1.2.3.4 and 1.2.3.5 are example IP addresses of the two Slice Component bundle hosts and where `/export/ogfs/store` and `/export/ogfs/audit` are corresponding paths that exist on the host from where you are exporting the OGFS data.

- b On a Linux host, modify the `/etc/exports` file, such as:

```
# Begin Opsware ogfs export
/export/ogfs/store 1.2.3.4(rw,no_root_squash, sync) \
1.2.3.5(rw,no_root_squash, sync)
/export/ogfs/audit 1.2.3.4(rw,no_root_squash, sync) \
1.2.3.5(rw,no_root_squash, sync)
# End Opsware ogfs exports
```

where 1.2.3.4 and 1.2.3.5 are example IP addresses of the two Slice Component bundle hosts and where `/export/ogfs/store` and `/export/ogfs/audit` are corresponding paths that exist on the host from where you are exporting the OGFS data.

- 3 After you add new entries to the export tables, export the directories or restart the Network File System using standard system procedures.



Remember to verify that the NFS Daemon starts when the system reboots. If your security policies require that NFS services be disabled, in order to install the Slice Component bundle on Linux systems you will need to configure the services `nfs`, `nfslock` to start the services and `netfs` to ensure that network (remote) filesystems are mounted after the network is available. Slice Component bundle installation will fail otherwise. The services can be disabled again after installation.

Name Service Caching Daemon (nscd) and OGFS

If the Name Service Caching Daemon (`nscd`) runs on the same server as the Slice Component bundle, then users cannot open a global shell session with a direct `ssh` connection. If `nscd` is running on the Slice Component bundle server, the Installer turns it off and runs the `chkconfig nscd off` command to prevent it from starting after a reboot. No action is required.

Time and Locale Requirements

This section discusses the time and locale requirements for SA Core Servers.

Core Time Requirements

Core Servers (either Single Core or Multimaster) and Satellite Core Servers must meet the following requirements. These time requirements do not apply to Managed Servers.

- All SA Core Servers must have their time zone set to Coordinated Universal Time (UTC).
- All SA Core Servers must maintain synchronized system clocks. Typically, you will synchronize the system clocks through an external server that uses NTP (Network Time Protocol) services.

Linux Time Configuration

To configure the time zone on a Linux server, perform the following tasks:

- 1 Copy or link

```
/usr/share/zoneinfo/UTC
```

to

```
/etc/localtime.
```

- 2 Ensure that the `/etc/sysconfig/clock` file contains the following lines:

```
ZONE="UTC"
```

```
UTC=true
```

Solaris Time Configuration

To configure the time zone on a Solaris server, verify that the `/etc/TIMEZONE` file contains the following line:

```
TZ=UTC
```

Locale Requirements

The servers hosting the Model Repository and the Software Repository (part of the Slice Component bundle) must have the `en_US.UTF-8` locale installed.

To display data from Managed Servers using various locales, the server hosting the Global File System (OGFS) must also have all the locales installed.

To enable non-English locales for Windows patching, follow the instructions in “Locales for Windows Patching” in the *SA User’s Guide: Application Automation*.

To verify whether the `en_US.UTF-8` locale is installed on a server, enter the following command:

```
echo $LANG
```

To define or modify the locale, enter the following values in the `/etc/sysconfig/i18n` file:

```
LANG="en_US.UTF-8"
```

```
SUPPORTED="en_US.UTF-8:en_US:en"
```

User and Group Requirements For Solaris and Linux

During installation on Solaris and Linux servers, the SA Installer creates two users (if you are installing OMDB, its installer will also add a user).

For Solaris, these users and groups are:

Table 19 Users and Groups Created During an SA/Solaris Install

| userid | group | groupid | home directory | shell |
|---------------|--------------|----------------|---------------------------------------|---------------|
| twist | twist | other | /var/opt/opsware/twist | /bin/sh twist |
| occ | occ | occ | /var/opt/opsware/occ | /bin/sh occ |
| opswgw | opswgw | na | /var/opt/opsware/ opswgw-<gw name> | na |

For Linux, these users and groups are:

Table 20 Users and Groups Created During an SA/Linux Install

| userid | group | uid | groupid | home directory | shell |
|---------------|--------------|------------|----------------|------------------------|---------------|
| twist | twist | | users | /var/opt/opsware/twist | /bin/sh twist |
| occ | occ | | occ | /var/opt/opsware/occ | /bin/sh occ |

3 SA Installation Parameter Reference

This section describes configuration parameters that you will be required to specify values for during an SA Core installation.

Depending on the type of installation you are performing, Single-host, Simple or Advanced, you will be prompted to provide certain required parameter values.

These parameters provide values for:

- Passwords (SA Administrator, Database Administrator, etc.)
- Service Names (TNS name)
- Configuration parameter values
- Path names for programs, configuration file, logs
- IP Addresses for Core hosts and devices hosting Core Components
- Gateway port numbers, and so on.

The values you provide are used for the current installation and are saved to a *response file* that you will use again later when upgrading the SA Core and when adding subsequent cores for a Multimaster Mesh. Therefore, you should give the file a name descriptive of the current installation and record the location of the response file or copy it to another secure location so that it can be easily found later.

When you start the SA Installer and choose the installation method, the Installer displays a series of parameters, some with default values that you can accept or modify, and other parameters that you must supply values for.

The number of parameters varies depending on whether you choose a single-host, standard, or advanced installation.

SA Installation Configuration Parameters

You can use the following reference to gather the information that you will need for the SA installation.

The tables below, list the various parameters that you may be asked to provide values for. The parameters are labeled with the type of installation in which they appear (Single-host, Simple, and Advanced).

When you run the SA Installation script, the Installer prompts you to choose either the **Simple** or **Advanced** interview. If you choose Simple mode, the default values are used for certain values, for example, passwords for the Oracle database, the Model Repository (`truth`) and Data Access Engine (`spin`) user, ports used by the Gateways, among others. In Advanced Mode, you can select values other than the default, giving you finer control.

Configuration Parameters by Installation Type

The configuration parameters you are asked to provide values for during the SA Installer Interview depends on the installation method you select:

- Single-Host
- Simple
- Advanced
- Uninstall

Table 21 through Table 25 list the parameters you will see based upon the type of installation. Table 26 through Table 36 list the parameters by their SA function.

Single-Host Installation Configuration Parameters

Table 21 lists the Single-Host installation configuration parameters and the expected values.

Table 21 Single-Host Installation Configuration Parameters

| Parameter | Description |
|---|---|
| <p>Please enter the database password for the <code>opsware_admin</code> user. This password is used to connect to the Oracle database.</p> <p>Parameter: <code>truth.oaPwd</code></p> | <p>Specify the <code>opsware_admin</code> password created by your database administrator.</p> <p><code>opsware_admin</code> is an Oracle user that the Installer uses during installation to perform required tasks.</p> <p>If you are installing the HP-supplied Oracle database created by the Installer, the password you provide here will be associated with <code>opsware_admin</code> during installation of the database.</p> <p>If you have an existing Oracle database installation, this must be the password that your DBA set for the <code>opsware_admin</code> user when setting up the Oracle instance on the server.</p> <p>Source: Oracle DBA</p> |
| <p>Enter the short name of the facility where the SA Installer is being run (no spaces).</p> <p>Parameter: <code>truth.dcNm</code></p> | <p>Specify the short name of the facility where the Installer is being run. This would also be the location of the First Core.</p> <p>Some SA processes use this name internally. It must be in uppercase, less than 25 characters, and cannot contain spaces or special characters (underscores are allowed, dashes are <i>not</i> allowed).</p> <p>Source: Variable</p> <p>Example: HEADQUARTERS</p> |

Table 21 Single-Host Installation Configuration Parameters (cont'd)

| Parameter | Description |
|--|---|
| <p>Please enter the directory that contains the Microsoft utilities. (Press Ctrl-I for a list of required files)</p> <p>Parameter: windows_util_loc</p> | <p>Specify the directory to which you have already copied the Microsoft utilities required for Window's Patch Management.</p> <p>Note: If you have not yet copied these Microsoft utilities onto the server you will use for OS Provisioning, see Windows Patch Management Requirements on page 40</p> <p>Source: Variable, however, this directory <i>must</i> exist on the same server as the Software Repository (part of the Slice Component bundle).</p> <p>Example: /tmp</p> |

Simple Installation Configuration Parameters

Table 22 lists the Simple installation configuration parameters and the expected values.

Table 22 Simple Installation Configuration Parameters

| Parameter | Description |
|---|---|
| <p>Please enter the database password for the opsware_admin user. This password is used to connect to the Oracle database.</p> <p>Parameter: truth.oaPwd</p> | <p>Specify the opsware_admin password created by your database administrator.</p> <p>opsware_admin is an Oracle user that the Installer uses during installation to perform required tasks.</p> <p>If you are installing the HP-supplied Oracle database created by the Installer, the password you provide here will be associated with opsware_admin during installation of the database.</p> <p>If you have an existing Oracle database installation, this must be the password that your DBA set for the opsware_admin user when setting up the Oracle instance on the server.</p> <p>Source: Oracle DBA</p> |

Table 22 Simple Installation Configuration Parameters (cont'd)

| Parameter | Description |
|--|---|
| <p>Enter the short name of the facility where the SA Installer is being run (no spaces).</p> <p>Parameter: truth.dcNm</p> | <p>Specify the short name of the facility where the Installer is being run. This would also be the location of the First Core.</p> <p>Some SA processes use this name internally. It must be in uppercase, less than 25 characters, and cannot contain spaces or special characters (underscores are allowed, dashes are <i>not</i> allowed).</p> <p>Source: Variable</p> <p>Example: HEADQUARTERS</p> |
| <p>Please enter the directory that contains the Microsoft utilities. (Press Ctrl-I for a list of required files)</p> <p>Parameter: windows_util_loc</p> | <p>Specify the directory to which you have already copied the Microsoft utilities required for Window's Patch Management.</p> <p>Note: If you have not yet copied these Microsoft utilities onto the server you will use for OS Provisioning, see Windows Patch Management Requirements on page 40</p> <p>Source: Variable, however, this directory <i>must</i> exist on the same server as the Software Repository (part of the Slice Component bundle).</p> <p>Example: /tmp</p> |
| <p>Please enter the IP address of the Management Gateway.</p> <p>Parameter: mgw_address</p> | <p>Specify the IP address of the Management Gateway. The Management Gateway manages Core-to-Core communications.</p> <p>Core Gateways installed on Subsequent Cores and/or Satellite Gateways also communicate with the Management Gateway.</p> <p>Source: Variable</p> <p>Example: 192.168.165.242</p> |

Table 22 Simple Installation Configuration Parameters (cont'd)

| Parameter | Description |
|--|--|
| <p>Enter the path of the Oracle home directory.</p> <p>Parameter: truth.orahome</p> | <p>Specify the base directory of the Oracle database installation.</p> <p>If you are installing the HP-supplied Oracle database created by the Installer, the default location of ORACLE_HOME is /u01/app/oracle/product/11.1.0/db_1.</p> <p>If you have an existing HP-supplied Oracle database, you will not be prompted for this parameter.</p> <p>For an existing non-HP-supplied Oracle database, you can determine the Oracle home directory by logging in as the oracle user on the Model Repository server, and checking the value of the \$ORACLE_HOME environment variable. (For a remote database installation, this parameter refers to the Oracle Client on the Model Repository server.)</p> <p>Source: The DBA who created the Oracle database.</p> <p>Example: /u01/app/oracle/product/11.1.0/db_1</p> |
| <p>Please enter the host (NFS server) where Software Repository Content resides.</p> <p>Parameter word.store.host</p> | <p>Specify the host name of the server where Software Repository content is stored.</p> <p>Source: Variable</p> <p>Example: 192.168.165.243</p> |
| <p>Please enter the path to the server where Software Respiratory content resides.</p> <p>Parameter word.store.path</p> | <p>Specify the path to the server where Software repository content is stored. This will be to the server specified in word.store.host.</p> <p>Source: Variable</p> |
| <p>Please enter the OS Provisioning Boot Server IP address or hostname.</p> <p>Parameter: bootagent.host</p> | <p>Specify the IP address for server on which you installed the OS Provisioning Boot Server.</p> <p>Important: You must provide a valid IP address or host name that can be resolved from the server on which you installed the OS Provisioning Boot Server component and the Build Manager. Additionally, the host name must be resolvable by SA managed servers for OS provisioning.</p> <p>Source: Variable</p> <p>Example: foo.example.com</p> |

Advanced Installation Configuration Parameters

Table 23 lists the Advanced installation configuration parameters and the expected values.

Table 23 Advanced Installation Configuration Parameters

| Parameter | Description |
|---|---|
| <p>Please enter the database password for the <code>opsware_admin</code> user. This password is used to connect to the Oracle database.</p> <p>Parameter: <code>truth.oaPwd</code></p> | <p>Specify the <code>opsware_admin</code> password created by your database administrator.</p> <p><code>opsware_admin</code> is an Oracle user that the Installer uses during installation to perform required tasks.</p> <p>If you are installing the HP-supplied Oracle database created by the Installer, the password you provide here will be associated with <code>opsware_admin</code> during installation of the database.</p> <p>If you have an existing Oracle database installation, this must be the password that your DBA set for the <code>opsware_admin</code> user when setting up the Oracle instance on the server.</p> <p>Source: Oracle DBA</p> |
| <p>Enter the short name of the facility where the SA Installer is being run (no spaces).</p> <p>Parameter: <code>truth.dcNm</code></p> | <p>Specify the short name of the facility where the Installer is being run. This would also be the location of the First Core.</p> <p>Some SA processes use this name internally. It must be in uppercase, less than 25 characters, and cannot contain spaces or special characters (underscores are allowed, dashes are <i>not</i> allowed).</p> <p>Source: Variable</p> <p>Example: HEADQUARTERS</p> |
| <p>Please enter the directory that contains the Microsoft utilities. (Press Ctrl-I for a list of required files)</p> <p>Parameter: <code>windows_util_loc</code></p> | <p>Specify the directory to which you have already copied the Microsoft utilities required for Window's Patch Management.</p> <p>Note: If you have not yet copied these Microsoft utilities onto the server you will use for OS Provisioning, see Windows Patch Management Requirements on page 40</p> <p>Source: Variable, however, this directory <i>must</i> exist on the same server as the Software Repository (part of the Slice Component bundle).</p> <p>Example: /tmp</p> |

Table 23 Advanced Installation Configuration Parameters (cont'd)

| Parameter | Description |
|--|--|
| <p>Please enter the IP address of the Management Gateway.</p> <p>Parameter: mgw_address</p> | <p>Specify the IP address of the Management Gateway. The Management Gateway manages Core-to-Core communications.</p> <p>Core Gateways installed on Subsequent Cores and/or Satellite Gateways also communicate with the Management Gateway.</p> <p>Source: Variable</p> <p>Example: 192.168.165.242</p> |
| <p>Please enter the password for the cryptographic material.</p> <p>Parameter: decrypt_passwd</p> | <p>Specify the password to use for decrypting cryptographic material.</p> <p>This password must be the same across all cores in a Multimaster Mesh.</p> <p>If you have an existing SA installation, this must be the password previously set for decrypting cryptographic material.</p> <p>Password Restrictions: The password cannot contain spaces and it must be between 4 and 20 characters long.</p> <p>Source: Variable</p> <p>Example: x145_pwd03</p> |
| <p>Enter the path of the Oracle home directory.</p> <p>Parameter: truth.orahome</p> | <p>Specify the base directory of the Oracle database installation.</p> <p>If you are installing the HP-supplied Oracle database created by the Installer, the default location of ORACLE_HOME is /u01/app/oracle/product/11.1.0/db_1.</p> <p>If you have an existing HP-supplied Oracle database, you will not be prompted for this parameter.</p> <p>For an existing non-HP-supplied Oracle database, you can determine the Oracle home directory by logging in as the oracle user on the Model Repository server, and checking the value of the \$ORACLE_HOME environment variable. (For a remote database installation, this parameter refers to the Oracle Client on the Model Repository server.)</p> <p>Source: The DBA who created the Oracle database.</p> <p>Example: /u01/app/oracle/product/11.1.0/db_1</p> |

Table 23 Advanced Installation Configuration Parameters (cont'd)

| Parameter | Description |
|--|---|
| <p>Please enter the host (NFS server) where Software Repository Content resides.</p> <p>Parameter word.store.host</p> | <p>Specify the host name of the server where Software Repository content is stored.</p> <p>Source: Variable</p> <p>Example: 192.168.165.243</p> |
| <p>Please enter the path to the server where Software Respiratory content resides.</p> <p>Parameter word.store.path</p> | <p>Specify the path to the server where Software repository content is stored. This will be to the server specified in word.store.host.</p> <p>Source: Variable</p> |
| <p>Please enter the OS Provisioning Boot Server IP address or hostname.</p> <p>Parameter: bootagent.host</p> | <p>Specify the IP address for server on which you installed the OS Provisioning Boot Server.</p> <p>Important: You must provide a valid IP address or host name that can be resolved from the server on which you installed the OS Provisioning Boot Server component and the Build Manager. Additionally, the host name must be resolvable by SA managed servers for OS provisioning.</p> <p>Source: Variable</p> <p>Example: foo.example.com</p> |
| <p>Please enter the password for the cryptographic material.</p> <p>Parameter: decrypt_passwd</p> | <p>Specify the password to use for decrypting cryptographic material.</p> <p>This password must be the same across all cores in a Multimaster Mesh.</p> <p>If you have an existing SA installation, this must be the password previously set for decrypting cryptographic material.</p> <p>Password Restrictions: The password cannot contain spaces and it must be between 4 and 20 characters long.</p> <p>Source: Variable</p> <p>Example: x145_pwd03</p> |

Table 23 Advanced Installation Configuration Parameters (cont'd)

| Parameter | Description |
|---|---|
| <p>Please enter the password for the SA <code>admin</code> user. this is the password that will be used to authenticate the user <code>admin</code> to SA.</p> <p>Parameter: <code>cast.admin_pwd</code></p> | <p>Specify the password for the SA <code>admin</code> user.</p> <p>Password Restrictions: This password cannot contain spaces.</p> <p>The Installer automatically creates the <code>admin</code> user.</p> <p>The first time you log in to the SAS Web Client to access a new Facility, you must log in as the <code>admin</code> user.</p> <p>Source: Variable</p> <p>Example: <code>x145_pwd03</code></p> |
| <p>Enter the fully qualified path to the directory where the export file will be saved.</p> <p>Parameter: <code>truth.dest</code></p> | <p><i>You must create this directory on the Model Repository server before you run the Installer.</i></p> <p>Specify the directory in which the database export file will be saved. This directory must reside on the Model Repository server in the source facility. You will see this prompt only when installing a new First Core.</p> <p>Note: When adding a facility to a Multimaster Mesh, you must export the Model Repository from the source facility, then copy it to the destination facility.</p> <p>Source: Variable</p> <p>Default: <code>/var/opt/opsware/truth/</code></p> |
| <p>Enter the fully qualified path to the directory that contains the export file.</p> <p>Parameter: <code>truth.sourcePath</code></p> | <p><i>This parameter is used when a new facility is added to a Multimaster Mesh and the source export file is copied to the new facility. This directory must exist on the server and contain the database export file before you run the Installer on the server.</i></p> <p>Specify the directory on the destination facility's Model Repository server to which you copied the export data file from the source facility.</p> <p>Source: Variable</p> <p>Default: <code>/var/opt/opsware/truth/</code></p> |

Table 23 Advanced Installation Configuration Parameters (cont'd)

| Parameter | Description |
|---|--|
| <p>Please enter the Facility ID (number only, less than or equal to 950, with no leading zeros).</p> <p>Parameter: truth.dcId</p> | <p>Specify an ID that uniquely identifies the facility.</p> <p>When you install the First Core, you will be prompted to provide this ID.</p> <p>When you install Subsequent Cores in the same Multimaster Mesh, SA automatically generates the Facility ID when you add a new facility using the SAS Web Client.</p> <p>You can determine the Subsequent Core's Facility ID by logging in to the SAS Web Client at the First Core facility, then select Opware Facilities under Environment in the Navigation pane and click the facility's name.</p> <p>ID Restrictions: The Facility ID value is capped at 1000. Therefore, you must specify a number for the first facility that is far enough below 1000 that you will have sufficient IDs available to continue adding facilities to your Multimaster Mesh.</p> <p>Source: Variable for the first facility; set by the SA for subsequent facilities.</p> <p>Default: 1</p> |
| <p>Please enter the default locale for users of the Command Center (en/ja)</p> <p>Parameter: default_locale</p> | <p>Specify the default locale for the SAS Web Client. For example, the locale entry en sets the language, character set, and date-and-time formats to English.</p> <p>Source: In this release, the allowed values are en (English) and ja (Japanese).</p> <p>Example: en or ja</p> <p>Default: en</p> |
| <p>Would you like this facility to mirror all Software Repository content in the mesh?</p> <p>Parameter: word.enable_content_mirroring</p> | <p>Enables mirroring (replication) of the Software Repository (word).</p> <p>Source: Variable</p> <p>Default: Y</p> |

Table 23 Advanced Installation Configuration Parameters (cont'd)

| Parameter | Description |
|--|--|
| <p>Enter the SID of the Oracle instance that contains the Data Model Repository.</p> <p>Parameter: truth.sid</p> | <p>Specify the database system ID (SID) that was set when Oracle was installed on the server where the Model Repository is installed.</p> <p>If you are installing the HP-supplied Oracle database created by the Installer, the SID is truth.</p> <p>If you have an existing HP-supplied Oracle database, you will not be asked to supply this parameter.</p> <p>For an existing non-HP-supplied Oracle database, you can find the SID by looking in the <code>tnsnames.ora</code> file. The location of this file can vary, so check with your DBA if you are not sure where to look.</p> <p>Source: The DBA who created the Oracle database.</p> <p>Default: truth</p> <p>Example: DTC05</p> |
| <p>Enter the fully-qualified path to the TNS admin directory (where the <code>tnsnames.ora</code> file resides).</p> <p>Parameter: truth.tnsdir</p> | <p>Specify the directory that contains the <code>tnsnames.ora</code> file.</p> <p>Note: This directory and path must be the same on all servers in a core.</p> <p>For example, since the Data Access Engine must access the <code>tnsnames.ora</code> file to connect to the Model Repository, the location of <code>tnsnames.ora</code> directory on the Data Access Engine server must be the same as the directory location on the Model Repository server.</p> <p>If you are installing the HP-supplied Oracle database created by the Installer, the <code>tnsnames.ora</code> file will be installed under <code>/var/opt/oracle</code>.</p> <p>If you have an existing HP-supplied Oracle database installed, you will not be prompted for this parameter.</p> <p>If you have an existing non-HP-supplied Oracle database, the location of the <code>tnsnames.ora</code> file can vary, so check with your DBA if you are not sure where to look.</p> <p>Source: The DBA who created the Oracle database.</p> <p>Example: <code>/var/opt/oracle</code></p> |

Table 23 Advanced Installation Configuration Parameters (cont'd)

| Parameter | Description |
|--|---|
| <p>Please enter the port on which the Model Repository database is listening.</p> <p>Parameter: <code>truth.port</code></p> | <p>Specify the port on which the Model Repository database listens:</p> <p>Source: Variable</p> <p>Default: 1521</p> |
| <p>Please enter the absolute path on the NFS server for the Opware Global File System (<code>/user</code>, <code>/home</code>, and <code>/tmp</code> directories). This value should be different from <code>ogfs.audit.path</code> and <code>word.store.path</code>.</p> <p>Parameter: <code>ogfs.store.path</code></p> | <p>Specify the absolute path on the NFS server for the Global File System (<code>/user</code>, <code>/home</code>, and <code>/tmp</code> directories). This value should be different from <code>ogfs.audit.path</code> and <code>word.store.path</code>.</p> <p>Source: Variable</p> <p>Default: <code>/var/opt/opsware/ogfs/export/store</code></p> |
| <p>Please enter the absolute path on the NFS server for the Opware Global File System where the audit streams will be stored. This value should be different from <code>ogfs.store.path</code> and <code>word.store.path</code>.</p> <p>Parameter: <code>ogfs.audit.path</code></p> | <p>Specify the absolute path on the NFS server for the Global File System where the audit streams will be stored. This value should be different from <code>ogfs.store.path</code> and <code>word.store.path</code>.</p> <p>Source: Variable</p> <p>Default: <code>/var/opt/opsware/ogfs/export/audit</code></p> |
| <p>Please enter the port on which Management Gateway in the First Core listens for connections from other Gateways (this value should match the value of <code>mgw_tunnel_listener_port</code> parameter in First Core's response file. Typically it's set to 2001.)</p> <p>Parameter: <code>masterCore.mgw_tunnel_listener_port</code></p> | <p>Specify the port on which Management Gateway in the First Core listens for connections from other Gateways (this value should match the value of <code>mgw_tunnel_listener_port</code> parameter in First Core's response file.</p> <p>Source: Variable</p> <p>Default: None</p> |
| <p>Enter the port on which the Management Gateway will listen for connections from other gateways.</p> <p>Parameter: <code>mgw_tunnel_listener_port</code></p> | <p>Specify the port on which the First and Subsequent Cores' Management Gateways will listen for connections from other Core and Satellite gateways.</p> <p>Source: Variable</p> <p>Example: 2001</p> |
| <p>Please enter the port on which Agents can contact the Agent Gateway to request connections to Core Components.</p> <p>Parameter: <code>agw_proxy_port</code></p> | <p>Specify the port that agents should use to connect to the SA Core.</p> <p>Source: Variable</p> <p>Default: 3001</p> |

Table 23 Advanced Installation Configuration Parameters (cont'd)

| Parameter | Description |
|---|--|
| <p>Please enter the pathname to the Linux media.</p> <p>Parameter: media_server.linux_media</p> | <p>Specify the path to the Linux OS media on the server on which the Media Server will be installed.</p> <p>Providing the path to the Linux OS media does not actually copy the media to the Media Server.</p> <p>See the <i>SA Policy Setter Guide</i> for the steps required to set up the media on the Media Server for OS Provisioning.</p> <p>Source: Variable, however, this directory must exist on the server where the Media Server is installed.</p> <p>Default: /media/opsware/linux</p> |
| <p>Please enter the pathname to the Solaris OS media.</p> <p>Parameter: media_server.sunos_media</p> | <p>Specify the path to the Sun Solaris OS media on the server on which the Media Server will be installed.</p> <p>Providing the path to the Solaris OS media does not actually copy the media to the Media Server</p> <p>See the <i>SA Policy Setter Guide</i> for the steps required to set up the media on the Media Server for OS Provisioning.</p> <p>Source: Variable, however, this directory must exist on the server where the Media Server is installed.</p> <p>Default: /media/opsware/solaris/</p> |
| <p>Please enter the pathname to the Windows OS media.</p> <p>Parameter: media_server.windows_media</p> | <p>Specify the path to the Microsoft Windows OS media on the server on which the Media Server will be installed.</p> <p>The OS Provisioning feature exports Windows OS media to SMB clients through a Samba share.</p> <p>Providing the path to the Windows OS media does not actually copy the media to the Media Server.</p> <p>See the <i>SA Policy Setter Guide</i> for the steps required to set up the media on the Media Server for OS Provisioning.</p> <p>Source: Variable, however, this directory must exist on the server where the Media Server is installed.</p> <p>Default: /media/opsware/windows/</p> |

Table 23 Advanced Installation Configuration Parameters (cont'd)

| Parameter | Description |
|---|---|
| <p>Please enter the host name or IP address of the Network Automation (NA) server. (Enter "none" if NA is not installed.)</p> <p>Parameter: twist.nasdata.host</p> | <p>Specify the host name or IP address of the server running HP Network Automation (NA), if installed. If NA is not installed, accept the default value none.</p> <p>Enter a value without spaces.</p> <p>Source: The network administrator/SA administrator who installed HP Network Automation.</p> <p>Example: 192.168.165.242</p> |
| <p>Please enter the username used to connect to HP Live Network. (Leave as "none" if HPLN is not being configured.)</p> <p>Parameter: hpln_user_name</p> | <p>Specify the username used to connect to the HP Live Network (HPLN).</p> <p>The value should adhere to HPLN's standard. A minimum of 5 characters and it cannot contain the special characters &, , or *. Also, any of the invalid characters defined for the SA install also apply, such as leading #, quotes, and so on</p> <p>Source: Variable</p> <p>Default: None</p> |
| <p>Please enter the password associated with the username used to connect to HP Live Network. (Leave as "none" if HPLN is not being configured.)</p> <p>Parameter: hpln_password</p> | <p>Specify the HPLN user password used to connect to the HP Live Network (HPLN).</p> <p>The value must follow the same rules as hpln_user_name, except the minimum characters accepted is 6.</p> <p>Source: Variable</p> <p>Default: None</p> |
| <p>Please enter the address of the proxy used to connect to the HP Live Network. (Leave as "none" if HPLN is not being configured or no proxy is needed to connect to HP Live Network.)</p> <p>Parameter: hpln_proxy</p> | <p>Specify the IP address or hostname of the proxy used to connect to the HP Live Network (HPLN)</p> <p>The value must follow the following format: <protocol>://<host> or <protocol>://<host>:<port>.</p> <p>If no <port> value is provided, the default 3128 is used.</p> <p>Source: Variable</p> <p>Default: None</p> |

Table 23 Advanced Installation Configuration Parameters (cont'd)

| Parameter | Description |
|--|---|
| <p>Please enter the username of the proxy user required to connect to the HP Live Network. (Leave as "none" if HPLN is not being configured, no proxy is configured or if no username is needed.)</p> <p>Parameter: hpln_proxy_user</p> | <p>Specify the username for the HPLN proxy user.</p> <p>The invalid characters for this parameter follow the SA convention for usernames, such as no leading #, no quotes, no whitespace, and so on.</p> <p>Source: Variable</p> <p>Default: None</p> |
| <p>Please enter the password of the proxy user required to connect to the HP Live Network. (Leave as "none" if HPLN is not being configured, no proxy is configured or if no username is needed.)</p> <p>Parameter: hpln_proxy_pwd</p> | <p>Specify the password for the HPLN proxy user.</p> <p>The invalid characters for this parameter follow the SA convention for usernames, such as no leading #, no quotes, no whitespace, and so on.</p> <p>Source: Variable</p> <p>Default: None</p> |

Subsequent Core Installation Parameters

Table 24 lists the parameters you see when installing a Subsequent Core and the expected values.

Table 24 Subsequent Core Installation Parameters

| Parameter | Description |
|---|---|
| <p>Advanced only</p> <p>Enter the short name of the new facility you would like to define</p> <p>Parameter: slaveTruth.dcNm</p> | <p>Specify the default facility name for the Subsequent Core.</p> <p>Some SA processes use this name internally. It must be less than 25 characters, and cannot contain spaces or special characters (both dashes and underscores are allowed).</p> <p>Source: Variable</p> <p>Example: NORTHSIDE</p> |
| <p>Advanced only</p> <p>Enter the IP address of the host where you want to install the Model Repository in the new facility.</p> <p>Parameter: slaveTruth.truthIP</p> | <p>Specify the IP address of the host on which you will install the Model Repository for the new target core.</p> <p>Source: Variable</p> <p>Example: 192.168.165.242</p> |

Table 24 Subsequent Core Installation Parameters (cont'd)

| Parameter | Description |
|---|--|
| <p>Advanced only</p> <p>Please enter the IP address of the device where you are planning to install the Infrastructure component in the new facility (or where the management gateway will be installed).</p> <p>Parameter: <code>slaveTruth.mgwIP</code></p> | <p>Specify the IP address of the host on which you will install the Infrastructure Component bundle or the host on which the Management Gateway will be installed.</p> <p>Source: Variable</p> <p>Example: 192.168.165.202</p> |
| <p>Advanced only</p> <p>Enter the subdomain for the facility you are about to create (lowercase, no spaces).</p> <p>Parameter: <code>slaveTruth.dcSubDom</code></p> | <p>Specify the fully-qualified DNS subdomain where the Destination Multimaster Core is to be deployed.</p> <p>This value must be <i>unique</i> for each core in the Multimaster Mesh, both Source and Destination Cores. The value is based on the VLAN for the facility in which you are installing the Multimaster core.</p> <p>The subdomain name must be in lowercase with no spaces, less than 50 characters, and in subdomain format.</p> <p>Source: Your network administrator.</p> <p>Example: <code>dc2.example.com</code></p> |
| <p>Advanced only</p> <p>Enter the service name (aka TNS name) of the Model Repository instance.</p> <p>Parameter: <code>slaveTruth.servicename</code></p> | <p>Specify the service name, also known as the <i>alias</i>, for the core's Model Repository. You will see this prompt only when installing a new First Core.</p> <p>If this is a new installation, the service name you specify will be associated with the Model Repository during installation.</p> <p>If you plan to use an existing Model Repository, you can find the service name by looking in the <code>tnsnames.ora</code> file on the Model Repository instance. The location of this file can vary, so check with your DBA if you are not sure where to look.</p> <p>Source: The DBA who created the Oracle database.</p> <p>Example: <code>truth02.example.com</code></p> |

SA Core Uninstallation Parameters

Table 25 lists the SA Core uninstallation parameters and the expected values.

Table 25 SA Core Uninstallation Parameters

| Parameter | Description |
|--|--|
| <p>Are you absolutely sure you want to remove all packages in the repository? [Y/N]</p> <p>Parameter: word.remove_files</p> | <p>If you answer <i>Yes</i>, the packages, logs, and cryptographic material for the Software Repository are removed.</p> <p>Default: None</p> |
| <p>Are you absolutely sure you want to remove users' OGFS home and audit directories? (home and audit directories will only be removed if they are stored on the Software Repository server) (Y/N)?</p> <p>Parameter: ogfs.remove_home_dirs</p> | <p>Respond <i>Yes</i> if you want the uninstall to remove all users' OGFS home and audit directories. Backup any information you want to retain.</p> <p>Source: Variable</p> <p>Default: None</p> |
| <p>Do you need to preserve any of the data in this database? [Y/N]</p> <p>Parameter: truth.uninstall.needdata</p> | <p>Uninstalling the Model Repository permanently deletes all data in the database, therefore, the uninstallation process stops if you reply <i>Yes</i> to this prompt.</p> <p>If you want to do an uninstallation, backup your data, run the uninstallation again and answer <i>No</i> to this prompt. Remember, the Installer <i>does not</i> preserve any data.</p> <p>Default: Y</p> |
| <p>Are you sure you want to remove all data and schema from this database? [Y/N]</p> <p>Parameter: truth.uninstall.aresure</p> | <p>Uninstalling the Model Repository by responding <i>Yes</i> permanently deletes all data in the database. You can stop the uninstallation by responding <i>No</i> to this prompt.</p> <p>Default: None</p> |
| <p>Would you like to preserve the database of cryptographic material? [Y/N]</p> <p>Parameter: save_crypto</p> | <p>If you answer <i>Yes</i>, the database of cryptographic material is saved. If you answer <i>No</i>, the material is deleted as part of the uninstallation.</p> <p>Default: None</p> |
| <p>Would you like to preserve the HPLN content? (Y/N)</p> <p>Parameter: hpln.uninstall.keepcontent</p> | <p>Responding <i>No</i> uninstalls all HP Live Network content.</p> <p>Source: Variable</p> <p>Default: None</p> |

SA Installation Configuration Parameters Listed by Function

Model Repository Parameters

The Model Repository is the database that stores information about the hardware and software deployed in the operational environment. Most of the Model Repository parameters apply only to a Single-host or First Core installation.

Table 26 lists the Model Repository parameters and the expected values.

Table 26 Model Repository Parameters

| Parameter | Description |
|--|--|
| <p>Install Method: Advanced</p> <p>Please enter the service name (aka TNS name) of the Model Repository instance in the facility where the SA Installer is being run.</p> <p>Parameter: <code>truth.servicename</code></p> | <p>Specify the service name, also known as the <i>alias</i>, for the Model Repository. For a Single Core, this is the server on which you are running the Installer.</p> <p>If you are installing the default Oracle database created by the Installer, the service name you provide here will be associated with the database during installation.</p> <p>If you intend to use an existing Oracle database, you can find the service name by looking in the <code>tnsnames.ora</code> file on the Model Repository instance. The service name is the value before the first equals sign (=) in the file. The location of this file can vary, so check with your DBA if you are not sure where to look.</p> <p>Source: The DBA who created the Oracle database.</p> <p>Example: <code>truth.example.com</code></p> |
| <p>Install Method: Simple, Advanced</p> <p>Enter the service name (aka TNS name) of the Model Repository instance.</p> <p>Parameter: <code>slaveTruth.servicename</code></p> | <p>Specify the service name, also known as the <i>alias</i>, for the core's Model Repository. You will see this prompt only when installing a new First Core.</p> <p>If this is a new installation, the service name you specify will be associated with the Model Repository during installation.</p> <p>If you plan to use an existing Model Repository, you can find the service name by looking in the <code>tnsnames.ora</code> file on the Model Repository instance. The location of this file can vary, so check with your DBA if you are not sure where to look.</p> <p>Source: The DBA who created the Oracle database.</p> <p>Example: <code>truth02.example.com</code></p> |

Table 26 Model Repository Parameters (cont'd)

| Parameter | Description |
|--|--|
| <p>Install Method: Advanced</p> <p>Enter the SID of the Oracle instance that contains the Data Model Repository.</p> <p>Parameter: truth.sid</p> | <p>Specify the database system ID (SID) that was set when Oracle was installed on the server where the Model Repository is installed.</p> <p>If you are installing the HP-supplied Oracle database created by the Installer, the SID is truth.</p> <p>If you have an existing HP-supplied Oracle database, you will not be asked to supply this parameter.</p> <p>For an existing non-HP-supplied Oracle database, you can find the SID by looking in the <code>tnsnames.ora</code> file. The location of this file can vary, so check with your DBA if you are not sure where to look.</p> <p>Source: The DBA who created the Oracle database.</p> <p>Default: truth</p> <p>Example: DTC05</p> |
| <p>Install Method: Simple and Advanced</p> <p>Enter the path of the Oracle home directory.</p> <p>Parameter: truth.orahome</p> | <p>Specify the base directory of the Oracle database installation.</p> <p>If you are installing the HP-supplied Oracle database created by the Installer, the default location of ORACLE_HOME is <code>/u01/app/oracle/product/11.1.0/db_1</code>.</p> <p>If you have an existing HP-supplied Oracle database, you will not be prompted for this parameter.</p> <p>For an existing non-HP-supplied Oracle database, you can determine the Oracle home directory by logging in as the <code>oracle</code> user on the Model Repository server, and checking the value of the <code>\$ORACLE_HOME</code> environment variable. (For a remote database installation, this parameter refers to the Oracle Client on the Model Repository server.)</p> <p>Source: The DBA who created the Oracle database.</p> <p>Example: <code>/u01/app/oracle/product/11.1.0/db_1</code></p> |

Table 26 Model Repository Parameters (cont'd)

| Parameter | Description |
|--|--|
| <p>Install Method: Advanced</p> <p>Enter the fully-qualified path to the TNS admin directory (where the <code>tnsnames.ora</code> file resides).</p> <p>Parameter: <code>truth.tnsdir</code></p> | <p>Specify the directory that contains the <code>tnsnames.ora</code> file.</p> <p>Note: This directory and path must be the same on all servers in a core.</p> <p>For example, since the Data Access Engine must access the <code>tnsnames.ora</code> file to connect to the Model Repository, the location of <code>tnsnames.ora</code> directory on the Data Access Engine server must be the same as the directory location on the Model Repository server.</p> <p>If you are installing the HP-supplied Oracle database created by the Installer, the <code>tnsnames.ora</code> file will be installed under <code>/var/opt/oracle</code>.</p> <p>If you have an existing HP-supplied Oracle database installed, you will not be prompted for this parameter.</p> <p>If you have an existing non-HP-supplied Oracle database, the location of the <code>tnsnames.ora</code> file can vary, so check with your DBA if you are not sure where to look.</p> <p>Source: The DBA who created the Oracle database.</p> <p>Example: <code>/var/opt/oracle</code></p> |
| <p>Install Method: Advanced</p> <p>Please enter the port on which the Model Repository database is listening.</p> <p>Parameter: <code>truth.port</code></p> | <p>Specify the port on which the Model Repository database listens:</p> <p>Source: Variable</p> <p>Default: 1521</p> |
| <p>Install Method: Advanced</p> <p>Enter the fully qualified path to the directory where the export file will be saved.</p> <p>Parameter: <code>truth.dest</code></p> | <p><i>You must create this directory on the Model Repository server before you run the Installer.</i></p> <p>Specify the directory in which the database export file will be saved. This directory must reside on the Model Repository server in the source facility. You will see this prompt only when installing a new First Core.</p> <p>Note: When adding a facility to a Multimaster Mesh, you must export the Model Repository from the source facility, then copy it to the destination facility.</p> <p>Source: Variable</p> <p>Default: <code>/var/opt/opsware/truth/</code></p> |

Table 26 Model Repository Parameters (cont'd)

| Parameter | Description |
|---|--|
| <p>Install Method: Advanced</p> <p>Enter the fully qualified path to the directory that contains the export file.</p> <p>Parameter: truth.sourcePath</p> | <p><i>This parameter is used when a new facility is added to a Multimaster Mesh and the source export file is copied to the new facility. This directory must exist on the server and contain the database export file before you run the Installer on the server.</i></p> <p>Specify the directory on the destination facility's Model Repository server to which you copied the export data file from the source facility.</p> <p>Source: Variable</p> <p>Default: /var/opt/opsware/truth/</p> |
| <p>Install Method: Simple, Advanced</p> <p>Enter the IP address of the host where you want to install the Model Repository in the new facility.</p> <p>Parameter: slaveTruth.truthIP</p> | <p>Specify the IP address of the host on which you will install the Model Repository for the new target core.</p> <p>Source: Variable</p> <p>Example: 192.168.165.242</p> |
| <p>Install Method: Simple, Advanced</p> <p>Please enter the IP address of the device where you are planning to install the Infrastructure component in the new facility (or where the management gateway will be installed).</p> <p>Parameter: slaveTruth.mgwIP</p> | <p>Specify the IP address of the host on which you will install the Infrastructure Component bundle or the host on which the Management Gateway will be installed.</p> <p>Source: Variable</p> <p>Example: 192.168.165.202</p> |

Database (Model Repository) Password Parameters

The Installer prompts you to specify passwords for required Oracle user accounts. The passwords must meet the following standard Oracle criteria:

- The password cannot contain an Oracle reserved word (see Oracle's documentation for a full list).
- The password must be between 1 and 30 characters long.
- The password must start with a letter and use only alphanumeric and underscore (_) characters.

Table 27 lists the Database parameters and the expected values.

Table 27 Database Password Parameters

| Parameter | Description |
|---|---|
| <p>Install Method: Single-Host, Simple, Advanced</p> <p>Please enter the database password for the <code>opsware_admin</code> user. This password is used to connect to the Oracle database.</p> <p>Parameter: <code>truth.oaPwd</code></p> | <p>Specify the <code>opsware_admin</code> password created by your database administrator.</p> <p><code>opsware_admin</code> is an Oracle user that the Installer uses during installation to perform required tasks.</p> <p>If you are installing the HP-supplied Oracle database created by the Installer, the password you provide here will be associated with <code>opsware_admin</code> during installation of the database.</p> <p>If you have an existing Oracle database installation, this must be the password that your DBA set for the <code>opsware_admin</code> user when setting up the Oracle instance on the server.</p> <p>Source: Oracle DBA</p> |

Software Repository Parameters

Table 28 lists the password parameters for the Software Repository and the expected values.

Table 28 Software Repository Parameters

| Parameter | Description |
|---|---|
| <p>Install Method: Advanced</p> <p>Would you like this facility to mirror all Software Repository content in the mesh?</p> <p>Parameter: <code>word.enable_content_mirroring</code></p> | <p>Enables mirroring (replication) of the Software Repository (word).</p> <p>Source: Variable</p> <p>Default: Y</p> |

Table 28 Software Repository Parameters

| Parameter | Description |
|---|--|
| <p>Install Method: Advanced</p> <p>Please enter the location where the Software Repository temporarily places content during uploads.</p> <p>Parameter word_tmp_dir</p> | <p>Specify the fully qualified location for the temporary storage of content during Software Repository uploads.</p> <p>Source: Variable</p> <p>Default: /var/opt/opsware/wordbot_tmp/</p> |
| <p>Install Method: Simple and Advanced</p> <p>Please enter the host (NFS server) where Software Repository Content resides.</p> <p>Parameter word.store.host</p> | <p>Specify the host name of the server where Software Repository content is stored.</p> <p>Source: Variable</p> <p>Example: 192.168.165.243</p> |
| <p>Install Method: Simple and Advanced</p> <p>Please enter the path to the server where Software Respiratory content resides.</p> <p>Parameter word.store.path</p> | <p>Specify the path to the server where Software repository content is stored. This will be to the server specified in word.store.host.</p> <p>Source: Variable</p> |

SA Component Password Parameters

Table 29 lists the password parameters for components other than the Model Repository and the expected values.



If this installation is for a Multimaster Mesh, the following passwords must be the same for all cores belonging to the mesh.

Table 29 Component User and Password Parameters

| Parameter | Description |
|---|---|
| <p>Install Method: Advanced</p> <p>Please enter the password for the cryptographic material.</p> <p>Parameter: decrypt_passwd</p> | <p>Specify the password to use for decrypting cryptographic material.</p> <p>This password must be the same across all cores in a Multimaster Mesh.</p> <p>If you have an existing SA installation, this must be the password previously set for decrypting cryptographic material.</p> <p>Password Restrictions: The password cannot contain spaces and it must be between 4 and 20 characters long.</p> <p>Source: Variable</p> <p>Example: x145_pwd03</p> |

Table 29 Component User and Password Parameters (cont'd)

| Parameter | Description |
|---|--|
| <p>Install Method: Advanced</p> <p>Please enter the password for the SA admin user. this is the password that will be used to authenticate the user admin to SA.</p> <p>Parameter: cast.admin_pwd</p> | <p>Specify the password for the SA admin user.</p> <p>Password Restrictions: This password cannot contain spaces.</p> <p>The Installer automatically creates the admin user.</p> <p>The first time you log in to the SAS Web Client to access a new Facility, you must log in as the admin user.</p> <p>Source: Variable</p> <p>Example: x145_pwd03</p> |

Facility Parameters

A *Facility* is a system object that represents a specific geographical location (such as Sunnyvale, Plano, Sacramento, or a data center). Servers and users are often associated with a facility as a means to enforce access rights and privileges. If you are performing a Single Core installation, your deployment is a single facility. Multimaster installations, however, consist of two or more facilities.

In this section, the first core installed in a Multimaster Mesh is called the *First Core*, and is the core that has the first Model Repository installed. *Subsequent Cores* are the second, third, and fourth (and so on) cores installed in the mesh. For historical reasons, First Cores are sometimes referred to in parameter names as *Master* and Subsequent Cores as *Slave*.

Table 30 lists the Facility parameters and the expected values.

Table 30 Facility Parameters

| Parameter | Description |
|--|--|
| <p>Install Method: Advanced</p> <p>Please enter the subdomain for this facility (lowercase, no spaces).</p> <p>Parameter: truth.dcSubDom</p> | <p>Specify the fully-qualified DNS subdomain where the core is to be deployed. This is the facility where you run the Installer.</p> <p>This value must be unique for each core in the Multimaster Mesh. The value is based on the VLAN for the facility in which you are installing the core.</p> <p>The subdomain name must be in lowercase, less than 50 characters long, and in subdomain format.</p> <p>Source: Your network administrator.</p> <p>Example: dc1.example.com</p> |

Table 30 Facility Parameters (cont'd)

| Parameter | Description |
|---|--|
| <p>Install Method: Simple, Advanced</p> <p>Enter the subdomain for the facility you are about to create (lowercase, no spaces).</p> <p>Parameter: slaveTruth.dcSubDom</p> | <p>Specify the fully-qualified DNS subdomain where the Destination Multimaster Core is to be deployed.</p> <p>This value must be <i>unique</i> for each core in the Multimaster Mesh, both Source and Destination Cores. The value is based on the VLAN for the facility in which you are installing the Multimaster core.</p> <p>The subdomain name must be in lowercase with no spaces, less than 50 characters, and in subdomain format.</p> <p>Source: Your network administrator.</p> <p>Example: dc2.example.com</p> |
| <p>Install Method: Single-Host, Simple, Advanced</p> <p>Enter the short name of the facility where the SA Installer is being run (no spaces).</p> <p>Parameter: truth.dcNm</p> | <p>Specify the short name of the facility where the Installer is being run. This would also be the location of the First Core.</p> <p>Some SA processes use this name internally. It must be in uppercase, less than 25 characters, and cannot contain spaces or special characters (underscores are allowed, dashes are <i>not</i> allowed).</p> <p>Source: Variable</p> <p>Example: HEADQUARTERS</p> |
| <p>Install Method: Simple, Advanced</p> <p>Subsequent Core Install only</p> <p>Enter the short name of the new facility you would like to define</p> <p>Parameter: slaveTruth.dcNm</p> | <p>Specify the default facility name for the Subsequent Core.</p> <p>Some SA processes use this name internally. It must be less than 25 characters, and cannot contain spaces or special characters (both dashes and underscores are allowed).</p> <p>Source: Variable</p> <p>Example: NORTHSIDE</p> |

Table 30 Facility Parameters (cont'd)

| Parameter | Description |
|---|--|
| <p>Install Method: Advanced</p> <p>Please enter the Facility ID (number only, less than or equal to 950, with no leading zeros).</p> <p>Parameter: truth.dcId</p> | <p>Specify an ID that uniquely identifies the facility.</p> <p>When you install the First Core, you will be prompted to provide this ID.</p> <p>When you install Subsequent Cores in the same Multimaster Mesh, SA automatically generates the Facility ID when you add a new facility using the SAS Web Client.</p> <p>You can determine the Subsequent Core's Facility ID by logging in to the SAS Web Client at the First Core facility, then select Opware Facilities under Environment in the Navigation pane and click the facility's name.</p> <p>ID Restrictions: The Facility ID value is capped at 1000. Therefore, you must specify a number for the first facility that is far enough below 1000 that you will have sufficient IDs available to continue adding facilities to your Multimaster Mesh.</p> <p>Source: Variable for the first facility; set by the SA for subsequent facilities.</p> <p>Default: 1</p> |

SA OS/Software Provisioning and NA Integration Parameters

The values specified for the following parameters will be used to configure OS Provisioning, Software Provisioning, Patch Management, and Network Automation (NA) integration.

[Table 31](#) lists the OS/Software Provisioning and NA Integration parameters and the expected values.

Table 31 SA OS/Software Provisioning and NA Integration Parameters

| Parameter | Description |
|--|---|
| <p>Install Method: Single-Host, Simple, Advanced</p> <p>Please enter the directory that contains the Microsoft utilities. (Press Ctrl-I for a list of required files)</p> <p>Parameter: windows_util_loc</p> | <p>Specify the directory to which you have already copied the Microsoft utilities required for Window's Patch Management.</p> <p>Note: If you have not yet copied these Microsoft utilities onto the server you will use for OS Provisioning, see Windows Patch Management Requirements on page 40</p> <p>Source: Variable, however, this directory <i>must</i> exist on the same server as the Software Repository (part of the Slice Component bundle).</p> <p>Example: /tmp</p> |

Table 31 SA OS/Software Provisioning and NA Integration Parameters (cont'd)

| Parameter | Description |
|---|---|
| <p>Install Method: Simple and Advanced</p> <p>Please enter the OS Provisioning Boot Server IP address or hostname.</p> <p>Parameter: bootagent.host</p> | <p>Specify the IP address for server on which you installed the OS Provisioning Boot Server.</p> <p>Important: You must provide a valid IP address or host name that can be resolved from the server on which you installed the OS Provisioning Boot Server component and the Build Manager. Additionally, the host name must be resolvable by SA managed servers for OS provisioning.</p> <p>Source: Variable</p> <p>Example: foo.example.com</p> |
| <p>Install Method: Advanced</p> <p>Please enter the pathname to the Linux media.</p> <p>Parameter: media_server.linux_media</p> | <p>Specify the path to the Linux OS media on the server on which the Media Server will be installed.</p> <p>Providing the path to the Linux OS media does not actually copy the media to the Media Server.</p> <p>See the <i>SA Policy Setter Guide</i> for the steps required to set up the media on the Media Server for OS Provisioning.</p> <p>Source: Variable, however, this directory must exist on the server where the Media Server is installed.</p> <p>Default: /media/opsware/linux</p> |
| <p>Install Method: Advanced</p> <p>Please enter the pathname to the Solaris OS media.</p> <p>Parameter: media_server.sunos_media</p> | <p>Specify the path to the Sun Solaris OS media on the server on which the Media Server will be installed.</p> <p>Providing the path to the Solaris OS media does not actually copy the media to the Media Server</p> <p>See the <i>SA Policy Setter Guide</i> for the steps required to set up the media on the Media Server for OS Provisioning.</p> <p>Source: Variable, however, this directory must exist on the server where the Media Server is installed.</p> <p>Default: /media/opsware/solaris/</p> |

Table 31 SA OS/Software Provisioning and NA Integration Parameters (cont'd)

| Parameter | Description |
|--|--|
| <p>Install Method: Advanced</p> <p>Please enter the pathname to the Windows OS media.</p> <p>Parameter: media_server.windows_media</p> | <p>Specify the path to the Microsoft Windows OS media on the server on which the Media Server will be installed.</p> <p>The OS Provisioning feature exports Windows OS media to SMB clients through a Samba share.</p> <p>Providing the path to the Windows OS media does not actually copy the media to the Media Server.</p> <p>See the <i>SA Policy Setter Guide</i> for the steps required to set up the media on the Media Server for OS Provisioning.</p> <p>Source: Variable, however, this directory must exist on the server where the Media Server is installed.</p> <p>Default: /media/opsware/windows/</p> |
| <p>Install Method: Advanced</p> <p>Please enter the host name or IP address of the Network Automation (NA) server. (Enter “none” if NA is not installed.)</p> <p>Parameter: twist.nasdata.host</p> | <p>Specify the host name or IP address of the server running HP Network Automation (NA), if installed. If NA is not installed, accept the default value none.</p> <p>Enter a value without spaces.</p> <p>Source: The network administrator/SA administrator who installed HP Network Automation.</p> <p>Example: 192.168.165.242</p> |
| <p>Install Method: Advanced</p> <p>Please enter the location where the Software Repository temporarily places content during uploads.</p> <p>Parameter: word_tmp_dir</p> | <p>Specify the fully qualified location for the temporary storage of content during Software Repository uploads.</p> <p>Source: Variable</p> <p>Default: /var/opt/opsware/wordbot_tmp/</p> |

SA Gateway Parameters

The values specified for the following parameters are used to configure the IP addresses and ports at which SA Gateways can be contacted by Core Components, Agents, or other gateways.

Table 32 lists the gateway parameters and expected values.



You can use only port numbers below 64001.

Table 32 SA Gateway Parameters

| Parameter | Description |
|--|--|
| <p>Install Method: Simple and Advanced</p> <p>Please enter the IP address of the Management Gateway.</p> <p>Parameter: mgw_address</p> | <p>Specify the IP address of the Management Gateway. The Management Gateway manages Core-to-Core communications.</p> <p>Core Gateways installed on Subsequent Cores and/or Satellite Gateways also communicate with the Management Gateway.</p> <p>Source: Variable</p> <p>Example: 192.168.165.242</p> |
| <p>Install Method: Advanced</p> <p>Enter the port on which the Management Gateway will listen for connections from other gateways.</p> <p>Parameter: mgw_tunnel_listener_port</p> | <p>Specify the port on which the First and Subsequent Cores' Management Gateways will listen for connections from other Core and Satellite gateways.</p> <p>Source: Variable</p> <p>Example: 2001</p> |
| <p>Install Method: Advanced</p> <p>Please enter the port on which the First Core Management Gateway listens for connections from other Gateways.</p> <p><i>Parameter:</i> masterCore.mgw_tunnel_listener_port</p> | <p>Specify the port number on which the First Core's Management Gateway listens for connections from other Gateways. This port will be used during installation of Subsequent Cores to create a Multimaster connection between the Management Gateways on the First and Subsequent Cores.</p> <p>Source: Variable</p> <p>Example: 2001</p> |
| <p>Install Method: Advanced</p> <p>Enter the port on which the Management Gateway can be contacted to request connections to Core Components.</p> <p><i>Parameter:</i> mgw_proxy_port</p> | <p>Specify the port number through which Core Components can request tunneled connections to other components through the Management Gateway.</p> <p>Source: Variable</p> <p>Example: 3003</p> |
| <p>Install Method: Advanced</p> <p>Please enter the port on which Agents can contact the Agent Gateway to request connections to Core Components.</p> <p>Parameter: agw_proxy_port</p> | <p>Specify the port that agents should use to connect to the SA Core.</p> <p>Source: Variable</p> <p>Default: 3001</p> |

Table 32 SA Gateway Parameters (cont'd)

| Parameter | Description |
|---|--|
| <p>Install Method: Advanced</p> <p>Please enter the port on which Management Gateway in the First core listens for connections from other Gateways (this value should match the value of <code>mgw_tunnel_listener_port</code> parameter in First Core's response file. Typically it's set to 2001.)</p> <p>Parameter: <code>masterCore.mgw_tunnel_listener_port</code></p> | <p>Specify the port on which Management Gateway in the First core listens for connections from other Gateways (this value should match the value of <code>mgw_tunnel_listener_port</code> parameter in First Core's response file.</p> <p>Source: Variable</p> <p>Default: 2001</p> |

Global File System Parameters

The values specified for the following parameters are used to configure IP addresses and directories for the Global File System.

Table 33 lists the Global File System parameters and the expected values.

Table 33 Global File System Parameters

| Parameter | Description |
|---|---|
| <p>Install Method: Advanced</p> <p>Please enter the pathname of where you wish the local cache of snapshots and audits to be. This will require a large amount of disk space (4 Gb by default).</p> <p>Parameter: spoke.cachedir</p> | <p>Specify the directory in which the Global File System service will cache snapshots and audits for quick access.</p> <p>Default: /var/opt/opsware/compliancecache</p> <p>Source: Variable</p> <p>Example: /var/opt/opsware/compliancecache</p> |
| <p>Install Method: Advanced</p> <p>Please enter the absolute path on the NFS server for the Opsware Global File System (/user, /home, and /tmp directories). This value should be different from ogfs.audit.path and word.store.path.</p> <p>Parameter: ogfs.store.path</p> | <p>Specify the absolute path on the NFS server for the Global File System (/user, /home, and /tmp directories). This value should be different from ogfs.audit.path and word.store.path.</p> <p>Source: Variable</p> <p>Default: /var/opt/opsware/ogfs/export/store</p> |
| <p>Install Method: Advanced</p> <p>Please enter the absolute path on the NFS server for the Opsware Global File System where the audit streams will be stored. This value should be different from ogfs.store.path and word.store.path.</p> <p>Parameter: ogfs.audit.path</p> | <p>Specify the absolute path on the NFS server for the Global File System where the audit streams will be stored. This value should be different from ogfs.store.path and word.store.path.</p> <p>Source: Variable</p> <p>Default: /var/opt/opsware/ogfs/export/audit</p> |

SAS Web Client Parameters

The values specified for the following parameters are used by the SAS Web Client.

Table 34 SAS Web Client Parameters

| Parameter | Description |
|---|--|
| <p>Install Method: Advanced</p> <p>Please enter the default locale for users of the Command Center (en/ja)</p> <p>Parameter: default_locale</p> | <p>Specify the default locale for the SAS Web Client. For example, the locale entry en sets the language, character set, and date-and-time formats to English.</p> <p>Source: In this release, the allowed values are en (English) and ja (Japanese).</p> <p>Example: en or ja</p> <p>Default: en</p> |

HP Live Network (HPLN) Parameters

Table 35 lists the parameters and expected values for the HP Live Network (HPLN).

Table 35 HP Live Network (HPLN) Parameters

| Parameter | Description |
|--|---|
| <p>Install Method: Advanced</p> <p>Please enter the username used to connect to HP Live Network. (Leave as "none" if HPLN is not being configured.)</p> <p>Parameter: hpln_user_name</p> | <p>Specify the username used to connect to the HP Live Network (HPLN).</p> <p>The value should adhere to HPLN's standard. A minimum of 5 characters and it cannot contain the special characters &, , or *. Also, any of the invalid characters defined for the SA install also apply, such as leading #, quotes, and so on</p> <p>Source: Variable</p> <p>Default: None</p> |
| <p>Install Method: Advanced</p> <p>Please enter the password associated with the username used to connect to HP Live Network. (Leave as "none" if HPLN is not being configured.)</p> <p>Parameter: hpln_password</p> | <p>Specify the HPLN user password used to connect to the HP Live Network (HPLN).</p> <p>The value must follow the same rules as hpln_user_name, except the minimum characters accepted is 6.</p> <p>Source: Variable</p> <p>Default: None</p> |

Table 35 HP Live Network (HPLN) Parameters

| Parameter | Description |
|---|--|
| <p>Install Method: Advanced</p> <p>Please enter the address of the proxy used to connect to the HP Live Network. (Leave as "none" if HPLN is not being configured or no proxy is needed to connect to HP Live Network.)</p> <p>Parameter: hpln_proxy</p> | <p>Specify the IP address or hostname of the proxy used to connect to the HP Live Network (HPLN)</p> <p>The value must follow the following format: <protocol>://<host> or <protocol>://<host>:<port>.</p> <p>If no <port> value is provided, the default 3128 is used.</p> <p>Source: Variable</p> <p>Default: None</p> |
| <p>Install Method: Advanced</p> <p>Please enter the username of the proxy user required to connect to the HP Live Network. (Leave as "none" if HPLN is not being configured, no proxy is configured or if no username is needed.)</p> <p>Parameter: hpln_proxy_user</p> | <p>Specify the username for the HPLN proxy user.</p> <p>The invalid characters for this parameter follow the SA convention for usernames, such as no leading #, no quotes, no whitespace, and so on.</p> <p>Source: Variable</p> <p>Default: None</p> |
| <p>Install Method: Advanced</p> <p>Please enter the password of the proxy user required to connect to the HP Live Network. (Leave as "none" if HPLN is not being configured, no proxy is configured or if no username is needed.)</p> <p>Parameter: hpln_proxy_pwd</p> | <p>Specify the password for the HPLN proxy user.</p> <p>The invalid characters for this parameter follow the SA convention for usernames, such as no leading #, no quotes, no whitespace, and so on.</p> <p>Source: Variable</p> <p>Default: None</p> |
| <p>Install Method: Uninstall</p> <p>This is an uninstallation parameter</p> <p>Parameter: hpln.uninstall.keepcontent</p> | <p>See Uninstallation Parameters on page 80</p> |

Uninstallation Parameters

Table 36 lists the parameters and expected values for an SA Core uninstallation.

Table 36 Uninstallation Parameters

| Parameter | Description |
|--|--|
| <p>Install Method: Uninstall</p> <p>Do you need to preserve any of the data in this database? [Y/N]</p> <p>Parameter: truth.uninstall.needdata</p> | <p>Uninstalling the Model Repository permanently deletes all data in the database, therefore, the uninstallation process stops if you reply <i>Yes</i> to this prompt.</p> <p>If you want to do an uninstallation, backup your data, run the uninstallation again and answer <i>No</i> to this prompt. Remember, the Installer <i>does not</i> preserve any data.</p> <p>Default: Y</p> |
| <p>Install Method: Uninstall</p> <p>Are you sure you want to remove all data and schema from this database? [Y/N]</p> <p>Parameter: truth.uninstall.aresure</p> | <p>Uninstalling the Model Repository by responding <i>Yes</i> permanently deletes all data in the database. You can stop the uninstallation by responding <i>No</i> to this prompt.</p> <p>Default: None</p> |
| <p>Install Method: Uninstall</p> <p>Would you like to preserve the database of cryptographic material? [Y/N]</p> <p>Parameter: save_crypto</p> | <p>If you answer <i>Yes</i>, the database of cryptographic material is saved. If you answer <i>No</i>, the material is deleted as part of the uninstallation.</p> <p>Default: None</p> |
| <p>Install Method: Uninstall</p> <p>Are you absolutely sure you want to remove all packages in the repository? [Y/N]</p> <p>Parameter: word.remove_files</p> | <p>If you answer <i>Yes</i>, the packages, logs, and cryptographic material for the Software Repository are removed.</p> <p>Default: None</p> |
| <p>Install Method: Uninstall</p> <p>Are you absolutely sure you want to remove users' OGFS home and audit directories? (home and audit directories will only be removed if they are stored on the Software Repository server) (Y/N)?</p> <p>Parameter: ogfs.remove_home_dirs</p> | <p>Respond <i>Yes</i> if you want the uninstall to remove all users' OGFS home and audit directories. Backup any information you want to retain.</p> <p>Source: Variable</p> <p>Default: None</p> |

Table 36 Uninstallation Parameters (cont'd)

| Parameter | Description |
|---|---|
| Install Method: Uninstall Would you like to preserve the HPLN content? (Y/N) Parameter: hpln.uninstall.keepcontent | Responding <i>No</i> uninstalls all HP Live Network content. Source: Variable Default: None |

4 Using the SA Installer

This section describes SA Installer syntax, interview modes, and installation logs.

Invoking the SA Installer

You invoke the SA Installer using one of the following scripts:

- `install_opsware.sh` — installs the Oracle database and Model Repository, installs the Core Components for a First Core, installs the components for subsequent cores, exports the contents of the Model Repository.
- `uninstall_opsware.sh` — uninstalls a single Core Component or uninstalls all Core components. For more information about uninstalling an SA Core, see [SA Core Uninstallation](#) on page 157.

`install_opsware.sh` accepts the command line arguments shown in [Table 1](#):

Table 1 SA Installer Command Line Arguments

| Argument | Description |
|---|--|
| <code>-h</code> | Display the Installer help for the command line options. <i>To display help during the interview, press <code>ctrl-I</code>.</i> |
| <code>--resp_file=file</code> (<i>-r file</i>) | Invoke the Installer using the SA installation configuration parameter values in a specified saved response file. If you do not specify a response file, you must provide the values for certain configuration parameters or accept the SA default values. The SA configuration parameter values you provide during the installation interview are used for the current installation and can be saved into an initial response file that is used later during SA Core upgrades and installation of Subsequent SA Cores. |
| <code>--standard</code> | Conduct the installation in standard interview mode. This mode gives you the opportunity to accept or modify the default values for the most typically user-modified SA configuration parameters. If you specify both <code>--standard</code> and <code>--resp_file</code> arguments, the installer runs the interview but uses the values in the response file you specified as the defaults. |

Table 1 SA Installer Command Line Arguments (cont'd)

| Argument | Description |
|------------|---|
| --advanced | Conduct the installation in advanced interview mode. You will be prompted to provide values for a number of component parameters. At the end of the interview, the installer saves the response file. If you specify both --advanced and --resp_file arguments, the installer runs the interview but uses the values in the response file you specified as the defaults. |
| --verbose | Run the installer in verbose mode which causes more information to be displayed on the console. See also Installer Logs on page 86. |

SA Installer Installation Modes

Depending on how you invoke the SA Installer, you are prompted to provide values for a number of parameters, for example, passwords, file locations, and so on. The number of parameters you are prompted for varies depending on the installation method you choose.

Simple Installation Modes

If you choose a Simple Installation, the default values for certain parameters that are rarely modified will be used (you will not be prompted to specify values for these parameters). These parameters include the various Oracle passwords used internally by the Core Components.



Advanced and Expert Interview modes should be used only by HP technical services.

Advanced Installation Modes

If you choose the Advanced Installation, the installer prompts you to supply values for those parameters not modifiable in the Simple Installation.

Expert Installation Mode

Used by HP Technical Staff

The SA Interview and the Response File

During installation, you are required to provide values for certain SA parameters used to configure your SA installation. This process is known as the *SA Interview*. The values you provide are saved to a *response file*.

You create the first response file when you install the SA First Core. You will use this response file later add a Subsequent Core for a Multimaster Mesh (multiple core SA installation). See [Reusing a Response File](#) on page 86.

In some cases, when you provide a parameter value, the SA Installer validates the response (for example, a directory or path that does not exist or an invalid value or range); you are asked to re-enter a value if the installer is not able to validate your response. Some parameters are also revalidated during the actual installation of the Core Components. If a response to a prompt cannot be validated at time of installation, the installer runs a mini-interview during which you can provide a valid response.

Help

At any time during the interview, you can press `ctrl-I` to display help for the current interview prompt. A brief description of the prompt and the expected responses will be displayed.

Concluding the Interview

After you have provided values for all the SA configuration parameters, the installer asks if you want to finish the interview.

You can go back to review or change your answers by pressing `n`.

If you press `y`, the installer prompts you to provide the fully qualified file name and path name for the response file in which it will save your answers. Ensure that the directory in which the response file is to be saved exists. Ensure also that you name the file in a way that identifies the installation for which it was created, save it where you can find it later, and make a backup copy to a secure location.

Continuing an Installation without Exiting the Installer

After you save the response file, you can continue the installation using the parameter values you specified during the SA Interview by pressing `y`. The installer displays Component Installation screen.

If you press `n`, the installer exits and you can restart the installation later by invoking the SA Installer and specifying the response file you saved.

Forcing an Interview

You can force the installer to start in interview mode using the `--interview` argument.

Reusing a Response File

You can specify a response file to use during the installation by invoking the installer using the `--resp_file=file` (or `-r file`) argument. The installer reads the contents of response file and uses the parameter values stored in that file as the defaults.

Installer Logs

The SA Installer logs output to the console on which it is run and to a standard log file:

```
/var/log/opsware/install_opsware/install_opsware.timestamp.log
```

By default, it also generates a more verbose version to:

```
/var/log/opsware/install_opsware/install_opsware.timestamp_verbose.log
```

If you specify the `--verbose` option, the output to the console will be more verbose while the contents of the standard and verbose log files will remain the same.

Some SA Core Components have supplementary logs that contain additional details about the installation of those components.

See the *SA Administration Guide* for information about the logs for SA Core Components.

The following log files are created during the installation of the Model Repository:

```
/var/log/opsware/install_opsware/truth/truth_install_number.log  
/var/log/opsware/install_opsware/truth/truth_install_number_verbose.log
```

Obfuscating Cleartext Passwords

During the SA installation or upgrade process, some cleartext passwords are automatically obfuscated and some are not. Some passwords are obfuscated when SA Core Components start up, such as the OS Provisioning Build Manager password when the Web Services Data Access Engine server starts up. Some passwords in certain files are obfuscated, such as passwords in the installation logs and Installer response files.

There are several ways to manually secure cleartext passwords. Which you choose will depend on your security requirements:

- Encrypt the response files and installation logs.
- Purge sensitive information from the SA Installer response files.
- Store the SA Installer response files and logs on a secure server.

Table 2 lists cleartext passwords that are automatically obfuscated and passwords that must be manually secured.

Table 2 Cleartext Passwords

| Cleartext Password | Filename | Automatically Obfuscated | Manually Secured |
|---------------------------|---|---------------------------------|-------------------------|
| admin | /var/opt/opsware/twist/ ?DefaultAuthenticatorInit.ldift | ✓ | |
| buildmgr | /var/opt/opsware/crypto/buildmgr/ twist.passwd /var/opt/opsware/crypto/occ/ twist.passwd /var/opt/opsware/twist/ ?DefaultAuthenticatorInit.ldift | ✓ ✓ ✓ | |
| cleartext admin | /etc/opt/opsware/twist/ startup.properties | ✓ | |
| detuser | /var/opt/opsware/crypto/twist/ detuserpwd /var/opt/opsware/crypto/OPSWHub/ twist.pwd | ✓ ✓ | |
| integration | /var/opt/opsware/twist/ ?DefaultAuthenticatorInit.ldift | ✓ | |
| root | /var/log/opsware/agent/agent.err | | ✓ |
| | Installer response files: /var/opt/opsware/install_opsware/ resp /var/opt/opsware/install_opsware/ install_opsware* /var/tmp/@* /var/opt/opsware/install_opsware/ truth/truth_install_* | ✓ | ✓ ✓ ✓ |
| spin | /etc/opt/opsware/spin/spin.args | ✓ | |
| vault | /var/opt/opsware/crypto/vault/ vault.pwd | ✓ | |

Securing Installer Log and Response Files

Depending on the level of your security requirements, it is recommended that the installation or upgrade team encrypt or move installation logs files to a secure server and, if necessary, encrypt, move to a secure server, and/or purge sensitive information from the SA Installer response file. Remember that certain response files are needed for SA Core upgrades and Subsequent Core installations and the log files are useful for troubleshooting so completely removing them is not recommended.

The Installer reminds you to protect sensitive log files by displaying the following message at the end of the installation process:

```
#####
```

```
WARNING: to make sure that no sensitive information is left  
on this server, please encrypt or copy to a secure location the following  
files and directories:
```

```
-- /var/opt/opsware/install_opsware/resp/*  
-- /var/log/opsware/install_opsware/*  
-- /var/tmp/*.sh
```

```
Also, please encrypt or store in a secure location the response file that you  
used to install this core.
```

```
#####
```

Types of SA Installations

There are four basic types of SA installations: Single host, First Core (Single Core), Subsequent Core (Multimaster Mesh), and Satellite.

- **Single-Host:** This is the easiest installation method for SA. This method installs all SA Core Components and the Oracle database for the Model Repository on a single host. For more information about the single-host installation procedure, see the *SA Single-Host Installation Guide*.
- **First Core or Single Core** (formerly Standalone Core): A Single Core typically provides management capabilities for servers in a single facility. By definition, a Single Core does not communicate or exchange information with other SA Cores however it can communicate with Satellite installations in remote facilities. The core contains all SA components including the Management Gateway, so it can easily become the First Core for a Multimaster Mesh (multiple core installation).
- **Subsequent Core (Multimaster Mesh):** A *Multimaster Mesh* consists of two or more SA Cores (First Core and one or more Subsequent Cores) that communicate through Management Gateways over a network and can perform real-time synchronization of the data about Managed Servers contained in the cores' Model Repositories.

The Model Repositories in each of the cores are continually updated so that they are always exact duplicates of each other. All the servers in a Multimaster Mesh can be managed through a single Command Center. A Multimaster Mesh is best for larger networks that span multiple facilities.

- **Satellite:** Satellite installations are appropriate for smaller, remote sites that may not have the installed infrastructure for a full core installation. A satellite installation is not a full core installation (it does not include the Model Repository), but it does provide some core capabilities by providing network communication with a core through a gateway. It

also allows you to manage bandwidth between connected sites. A Satellite installation must be linked to at least one core, which can be either a Single Core or part of a Multimaster Mesh.



This guide uses the term *facility* to refer to the collection of servers and devices that reside in a single physical location. A facility can be all or part of a data center, server room, or computer lab. Each SA Core or Satellite is associated with a specific facility.

SA Core Installation Process Flow

The six main phases of the SA core installation process are summarized below. For more detailed information, see the cross references associated with each step.

- 1 **Planning:** In the planning phase, you must decide which facilities and servers you will manage with SA. You must also choose the type of SA installation that is appropriate for your site(s) and ensure that you have the required hardware and software, including operating systems, and sufficient network connectivity.

See the *SA Product Overview and Architecture* guide and [Chapter 2, “SA System Requirements”](#) on page 11 of this guide for more information.

- 2 **Pre-installation Requirements:** Before beginning a core installation, whether it is a Single Core or a core in a Multimaster Mesh, you must perform such administrative tasks as ensuring that host names can be resolved, required ports are open and available, and installing any necessary operating system utilities, packages, and/or patches.

See [Chapter 2, “SA System Requirements”](#) on page 11 of this guide for more information.

- 3 **Prerequisite Information for the SA Installer Interview:** the SA Installer Interview Mode requires that you have certain information about your operational environment available because you will be asked to enter it during the interview. The information you provide will be saved into a *Response File* that will be used to set up the Core Server environment. You must gather this information and have it at hand as you run the pre-installation interview. Some examples of the information required are the name of the Facility to be managed by the core, the authorization domain, host names and IP addresses, and passwords used for SA users and the Oracle database, and so on.

For a detailed description of the information required during the SA Installer Interview, see [Chapter 3, “SA Installation Parameter Reference”](#).

- 4 **SA Core Installation:** During this phase, you will run the SA Installer, complete the installation interview and create the required response file, and then install one of the following types of Cores or Satellites:

- **First or Single Core Installation:** [Chapter 5, “First Core Installation”](#).

- **Subsequent Core Installations for a Multimaster Mesh:** [Chapter 7, “Multimaster Mesh Installation”](#).

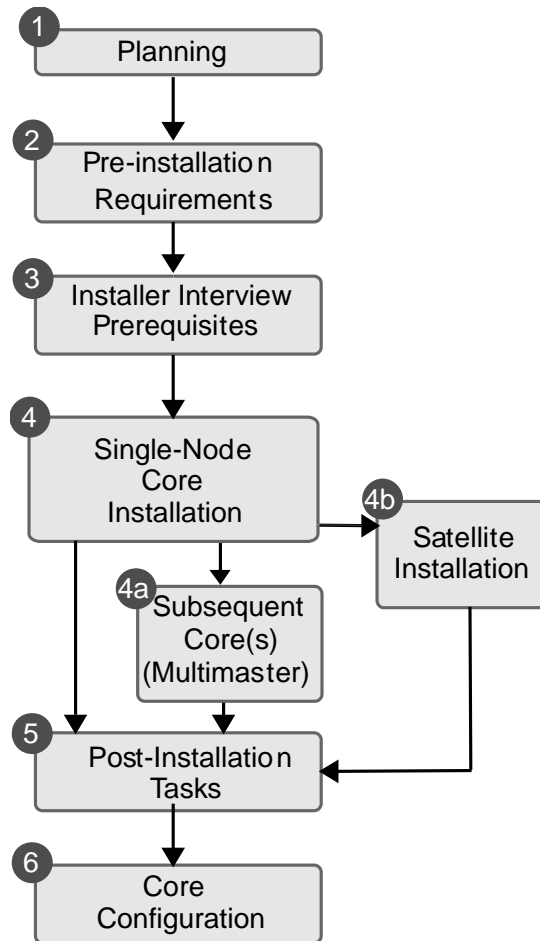
- **Satellite Core Installation:** [Chapter 8, “Satellite Installation”](#).

- 5 **Post-installation Tasks:** [Chapter 6, “First Core Post-Installation Tasks”](#).

- 6 **Core Configuration:** You will configure SA, performing tasks such as creating SA users and groups. At the end of this phase, SA is ready for operational use by system administrators. See the *SA Administration Guide* for more information.

Figure 1 shows the overall process of an SA core installation.

Figure 1 SA Core Installation Process Flow



5 First Core Installation

This section describes the installation tasks for a First Core (formerly standalone core). The topics covered include:

- [First Core Installation Overview](#)
- [Oracle Database Installation Options](#)
- [First Core Installation Procedure](#)
- [Log in to the SAS Web Client](#)
- [Post-Installation Tasks](#)

First Core Installation Overview

This section describes how to install an SA Core. This core can be:

- A single (standalone) core that manages servers in a single Facility
- The first (primary) core of a Multimaster Mesh (multiple core) installation

Whether you are installing a single core or a First Core of a Multimaster Mesh, you must perform the tasks described in this section.

There are certain additional post-installation tasks you may need to perform after installing the core, see [Chapter 6, “First Core Post-Installation Tasks”](#).



If you are installing the First Core of a Multimaster Mesh installation, after you complete the tasks in this section you must also complete the tasks described in [Chapter 7, “Multimaster Mesh Installation”](#) to add additional cores to your mesh.

A First Core has all the components required to be the primary core of a Multimaster Mesh. You simply need to add Subsequent Cores and configure them to communicate with the First Core.

In a Multimaster Mesh installation, a First Core’s role is not much different than any other core’s role in the mesh, however, it does have additional centralized Core Components that oversee communication between the various cores as well as manage conflicts and load balancing.

Installation Phases

A typical First Core installation has the following phases:

- 1 *Before Installation*: Ensure that
 - all installation prerequisites have been met
 - you have the information needed to complete the SA Installer interview
 - you have all necessary permissions to complete the installation
 - you have the SA installation DVDs.For more information, see [Chapter 2, “SA System Requirements”](#).
- 2 *Database Installation*: The Model Repository requires that an Oracle database is installed and available before the SA Installer is run. You can:
 - install the *HP-supplied Oracle database* provided with the SA product software
 - use an *existing Oracle database installation* that you have configured for use with SA
 - install a database using the *Oracle Universal Installer* before beginning the SA installation and configure it for use with SA.

If you plan to use a new or existing non-HP-supplied Oracle database installation it must be configured for SA, see [Appendix A, “Oracle Setup for the Model Repository”](#).

- 3 *SA Installation Interview*: When you install your First Core, you are required to complete the SA Interview, during which you are asked to provide the values for certain SA configuration parameters. At the end of the interview, you save the configuration information to a *Response File*. This response file may also be used later to install Subsequent Cores (multimaster Mesh), Satellites, and for SA Core upgrades.
- 4 *SA Core Component Installation*: After you complete the SA Interview, the SA Installer installs the SA Core Components on your host server. If your core is to be on a single host, you need only run the Installer once. If you plan to distribute your SA Core Components to multiple hosts, you must log on to and run the SA Installer on each core component host to install the component(s) you have decided to install on that host.
- 5 *Upload Software Repository Content*: After the Core Components are installed, on the Software Repository (Slice Component bundle) host you upload the default SA Software Repository content (data required to run SA).
- 6 *After Installation*: You must complete the post-installation tasks.
For more information, [Chapter 6, “First Core Post-Installation Tasks”](#).

Oracle Database Installation Options

A functioning, properly configured Oracle 10g or 11g database must be available *before* you begin the SA installation process. You can choose to:

- Use the HP-supplied Oracle 11g database and allow the SA Installer to install and pre-configure the database. If you choose to install the HP-supplied Oracle database, the *Oracle_SAS* Installer will guide you through the process as described in this chapter.

The HP-supplied Oracle database requires that certain system and Oracle environment variables be specified for use with SA. These changes are made automatically during SA installation. See [HP-Supplied RDBMS Configuration Details](#) on page 176.



As of SA 7.50 or later, the HP-supplied Oracle database is distributed on its own DVD.

- Use the Oracle Universal Installer to install an Oracle 10g or 11g database that must be configured for use with SA. For more Oracle configuration information, see [Appendix A, “Oracle Setup for the Model Repository”](#). If you choose use the Oracle Universal Installer to install Oracle, you must do so before running the SA Installer, making sure to record all database-related information required by the Installer Interview, such as passwords, the path to ORACLE_HOME, and so on.
- Use an existing Oracle 10g or 11g installation. This database must be configured for use with the SA Model Repository. For more information about the required configuration, see [Appendix A, “Oracle Setup for the Model Repository”](#). You may need to contact your local Oracle DBA for assistance with integrating SA with your pre-existing Oracle database.



The version of the HP-supplied Oracle database is Oracle Database Standard Edition 11g. For non-HP-supplied Oracle database installations, SA supports both the Oracle Database Standard Edition and the Oracle Database Enterprise Edition.

First Core Installation Phases

This section provides a summary of the First Core upgrade process. You can use the right-hand column to indicate that a phase is completed:

Table 3 First Core Installation Phases

| Phase | Description | Complete |
|-------|---|----------|
| 1 | Preparing to Install a First Core | |
| 2 | Install the HP-supplied Oracle software and database. (If you are using a non-HP-supplied Oracle database, you can skip this phase but must insure that your database is configured for SA. See Appendix A, “Oracle Setup for the Model Repository”) | |
| 3 | Invoke the SA Installer and Complete the SA Installer Interview | |
| 4 | Install the Core Components | |
| 5 | Post-Component Installation Tasks | |
| 6 | Upload the Software Repository Content | |

First Core Installation Procedure

-
- ▶ A VMware ESX/ESXi server guest OS (virtual machine) is *not* supported as an SA Core Server.
-

This section contains instructions for running the Installer to install a First Core. The installer is a script called `install_opsware.sh` and is located on your SA distribution media.

Complete the following tasks to install a First Core:

Phase 1: Preparing to Install a First Core

- 1 You will need the *SA Product Software DVD* and the *SA Agent and Utilities DVD*. If you plan to install the *HP-supplied Oracle database*, you will need the *Oracle_SA installation DVD*.
- 2 On the server on which you are installing the new SA Core Components (or on each server that will host Core Components if you plan to distribute components to different hosts), mount the *Product Software DVD* and, optionally, the *Oracle_SA DVD*, or NFS-mount the directory that contains a copy of the DVD contents.

-
- ▶ The SA Installer must have *read/write root access* to the directories where it will install the SA components, including NFS-mounted network appliances.
-

- 3 On the server on which you are installing the Model Repository, open a terminal window and log in as `root`.
- 4 Change to the root directory:

```
cd /
```

-
- ▶ If you plan to use OS Provisioning, before you run the SA Installer interview for the First Core, the paths for the OS provisioning media must already exist on the server where you will install the OS Provisioning components even if the content has not yet been uploaded.
-

Phase 2: Install the HP-Supplied Oracle Database

-
- ▶ If you are using a non-HP-supplied Oracle database, you can skip this phase but must ensure that your existing Oracle database is already installed and configured for SA. See [Appendix A, “Oracle Setup for the Model Repository”](#).
-

The SA distribution Media includes an Oracle 11g database installation DVD.

- 1 Mount the *Oracle_SA DVD* on the server you plan to use to host the Model Repository and enter the following command to begin the Oracle installation.

```
/<distro>/oracle_sas/install_opsware.sh --verbose
```

2 You will see a screen similar to this:

```
Install Type: "Oracle RDBMS for SAS"
```

```
Please select the interview mode. Simple mode uses default values for many of the configuration parameters. Advanced mode allows you to fully configure the installation.
```

```
1 - Simple Interview Mode
2 - Advanced Interview Mode
3 - Expert Interview Mode
```

```
Please select the interview mode from the menu, type 'h' for help, 'q' to quit: 1
```

```
The Opsware Installer will now interview you to obtain the installation parameters it needs. You can use the following keys to navigate forward and backward through the list of parameters:
```

```
Control-P - go to the previous parameter
Control-N - go to the next parameter
Return - accept the default (if any) and go to the next parameter
Control-F - finish parameter entry
Control-I - show this menu, plus information about the current parameter
```

```
Press Control-F when you are finished. The Opsware Installer will perform a final validation check and write out a response file that will be used to install the Opsware components.
```

3 Enter 1 for the Simple Interview the Simple Interview.



Advanced and Expert Interview modes are typically only used for complex installations and troubleshooting purposes.

You will see a screen similar to this:

```
Parameter 1 of 2 (truth.aaPwd)Please enter the password for the
opsware_admin user. This is the password used to connect to the Oracle
database.: opsware_admin
Validating... OK.
```

```
Parameter 2 of 2 (truth.dcNm)Please enter the short name of the facility
where Opsware Installer is being run (no spaces).:
Validating... OK.
```

```
All parameters have values. Do you wish to finish the interview? (y/n): y
```

```
Concluding interview.
```

```
Interview complete.
```

- 4 You are then asked to supply the name of the response file in which to store your interview responses. The default is `oiresponse.oracle.sas`:

```
Name of response file to write [/usr/tmp/oiresponse.oracle_sas]:
Response file written to /usr/tmp/oiresponse.oracle_sas.
```

```
Would you like to continue the installation using this response file?
(y/n): y
```

```
You will then see this screen:
Welcome to the Opware Installer.
Please select the components to install.
1 ( ) Oracle RDBMS for SAS
Enter a component number to toggle ('a' for all, 'n' for none).
When ready, press 'c' to continue, or 'q' to quit.
```

Selection:

Select 1 and press `c` to begin the database installation. When the installation is complete, a message to that effect is displayed. You can now continue with the SA installation.

Phase 3: Invoke the SA Installer and Complete the SA Installer Interview

- 1 Invoking the SA Installer for the first time depends on how you installed the Model Repository database:
 - a If you installed the *HP-supplied Oracle database*, you have the response file you created during Phase 2 above (default: `oiresponse.oracle_sas`). During the interview phase below, the database configuration information in the response file is used to complete certain of the parameter default values.

On the server that is to host your First Core or, if you plan to distribute components on different servers, on the server that will host the *Model Repository*, start the installation with the following command:

```
/opsware_system/opsware_installer/install_opsware.sh -r
<response_file_name>
```

You must specify the full path to the script. The command-line example above assumes that you have copied the contents of the *SA Product Software DVD* to a local disk or network share.

- b If you installed the Oracle database using the *Oracle Universal Installer* or are using an existing Oracle installation, *you will not have a response file*. You must supply all the Oracle-specific parameter values during the interview based on your Oracle configuration. On the server that is to host your First Core or, if you plan to distribute components on different servers, on the server that will host the *Model Repository*, run the SA Installer in *Interview Mode* by invoking it with no command-line argument:

```
/opsware_system/opsware_installer/install_opsware.sh
```

You must specify the full path to the script. The example above assumes that you have copied the contents of the *SA Product Software DVD* to a local disk or network share.

2 The Installer Installation Options screen displays the following:

```
Welcome to the Opsware Installer. Please select one of the
following installation options:
```

- 1 - Multimaster Opsware Core - First Core
- 2 - Multimaster Installation: Define New Facility; Export Model Repository
- 3 - Multimaster Opsware Core - Subsequent Core



When you install an SA Core, you can open a second terminal window and issue the following commands:

```
# cd /var/log/opsware/install_opsware/install_opsware
# tail -f install_opsware.<date>_verbose.log
```

where <date> is the most recent timestamp. This will allow you to see all messages posted to the log by the installer as the installation progresses.

3 At the installation options prompt, select the option:

- 1 - Multimaster Opsware Core - First Core

Press `c` to continue.



Note that, to install a First Core you must select *Multimaster Opsware Core - First Core* even if you do not plan to install Subsequent Cores. A First Core is a fully Multimaster-capable core, even if you use it as a standalone core and do not use the Multimaster functionality.

4 The Installer Component Layout Mode screen displays the following:

```
Please select the component layout mode. In a "typical" install,
components are already bundled together in a pre-defined configuration.
"Custom" install allows you to install components "a la carte."
```

- 1 - Typical Component Layout Mode
- 2 - Custom Component Layout Mode

5 At the Component Layout Mode Prompt, select the option:

- 1 - Typical Component Layout Mode



Choosing *Option 2, Custom Component Layout Mode*, gives you the ability to more finely control the distribution of the SA Core Components by breaking certain components out of their component bundles.

You should use this option only if you are very certain that you understand how to distribute Core Components across Core Servers. Be aware that breaking up the component bundles can make diagnosing and troubleshooting problems later more difficult.

Complete the Installation Interview

The following steps use a Typical Layout and a Simple Interview.

- 1 The Interview Mode screen appears. At the Interview Mode prompt, select one of the following options:

- 1 - Simple Interview Mode
- 2 - Advanced Interview Mode
- 3 - Expert Interview Mode

Choose Option 1 to use the default values for certain configuration parameters.



Advanced and Expert Interview modes are typically only used for complex installations and troubleshooting purposes.

Press `c` to continue.

- 2 The Interview begins. The prompts will ask you to provide values for the parameters listed in [SA Installation Configuration Parameters](#) on page 47.

- 3 If you specified a response file when invoking the Installer, you should accept the parameter defaults as these values are taken from the response file.

If you did not specify a response file, provide values for the parameters as requested in the interview. Certain parameters have SA default values that you can change or accept. Follow the on screen instructions to complete the interview.

The SA Installer displays default values in square brackets `[]`. To accept the default value simply continue to the next interview question.

- 4 When you have completed the interview, the Installer displays this message:

```
All parameters have values. Do you wish to finish the interview (y/n):
```

If you are satisfied with the parameter values you provided, press `y`.

If you want to review or change any values, press `n`. The Installer sequentially displays the parameters again, showing in brackets `[]` the values that you provided and provides a chance to change the values.

After modifying your responses, press `y` to finish the interview.

- 5 The installer prompts you to provide a filename for the response file:

```
Name of response file to write  
[/usr/tmp/oiresponse.slices_master_typical]
```

All of the parameter values you specified during the Interview will be written to a text response file and saved to the current server at the location you specify. You can enter the full path and name of the response file or accept the default location and name:

```
/usr/tmp/oiresponse.slices_master_typical
```

Had you specified a Custom Interview, the default file name would be:

```
/usr/tmp/oiresponse.slices_master_custom
```



Record the fully qualified path to and name of the response file and store it where you can easily find it. You will need to use it again during future installations and upgrades.

- 6 After saving the response file, you can continue the installation using the response file you just created or end the installation and use the response file later.

```
Would you like to continue the installation using this response file?  
(y/n):
```

If you are satisfied with the responses you entered in the interview and you are ready to install SA now, enter y to continue.

If you do not want to install SA after completing the interview, enter n.



To use this response file later, invoke the Installer with the `-r` option and supply the fully qualified path to the file then go to Phase 4:

```
/opsware_system/opsware_installer/install_opsware.sh -r  
<full_path_to_response_file>
```

Phase 4: Install the Core Components

- 1 The Component Selection screen displays the components that can be installed:

```
Welcome to the Opsware Installer.  
Please select the components to install.  
1 ( ) Model Repository, First Core  
2 ( ) Core Infrastructure Components  
3 ( ) Slice  
4 ( ) OS Provisioning Components
```

```
Enter a component number to toggle ('a' for all, 'n' for none).  
When ready, press 'c' to continue, or 'q' to quit.
```

```
Selection:
```

The new SA Component Bundle architecture bundles components for installation. Components within a bundle must always be installed together on the same server. For information about how components are distributed in bundles, see the *SA Overview and Architecture Guide*.

Single Host Installation: If you are installing the Model Repository, Infrastructure Component bundle, Slice Component bundle(s), and optionally, the OS provisioning bundle on a *single server*, press a which selects all components and press c to continue. The SA Installer begins the installation of the selected SA Core Components.

Distributed Component Installation: If you plan to distribute components on multiple servers, you must run the SA Installer (specifying the response file created in Phase 3, [step 5](#) on page 98) on each server on which you will distribute the components. You must also install the components in the order that they are listed on the *Component Selection* screen (you must install the Model Repository before the Infrastructure Component bundle and the Infrastructure Component bundle before the Slice Component bundle, and so on). In addition, if you plan to install *multiple Slice Component bundles* on the same or different hosts, you must install all of them before installing the OS Provisioning components.

To install the Core Component bundles of an SA Core to different servers, perform the following tasks:

- a Copy the response file created in Phase 3, [step 5](#) on page 98 to all other servers on which you will install Core Component bundles.
- b On each core, copy the contents of the *SA Product Software DVD* to a local disk or network share.
- c On each core, invoke the installer specifying the response file you copied in **step a** above:

```
/opsware_system/opsware_installer/install_opsware.sh -r  
<full_path_to_response_file>
```

You must specify the full path name to the response file.

- d The *Component Selection* menu is displayed:

```
Welcome to the Opsware Installer.  
Please select the components to install.  
1 ( ) Model Repository, First Core  
2 ( ) Core Infrastructure Components  
3 ( ) Slice  
4 ( ) OS Provisioning Components  
  
Enter a component number to toggle ('a' for all, 'n' for none).  
When ready, press 'c' to continue, or 'q' to quit.  
  
Selection:
```

- e Select the component(s) to install on that host and press c to continue.



During the *Model Repository installation*, the Installer asks if you want to generate a *new database of cryptographic material*, enter *y*.

Phase 5: Post-Component Installation Tasks

- 1 If you install the Model Repository on a server *without* an installed Slice Component bundle, you must also install a *Server Agent* on that server after Core installation is complete. For more information about deploying SA Agents, see the *SA User Guide: Server Automation*.
- 2 *If you are distributing Core components*, after the cryptographic material has been generated, copy the `crypto` database and the gzipped Unix tar file from the following directory to every Core Server:

```
/var/opt/opsware/crypto/cadb/realm/opsware-crypto.db.e  
/var/opt/opsware/crypto/cadb/realm/opsware-crypto.tgz.e
```

You must copy the database of cryptographic material and the gzipped tar file to the same directory and must use the same file names on every distributed Core Server. The directory and database must also be readable by the root user.

- 3 *If you are distributing Core components*, after the Model Repository installation is complete, copy the Oracle `tnsnames.ora` file from the First Core server to all other servers that will host components. Ensure that the path for the file (`/var/opt/oracle/tnsnames.ora`) is the same on all servers. For more information, see [tnsnames.ora File Requirements](#) on page 186.
- 4 *If you are distributing Core Components*, you can install additional instances of the Slice Component bundle which includes a secondary Data Access Engine, Command Center, Core and Agent Gateways, Global file system, Web Services Data Engine, and a Build Manager.

Phase 6: Upload the Software Repository Content

► In previous releases, you would have been required in this phase to upload the *OS Provisioning Stage 2 Images* due to certain modifications to Linux installation media that were necessary for compatibility with SA. As of SA 9.0, these modifications are no longer required so there is no longer a requirement to upload OS Provisioning Stage 2 Images. You can continue to use your SA 7.50 Satellites in an SA 7.80 environment, however, the SA 7.50 Satellites will continue to be restricted by the Stage 2 images restrictions limiting which operating systems can be provisioned. After you upgrade your Satellites to SA 7.80, these restrictions will be lifted.

- 1 Now you must upload the default SA Software Repository Content. On the server where you installed the Software Repository (part of the *Slice Component bundle*), mount the *Agent and Utilities DVD* or NFS-mount the directory that contains a copy of the DVD contents.

► The Installer must have *read/write root access* to the directories where it will install the SA components, including on NFS-mounted network appliances.

- 2 In a terminal window, log in as root and change to the root directory:

```
cd /
```

- 3 Invoke the Installer with the `-r` (response file) argument. For example:

```
/opsware_system/opsware_installer/install_opsware.sh -r  
/usr/tmp/oiresponse.slices_master_typical
```

Specify the fully qualified path to the response file. The directory path in the preceding command assumes that you copied the *SA Agent and Utilities DVD* to a local disk or network share.

The Installer displays following options:

```
Welcome to the Opsware Installer.  
Please select the components to upgrade.  
1 ( ) Software Repository - Content (install once per mesh)  
Enter a component number to toggle ('a' for all, 'n' for none.)
```

- 4 At the install prompt, select Software Repository:

```
1 ( ) Software Repository - Content
```

Press `c` to continue. The Installer uploads the Software Repository content.

When the installation of the Software Repository content finishes, the SA installation phase is complete.

You must now complete the tasks in the next section.

The SAS Web Client

Now that you have installed an SA Core, completing the following tasks will enable you to log in to the SAS Web Client and begin to create users and user groups and use SA to manage servers in your Facility.

Browser Configuration

To access the Command Center your browser must:

- Accept cookies.
- Have Java™ support enabled.
- Support SSL and provide 128-bit encryption (recommended).
- Have third-party pop-up blockers disabled. As an alternative, use the supported browser's native pop-up blocking. Using a third-party pop-up blocker could prevent certain SAS Web Client functions from working correctly.

Log in to the SAS Web Client

To log in to the SAS Web Client, perform the following tasks:

- 1 In a web browser, enter the following URL:

http://<occ_hostname>

where *<occ_hostname>* is the host name or IP address of the server on which you installed the Command Center component (part of the Slice Component bundle).

- 2 Follow the browser's instructions for installing the security certificate.
- 3 The SAS Web Client will then prompt you for a user name and password.

Enter *admin* for the user name.

The password is the SA Admin password you specified during the Installer Interview (*cast.admin_pwd*).

- 4 When you are logged on, the first task is to create a new *Administrator user*.

From the Navigation panel, select **Administration ► Users & Groups**. Follow the instructions for creating new users in the *SA Administration Guide*

For the Group Membership, select *SA System Administrators*.

- 5 Next, create an *Advanced User* using the same method described in **step 4**. For the Group Membership, specify *Advanced Users*.
- 6 Now log out as *admin* and log back in to the SAS Web Client as the *Advanced User* you created in the previous step. This Advanced User should now be able to use all available SA system functions.

- 7 Still logged in as the Advanced User, run **System Diagnosis**. From the Navigation panel, click **Administration ► System Diagnosis**.

See the *SA Administration Guide* for detailed information about running and interpreting the output of the System Diagnosis Tool.

Post-Installation Tasks

You must now complete the tasks described in [Chapter 6, “First Core Post-Installation Tasks.”](#)

6 First Core Post-Installation Tasks

This section describes system administration tasks that you must perform after installing a First Core.

The SA Client

The SA Client is a powerful Java™ client for the Server Automation System. It provides the look-and-feel of a Microsoft Windows desktop application with the cross-platform flexibility of Java. If you installed your core on multiple servers, you can access the SA Client from any Core Server hosting a Component Slice bundle.

To access the SA Client for the first time, you must invoke the SA Client Launcher from the SAS Web Client Main Page. Clicking on this link will install the SA Client and the required Java Runtime Environment (JRE) on your local machine. Once installed, you can invoke the SA Client from the local machine rather than from the SAS Web Client.



The SA Client is installed with the Java™ 2 Runtime Environment, Standard Edition 1.4.2._15. The SA Client is a Java application that installs and runs with its own Java Runtime Environment (JRE). The SA Client will not interfere with any other versions of JRE you may have installed on your system. The JDK will not be used (and is not usable) by any other Java application on the target computer, and it will not set itself as the default JDK on the target computer.

Note that the SA Client adds certain functionality not in the SAS Web Client. Instructions in this documentation set will explicitly identify either the SAS Web Client or the SA Client as required to complete a task.

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

Unattended Installation of the SA Client

This section describes how to perform unattended installation of the SA Client from the command line.

To begin an unattended installation, invoke the installer using the `-q` (quiet) argument, which causes the installer to perform the installation as if you had accepted all default settings and it asks for no user input.

For example, execute the following command on the server on which you want to install the SA Client:

```
opswclientinstaller_windows_1_0.exe -q
```

By default, the SA Client is installed in the following directory:

```
C:\Opware
```

If you want to install the launcher in another directory, specify the `-d` option, as in the following example:

```
opswclientinstaller_windows_1_0.exe -q -dir C:\Opware_SAS_Client
```

See the *SA User Guide: Server Automation* for more information on how to use the SA Client.

Adding or Changing an SA Client Launcher Proxy Server

By default, the SA Client uses the proxy server settings configured for the default browser on your local system. For example, if your default browser has no proxy server settings configured, neither will the SA Client.

You can configure SA Client to use a proxy server by editing the Java Web Start `deployment.properties` file.

For details on how to do that, see the *SA User Guide: Server Automation*.

Configuring Contact Information in SA Help

To configure the SA administrator contact information that appears on the SA Help page, perform the following tasks:

- 1 In the SA Core, log on as `root` to the server running the Command Center (Slice Component bundle).
- 2 Change to the following directory:

```
/etc/opt/opsware/occ
```

- 3 Open the `psrvr.properties` file in a text editor.
- 4 Modify the values in the following fields to change the contact information in the SAS Web Client Help:

```
pref.occ.support.href
```

```
pref.occ.support.text
```

- 5 Save the file and exit.
- 6 Restart the Command Center component by entering the following command:

```
/etc/init.d/opsware-sas restart occ.server
```

Pre-Defined User Groups Permissions

SA provides an extended set of role-based, pre-defined user groups. If you plan to use these groups, you must grant read and/or write permissions to the first Facility and any other appropriate permissions to the groups. For more information about predefined user groups and permissions, see “Pre-Defined User Groups” and Appendix A: “Permissions Reference” in the *SA Administration Guide*.

Installing Application Configuration (AppConfig) Content

In order to get the baseline set of Application Configurations (AppConfigs) into your core, you must perform the post-installation tasks described in this section using the DCML Exchange Tool (DET).

The AppConfig content archive is located on the Agent & Utilities DVD in the `disk001/packages/` directory:

```
OPSWContent-AppConfig-<current_version>.tgz.
```

Complete the following steps:

- 1 The AppConfig content archive is in `tar/gz` format, so you must uncompress it with `gunzip` and extract it using `tar`. You can also use GNU `tar` with the `xvzf` flags to simultaneously uncompress and extract the file, for example:

```
tar xvzf OPSWContent-AppConfig-<current_version>.tgz
```

This command creates a directory named `AppConfig`.

- 2 Install the Content Baseline Tool (`cbt`) (for example, `cbt-34_1_0_27.zip`) from the primary Product Software DVD. The tool is located in the `directory /disk001/packages/<core OS>`. Install the tool under `/usr/local` or any known path and add the location to your path, for example:

```
export PATH=$PATH:/usr/local/cbt/bin
```

- 3 Set the `JAVA_HOME` environment variable to use Opsware's JRE:

```
export JAVA_HOME=/opt/opsware/j2sdk1.4.2/
```

- 4 Verify that `cbt` is working properly by invoking it using `cbt -v`. This command should return a version, if not, check your installation, `PATH` and/or `JAVA_HOME` settings.
- 5 Import the content using a `cbt` config file or by manually entering the user names and passwords for the DCML Exchange Tool and Web Services Data Access Engine users (for example, `admin` and `detuser`):

```
cbt -i AppConfig -cf core.cfg
```

Shown below is a sample `cbt` config file. Change the `*.host` entries and/or passwords as necessary:

```
cbt.numthreads: 5
mail.from: joeuser@opsware.com
spike.host: USE YOUR IP ADDRESS FOR YOUR SAS CORE OR COMPONENT
way.host: USE YOUR IP ADDRESS FOR YOUR SAS CORE
word.host: USE YOUR IP ADDRESS FOR YOUR SAS CORE
spin.host: USE YOUR IP ADDRESS FOR YOUR SAS CORE
twist.host: USE YOUR IP ADDRESS FOR YOUR SAS CORE
```

```
spike.username: admin
spike.password=admin
twist.username: detuser
twist.password=detuser
ssl.keyPairs: /var/opt/opsware/crypto/twist/spog.pkcs8
ssl.trustCerts: /var/opt/opsware/crypto/twist/opsware-ca.crt
twist.certPaths: /var/opt/opsware/crypto/twist/opsware-ca.crt
```

- 6 Launch the SA Client and select **Tools** ► **Options** and **Reload cache now**, or wait a few minutes, then verify that your new Content is available.
- 7 AppConfig content appears in two locations in the SA Client, in the Application Configuration and in the Audit and Remediation feature. To view the AppConfig content in the SA Client, select:

Navigation pane ► **Library** ► **By Type** ► **Application Configuration**

or, when viewing an Audit or Snapshot Specification rule:

Navigation pane ► **Library** ► **By Type** ► **Audit and Remediation**

If you have any questions on any Content, please contact technical support.

SA Agent Discovery and Deployment (ODAD)

The Discovery and Deployment (ODAD) utility allows you to use the SA Client to identify servers on your network that do not have Agents installed and install (deploy) Server Agents onto those servers.

Enabling ODAD for Unix and Windows Servers

The HP SA Installer automatically installs all required software to use ODAD with Unix and Windows servers during the SA Core installation. No other configuration is required.

Agent Deployment Tool (ADT) Requirements

If you plan to use the Agent Deployment Tool (ADT) to deploy Server Agents, you must have the following in the root user's path on each server hosting the Slice Component bundle(s) (includes the Gateway) and each Satellite server:

- OpenSSH client
- telnet client (standard client that ships with Linux or Solaris)
- rlogin (standard rlogin that ships with Linux or Solaris)

Storage Visibility and Automation

If you plan to use Storage Visibility and Automation, see the *Storage Visibility and Automation Installation & Administration Guide*.



Storage Essentials (SE) version 6.1.1 or 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.

BSA Essentials Reporting

If you plan to use BSA Essentials to view SA reports you must install BSA Essentials 2.0 and activate the 'bsae_sa_reports' stream using the BSA Essentials Live Network connector. For more information, see the BSA Essentials 2.0 Installation Guide and Live Network connector Installation and Configuration Guide.

NA/SA Integration

For information about integrating SA with Network Automation (NA), see the *SA Integration Guide*.

Operations Orchestrator/SA Integration

For information about integrating SA with Operations Orchestration (OO), see the *SA Integration Guide*.

DHCP Configuration for OS Provisioning

The Dynamic Host Configuration Protocol (DHCP) specifies how to assign dynamic IP addresses to servers on a network. OS Provisioning uses DHCP to allow network booting and configuration of unprovisioned servers in the Server Pool. DHCP is also used to configure networking on newly provisioned servers that have not been assigned a static network configuration.

For OS provisioning, you may use either the DHCP server included with SA, an existing ISC DHCP server, or the MS Windows DHCP server. The instructions for configuring these various DHCP servers are in the following sections:

- [Configuring the SA DHCP Server for OS Provisioning](#)
- [Configuring an Existing ISC DHCP Server for OS Provisioning](#)
- [Configuring the Windows DHCP Server for OS Provisioning](#)
- [Controlling the SA and Windows DHCP Servers Responses to OS Provisioning Requests](#)

DHCP Software included with the Boot Server

When you install the Boot Server, the SA Installer also installs the following:

- **dhcpcd**: An Internet Software Consortium DHCP server (ISC dhcpcd).
- **dhcpcd.conf**: A default DHCP server configuration file, read by the dhcpcd server.
- **dhcpcdtool**: The SA DHCP Network Configuration Tool which allows you to modify the dhcpcd.conf file.

SA DHCP Server (dhcpcd)

The DHCP server provides service to two types of networks:

- **Local networks**: Networks that are attached directly to the network interfaces of the host running the DHCP server. No special network configuration is needed to support local networks.
- **Remote networks**: Networks that are not directly attached to the DHCP server host. A router sits between the DHCP server host and the remote networks. For remote networks, a DHCP proxy (sometimes called IP helper) must be configured on each remote network to relay DHCP packets to the DHCP server host.

A DHCP proxy is not provided with SA and instructions for setting one up are beyond the scope of this document. DHCP proxy functionality is often included in modern routers. Check with your network administrator or router vendor.

Log messages that the DHCP server produces are sent to the standard Unix syslog process with the daemon facility. Consult your vendor documentation on how to configure and view syslog messages.

See “Starting and Stopping the SA DHCP Server” on page 113.

SA dhcpcd.conf File

The dhcpcd.conf file provides the necessary parameters to support network booting of Sun hardware (a DHCP-capable PROM is required) and x86 hardware (a PXE-compatible system is required).



For x86 hardware that does not support PXE, the server can be booted from a floppy (Windows) or CD (Linux). When a boot floppy or CD is used, the DHCP server still provides network configuration information to the host.

The DHCP configuration file is `/etc/opt/opsware/dhcpcd/dhcpcd.conf`. In most cases, you will modify this file by running the DHCP Network Configuration Tool. For some advanced configurations (as noted in the following section), you may need to modify the file with a text editor. Documentation on the DHCP configuration file is available at the ISC web site www.isc.org.

The DHCP leases file is `/var/opt/opsware/dhcpcd/dhcpcd.leases`. This file should not need editing.

SA DHCP Network Configuration Tool (dhcpcdtool)

The DHCP Network Configuration Tool is a menu-driven, terminal-based utility that enables you to customize the dhcpcd.conf file for common local and remote network configurations. The tool prompts you for network information needed to configure DHCP for each OS

provisioning network. Using the DHCP Network Configuration Tool simplifies configuration of the DHCP server and ensures that the DHCP configuration contains the options that are needed for the OS Provisioning feature to function properly.

If you need to configure the network for OS Provisioning to support less common configurations, you must modify the `dhcpd.conf` file with a text editor. Less common configurations include dual-interfaces with split-horizon DNS requirements, private build networks, and static NAT. Contact Technical Support for more assistance.

Additionally, in some environments, multiple IP networks (layer 3) are layered on top of a single VLAN (layer 2). While this configuration is supported by the ISC DHCP server, generally such a topology requires careful consideration to work properly with DHCP. Therefore, the DHCP Network Configuration Tool can only configure a single IP network per VLAN.

The man pages for the DHCP Network Configuration Tool are installed in `/opt/opsware/dhcpd/man` on the Boot Server. They are also available at the Support web site.

Required Information for the SA DHCP Network Configuration Tool

Before you use the DHCP Network Configuration Tool to configure an OS provisioning network, you need the following information:

- The range of IP addresses that are assigned dynamically by the DHCP server. For example, 192.168.0.11 - 192.168.0.20 might be used to configure a pool of 10 addresses.



Each of these IP addresses must resolve to a host name on the DNS server.

- The IP addresses of one or more DNS servers. The servers must be able to resolve the standard required SA DNS entries. The DNS servers do not need to be on the same network that is being configured.
- A default DNS domain. This domain must include the standard, required SA DNS entries. For example, if the default DNS domain is `example.org`, then there must be an entry `spin.example.org` that can be resolved by the DNS servers.

If you are going to configure a remote network with the DHCP Network Configuration Tool, you will also need to provide the following information:

- The network address and size (netmask or bits). For example, 192.168.0.0/255.255.255.0 or 192.168.0.0/24. Both specify a network range of 192.168.0.0 - 192.168.0.255.
- The network gateway or default router, for example, 192.168.0.1.

Configuring the SA DHCP Server for OS Provisioning

The DHCP Network Configuration Tool is installed with the Boot Server. Perform the following steps to configure networks for OS provisioning:

- 1 Log in as root to the server running the Boot Server.
- 2 Make a backup copy of the configuration file with the following commands:

```
cd /etc/opt/opsware/dhcpd
cp dhcpd.conf dhcpd.conf.orig
```

- 3 Run the DHCP Network Configuration Tool with the following command:

```
/opt/opsware/dhcpd/sbin/dhcpdtool
```

The following DHCP Network Configuration Tool main menu appears:

Example: DHCP Network Configuration Tool Main Menu

```
Opsware DHCP Network Configuration Tool
```

```
a)dd a new network.  
e)xit.
```

```
Choice [a, e]:
```

- 4 To add a new network, enter a at the preceding prompt.

The following menu to add local or remote networks appears:

Example: Menu to Add Local or Remote Networks

```
Opsware DHCP Network Configuration Tool
```

```
You may view/edit/delete one of the currently configured network(s):
```

```
1) 192.168.164.0/28  
2) 192.168.165.128/28
```

```
Or
```

```
a)dd a new network.  
e)xit.
```

```
Choice [1..2, a, e]: a:
```

-
- 5 To configure the DHCP service on the local network, enter 1 at the preceding prompt. Local networks are detected automatically and displayed,

or,

to add a remote network, enter r at the preceding prompt.

- 6 If you are adding a local network, you need to enter the IP addresses or host names of the DHCP range and the DNS servers.

In the following example, note that the IP addresses are separated by a comma and a space.

Example: Local Network Configuration

```
Opsware DHCP Network Configuration Tool
```

```
Editing DHCP information for 192.168.8.0/23 (255.255.254.0)
```

```
All values which prompt for an address accept either a IP or a hostname.
```

```
Enter the DHCP Range (start address, stop address)  
: 192.168.8.20, 192.168.8.29
```

```
Enter the DNS server(s) (comma separated)
: 192.168.2.25, 192.168.2.28
Enter the DNS domain: opsware.com
```

- 7 If you are adding a remote network, supply information for the network address, size, and gateway. See the following example:

Example: Remote Network Configuration

```
Opsware DHCP Network Configuration Tool
```

```
All values which prompt for an address accept either a IP or a hostname.
```

```
Enter network/netmask or network/bits: 192.168.10.0/24
Enter the network gateway: 192.168.10.1
Enter the DHCP Range (start address, stop address)
: 192.168.10.51, 192.168.10.59
Enter the DNS server(s) (comma separated)
: 192.168.2.25, 192.168.2.28
Enter the DNS domain: opsware.com
```

- 8 If the displayed information is correct, enter `k` to keep the network and return to the main menu.
- 9 At the main menu, to save the information you have entered, enter `s`,
or,
to edit a configured network, enter the corresponding integer and go back to step 3,
or,
to add more networks, enter `a` and go back to step 3.
- 10 To exit the DHCP Network Configuration Tool, enter `e`. You are prompted to start (or restart) the DHCP server process.
- 11 To start (or restart) the DHCP server process, enter `y`. The DHCP Network Configuration Tool displays diagnostic output as part of its startup.

Starting and Stopping the SA DHCP Server

To start the DHCP server process, enter the following command on the server running the Boot Server:

```
/etc/init.d/opsware-sas start dhcpd
```

To stop the DHCP server process, enter the following command on the server running the Boot Server:

```
/etc/init.d/opsware-sas stop dhcpd
```

Modifying the dhcp.conf File for Use with WINPE

Typically, networks with other DHCP servers do not have the SA DHCP server configured as authoritative. However, WINPE requires that the DHCP server be authoritative in order for servers to be able to boot using WINPE.

The `dhcp.conf` file provided with SA 9.0 by default has the authoritative setting commented out. If you need to boot servers using WINPE, you will need to uncomment this line:

- 1 Log on to the Core's dhcpd server as root.
- 2 cd to the `/etc/opt/opsware/dhcpd` directory.
- 3 Issue the following command:

```
chmod a+w dhcpd.conf
```
- 4 Open an editor and edit the `dhcp.conf` file, for example:

```
vi dhcpd.conf
```


and add or uncomment `authoritative`.
- 5 Save the file
- 6 Issue the command:

```
chmod a-w dhcpd.conf
```
- 7 Issue the command:

```
/etc/init.d/opsware-sas restart dhcpd
```

Configuring an Existing ISC DHCP Server for OS Provisioning

You may use an existing ISC DHCP server for OS provisioning instead of the DHCP server included with SA. An existing ISC DHCP server will work with the provisioning of PXE 2.0 clients, but not with older clients such as PXE 0.99 or 1.0. (These older PXE clients have old PROMS and a PXE bootstrap floppy made with `rbfg.exe`.) The following instructions apply to recent versions of an ISC DHCP server, such as version 3.02rc3.

To configure an existing ISC DHCP server, perform the following steps:

- 1 The SA DHCP server must not be running on the server hosting the Boot Server. To disable DHCP on that server:

On a Linux server, enter the following command:

```
chkconfig --level 345 dhcpd off
```


On a Solaris server, enter the following commands:

```
rm /etc/rc2.d/S90dhcpd  
rm /etc/rc0.d/K30dhcpd
```
- 2 Ensure that the configuration file for the existing ISC DHCP server has the entries shown in: [Sample Configuration File Entries for an Existing ISC DHCP Server](#) on page 115.

The example is a snippet of the `dhcp.conf` file shipped with SA, with the addition of `next-server`. This addition tells the PXE client to look for the `tftpserver` on the SA Core, not on the existing DHCP server.



If you copy and paste the example, change all of the IP addresses (1.2.3.4) to the IP address of your core.

- 3 Ensure that the DHCP scope for the systems to be provisioned is set up with the required details, such as the DNS server, netmask, default router, DNS domain, and so forth.
- 4 Restart the existing ISC DHCP server.

Sample Configuration File Entries for an Existing ISC DHCP Server

```
#
# declare OPSW site options
#
option space OPSW;
#
# DANGER WILL ROBINSON - if you change the codes for these
# options, you'll need to also edit them in the param-request-
# lists appearing below. Note that in the pxeclient section, you # need to
# specify the values in hex, not in decimal. Also, these
# values are burned into a couple other files you'll need to
# edit as well:
# /opt/opsware/boot/tftpboot/pxelinux.cfg/default
# /opt/opsware/boot/jumpstart/Boot/etc/dhcp/inittab
# /opt/opsware/boot/jumpstart/Boot/etc/default/dhcpagent
#
option OPSW.buildmgr_ip code 186 = ip-address;
option OPSW.buildmgr_port code 187 = unsigned integer 16;

#
# define OPSW site options
#
site-option-space "OPSW";
option OPSW.buildmgr_ip 1.2.3.4;
option OPSW.buildmgr_port 8017;

#
# declare SUNW jumpstart vendor options (Sun recommended naming)
#
option space SUNW;
option SUNW.SrootIP4 code 2 = ip-address;
option SUNW.SrootNM code 3 = text;
option SUNW.SrootPTH code 4 = text;
option SUNW.SbootFIL code 7 = text;
option SUNW.SinstIP4 code 10 = ip-address;
option SUNW.SinstNM code 11 = text;
option SUNW.SinstPTH code 12 = text;
option SUNW.SsysidCF code 13 = text;
option SUNW.SjumpsCF code 14 = text;
option SUNW.Sterm code 15 = text;

#
# define SUNW jumpstart vendor options
#
class "solaris-sun4u" {
    match option vendor-class-identifier;
    vendor-option-space SUNW;
}
```

```

next-server 1.2.3.4;
option SUNW.SrootIP4 1.2.3.4;
option SUNW.SrootNM "js";
option SUNW.SrootPTH "/opt/opsware/boot/jumpstart/Boot";
option SUNW.SinstIP4 1.2.3.4;
option SUNW.SinstNM "js";
option SUNW.SjumpsCF "js:/opt/opsware/boot/jumpstart/Conf";
option SUNW.SsysidCF "js:/opt/opsware/boot/jumpstart/Conf";
option SUNW.Sterm "vt100";
option SUNW.SbootFIL "/platform/sun4u/kernel/sparcv9/unix";
#
# We use a bogus install path just to give the installer
# something to mount for now.
#
option SUNW.SinstPTH "/opt/opsware/boot/jumpstart/Boot";
option dhcp-parameter-request-list 1,3,6,12,15,43,186,187;
}
#
# Begin dhcptool added SUNW client classes (do not edit)
#
subclass "solaris-sun4u" "FJSV.GPUU";
subclass "solaris-sun4u" "NATE.s-Note_737S";
subclass "solaris-sun4u" "NATE.s-Note_747S";
subclass "solaris-sun4u" "NATE.s-Note_777S";
subclass "solaris-sun4u" "SUNW.Netra-T12";
subclass "solaris-sun4u" "SUNW.Netra-T4";
subclass "solaris-sun4u" "SUNW.Sun-Blade-100";
subclass "solaris-sun4u" "SUNW.Sun-Blade-1000";
subclass "solaris-sun4u" "SUNW.Sun-Fire-15000";
subclass "solaris-sun4u" "SUNW.Sun-Fire-280R";
subclass "solaris-sun4u" "SUNW.Sun-Fire-480R";
subclass "solaris-sun4u" "SUNW.Sun-Fire-880";
subclass "solaris-sun4u" "SUNW.Sun-Fire";
subclass "solaris-sun4u" "SUNW.Ultra-1-Engine";
subclass "solaris-sun4u" "SUNW.Ultra-1";
subclass "solaris-sun4u" "SUNW.Ultra-2";
subclass "solaris-sun4u" "SUNW.Ultra-250";
subclass "solaris-sun4u" "SUNW.Ultra-30";
subclass "solaris-sun4u" "SUNW.Ultra-4";
subclass "solaris-sun4u" "SUNW.Ultra-5_10";
subclass "solaris-sun4u" "SUNW.Ultra-60";
subclass "solaris-sun4u" "SUNW.Ultra-80";
subclass "solaris-sun4u" "SUNW.Ultra-Enterprise-10000";
subclass "solaris-sun4u" "SUNW.Ultra-Enterprise";
subclass "solaris-sun4u" "SUNW.UltraAX-MP";
subclass "solaris-sun4u" "SUNW.UltraAX-e";
subclass "solaris-sun4u" "SUNW.UltraAX-e2";
subclass "solaris-sun4u" "SUNW.UltraAX-i2";
subclass "solaris-sun4u" "SUNW.UltraSPARC-IIe-NetraCT-40";
subclass "solaris-sun4u" "SUNW.UltraSPARC-IIe-NetraCT-60";
subclass "solaris-sun4u" "SUNW.UltraSPARC-III-Engine";
subclass "solaris-sun4u" "SUNW.UltraSPARC-III-Netract";
subclass "solaris-sun4u" "SUNW.UltraSPARC-III-cEngine";
subclass "solaris-sun4u" "SUNW.UltraSPARCEngine_CP-20";
subclass "solaris-sun4u" "SUNW.UltraSPARCEngine_CP-40";

```



```

subclass "solaris-sun4u" "SUNW.UltraSPARCEngine_CP-60";
subclass "solaris-sun4u" "SUNW.UltraSPARCEngine_CP-80";
#
# End dhcpdtool added SUNW client classes (do not edit)
#
# declare PXE vendor options
#
option space PXE;
option PXE.mtftp-ip          code 1 = ip-address;
option PXE.mtftp-cport       code 2 = unsigned integer 16;
option PXE.mtftp-sport       code 3 = unsigned integer 16;
option PXE.mtftp-tmout       code 4 = unsigned integer 8;
option PXE.mtftp-delay       code 5 = unsigned integer 8;
option PXE.discovery-control code 6 = unsigned integer 8;
option PXE.discovery-mcast-addr code 7 = ip-address;
option PXE.boot-item         code 71 = unsigned integer 16;

#
# define PXE vendor options
#
class "pxeclients" {
    match if substring (option vendor-class-identifier, 0, 9) = "PXEClient";
    vendor-option-space PXE;
    filename "pxelinux.0";
    next-server 1.2.3.4;
    option vendor-class-identifier "PXEClient";
#
# We set the MCAST IP address to 0.0.0.0 to tell the boot ROM we
# can't provide multicast TFTP, so it will have to use just
# plain ol' TFTP instead (address 0.0.0.0 is considered
# as "no address").
#
    option PXE.mtftp-ip 0.0.0.0;
    option dhcp-parameter-request-list =
        concat(dhcp-parameter-request-list,ba,bb);
}

```

Configuring the Windows DHCP Server for OS Provisioning

You can use a Microsoft Windows DHCP server instead of the Opsware-supplied DHCP server to provision both Windows or Linux on PXE 2.0 clients.

The Microsoft Windows DHCP server *cannot* be used during the OS provisioning of the following types of systems:

- Solaris
- PXE 0.99 or 1.x clients (These older PXE clients have old PROMS and a PXE bootstrap floppy made with `rbfg.exe`.)

To configure a Microsoft Windows DHCP server for use with OS Provisioning, perform the following tasks:

- 1 On the Windows system running the DHCP server, you must define option #60, so that it appears in the DHCP scope options. To do so, open a command prompt window, and enter the following command:

```
netsh.exe dhcp server add optiondef 60 "PXEClient" STRING
```

- Using the Windows DHCP Management Snap-in (`dhcpcmgmt.msc`), create a scope, which is usually a subnet declaration. In the scope options, #60 should now appear. Check the box, and then add the string `PXEClient`.
- Using the same scope options box, configure options 66 and 67: Click the DHCP option #66 (Boot Server Host Name), and add the full DNS name of the TFTP/Boot Server (for example `core01.test.com`). For option #67 (Bootfile Name), add the boot file name: `pxelinux.0`.
- Ensure that the DHCP scope for the systems to be provisioned is configured with the required details, such as the DNS server, netmask, default router, DNS domain, and so on.
- At the command prompt, enter the following commands to define the IP address of the Agent Gateway and the port forward for the Build Manager:

```
netsh.exe dhcp server add optiondef 186 "buildmgr_ip" IPADDRESS  
  
netsh.exe dhcp server add optiondef 187 "buildmgr_port" WORD
```
- Using the DHCP Management Snap-in (`dhcpcmgmt.msc`), configure options 186 and 187 to be part of your scope, and give them the appropriate values (IP address of the Agent Gateway and the port forward for the Build Manager, normally 8017).
- Define option 043 (Vendor specific options) as a BINARY type, with the value `01 04 00 00 00 00 ff`. This setting tells the DHCP server to go directly to the FTP server specified in the Boot Server Host Name parameter, and also tells it to not use Multicast TFTP.
- Restart the Windows DHCP server.

Controlling the SA and Windows DHCP Servers Responses to OS Provisioning Requests

You can configure the SA DHCP server to respond only to the OS provisioning requests from PXE and Sun Solaris JumpStart clients while the Microsoft Windows DHCP server responds to all Windows provisioning requests.

- Add the network subnet to the SA DHCP server. See [“Configuring the SA DHCP Server for OS Provisioning” on page 111](#).
- Stop the SA DHCP server:

```
/etc/init.d/opsware-sas stop dhcpd
```
- Make a backup copy of the SA DHCP configuration file:

```
cd /etc/opt/opsware/dhcpd  
cp dhcpd.conf dhcpd.conf.orig
```
- In a text editor, open the SA DHCP configuration file.
- Below the `pool` entry, find the subnet definition you want to configure and comment it out with the `#` character:

```
range <IP1> <IP2>;  
  
Should now read:  
  
# range <IP1> <IP2>;
```
- Immediately after the now commented out range line, enter:

```
pool {
```

```

# range <IP1> <IP2>;
allow members of "solaris-sun4u";
allow members of "solaris-sun4us";
allow members of "pxeclients";
range <IP1> <IP2>;
}

```

modifying the above as necessary to fit your system. The `pool` statement tells the DHCP server to continue serving the specified range, but only for the three types of clients indicated. (The first two `allow` statements are for Sun machines, the third is for PXE clients). The closing brace in the `pool` statement is required.

- 7 Repeat the preceding two steps for every subnet you wish to configure.
- 8 In the text editor, save the `dhcpd.conf` file.
- 9 Start the SA DHCP server:


```
/etc/init.d/opsware-sas start dhcpd
```
- 10 Check the DHCP logs for errors. The DHCP service logs with `syslog`. See the `syslog.conf` file to determine how logging has been configured for the SA DHCP server.
- 11 Ensure that the Windows DHCP server subnet/scope declarations are modified to include the Build Manager DHCP options (code 186 and 187). See [“Configuring the Windows DHCP Server for OS Provisioning” on page 117](#).
- 12 Ensure that the Windows DHCP server does not include options 43, 60, 66, or 67 in the scope/subnets. This will prevent the PXE and Sun JumpStart clients from connecting to the Windows DHCP server but allow them to connect to the SA DHCP server.
- 13 Ensure that the IP ranges of the Windows and SA DHCP servers don't overlap. As a guideline, the number of IP addresses in a given range should be twice the maximum number of servers that will be provisioned concurrently.
- 14 If the DHCP servers aren't directly connected to the network/subnet of the systems being provisioned, the DHCP requests must be forwarded to both DHCP servers, the SA DHCP server first.

Additional Network Requirements for OS Provisioning

OS Provisioning for Solaris

If you are using OS provisioning for Solaris (JumpStart) on an isolated network, you must have a default Gateway (router) available, even if it does not route packets. For Solaris JumpStart to function properly, the IP address of the default Gateway must be sent to the installation client that is being provisioned with DHCP. When you use the SA DHCP Configuration Tool, a default Gateway is properly configured for Solaris because the tool adds the appropriate default router.

Host Name Resolution

For Windows OS provisioning, the host name `buildmgr` must resolve on all Windows OS installation clients.

The SA Core host names must resolve using the DNS search order and DNS server information that the DHCP server provides. The DHCP server provides the DNS server IP address and the DNS search order. For each subnet you configure with the SA DHCP Configuration Tool, the DNS domain used by that subnet must have a DNS entry for `buildmgr`.

For example, you could have two subnets with the following domain names:

```
subnet1.example.com
subnet2.example.com.
```

Therefore, there must be two DNS entries for `buildmgr`:

```
buildmgr.subnet1.example.com
buildmgr.subnet2.example.com.
```

The host running the OS Provisioning Media Server must be able to resolve the IP address to the host name (reverse lookup) for any server being provisioned.

See also [Host and Service Name Resolution Requirements](#) on page 40.

Open Ports

Any server on which an OS is to be provisioned must meet the same requirements for connectivity to the SA Core network as any managed server. See [“Open Ports”](#) on page 38.

Windows Patch Management Tasks

This section includes post-installation tasks for the SA Windows Patch Management feature.

Import Windows Patches into the Software Repository

Before Windows patches can be installed on managed servers using SA, the patches must be imported into the Software Repository. You can import the patches with the SA Client or with the following shell script:

```
/opt/opsware/mm_wordbot/util/populate-opsware-update-library
```

This script downloads the Microsoft Patch Database and patches from the Microsoft site and imports them into the Software Repository. You should schedule the script to run weekly as a `cron` job on the Software Repository server. Non-administrative users of the SA Client will have the new patches available to them without any action on their part.

For more information about the Opsware-supplied Windows Patch Import script, see the *SA Administration Guide*. For more information about importing Windows patches using the SA Client, see the *SA User's Guide: Application Automation*.

Install Internet Explorer 6.0 or Later for Patch Management on Windows NT 4.0 and Windows 2000



The `mbsaccli.exe` patch utility for patch management on Windows NT 4.0 and Windows 2000 requires Internet Explorer 6.0 or later. Note that IE 6.0 is pre-installed on Windows Server 2003.

Automating Installation of IE 6.0 or Later

To automatically deploy IE 6.0 or later, use the Internet Explorer Administrator's Kit (IEAK) for the version of IE that you want to install. For more information on IEAK, see the following URL:

<http://microsoft.com/windows/ieak/default.asp>

To automate deployment of IE 6.0 or later to managed servers, perform the following tasks:

- 1 Install IEAK on a Windows 2000 or Windows Server 2003 system.
- 2 After you install IEAK, start the Internet Explorer Customization Wizard.
- 3 IEAK will prompt you to choose a Media Selection option. Select the option *Flat* (all files in one directory).
- 4 Accept the defaults for all other options.
- 5 After the wizard completes, zip the contents of the directory it created. This directory contains the automatically deployable version of IE 6.0 or later.
- 6 Upload the ZIP package into the SA Software Repository. See the *SA Policy Setter Guide* for instructions on importing software into the Software Repository.

Set the following properties for the package when you import it into the Software Repository. See the *SA Policy Setter Guide* for the steps to edit the properties for a package in the SA Client.

- In the Installation Parameters section in the **Install Flags** field, specify the installation location:

```
%SystemDrive%\IE-redist
```
- In the Installation Parameters section in the **Reboot Required** field, specify Yes.
- In the Install Scripts section in the **Post-Install Script** tab, enter this text:

```
%SystemDrive%\IE-redist\ieX.xsetup.exe /q:a /r:n
```

Where `ieX.xsetup.exe` is the IE stub installer and `X.x` identifies the version.

The `/q:a` install option specifies quiet install mode, with no user prompts. The `/r:n` install option suppresses restarting the server after IE installation.

- 7 Start the SAS Web Client, create a Software Policy, and add the package you imported into the Software Repository in **step 6** to that policy. See the *SA Policy Setter Guide* for the steps to create a software policy and add a package to a software policy.
- 8 Use the SA Client to remediate the Software Policy to your managed Windows servers. See the *SA User's Guide: Application Automation* for the steps to install software on a server by remediating a software policy onto a managed server.

Support for Red Hat Network Errata and Channels

The Red Hat Network (RHN) is a web-based system for administrators that assists them in patch management, updating, monitoring, and maintenance. Of particular interest to SA administrators is the ability to install and upgrade packages (RPMs) on Red Hat Linux servers.

Included with SA, the `rhn_import` CLI program allows you to download packages from the Red Hat Network, upload the packages into SA Software Repository, and create software policies that correspond to Red Hat Network patches, errata, and channels. When you remediate the software policies, the packages in the policies are installed or upgraded on the managed servers.

SA administrators can import these packages and create software policies using the SA Client. Alternatively, all these operations can be done from the command line using the `rhn_import` utility. This remediation process can be transparent to end users.

For more information on `rhn_import`, see “Automatically Importing Red Hat Network Errata” in the *SA Policy Setter Guide*.

Global File System Tasks

This section contains optional post-installation tasks for the Global File System (OGFS).

Configuring User ID Numbers for the Global File System

When you install a SA Core, you can set values to control the range of UID and GID numbers used by the Global File System. These values are used to provide unique user IDs for all SA users that are logged in to the OGFS. When the Web Services Data Access Engine creates a new user, it will use these values to determine the next available (unique) user ID that is within the range for the local data center.

To set values that control the range of UID and GID numbers, you must specify the following Web Services Data Access Engine parameters in the `params.conf` file:

- **`twist.min_uid`**: Contains the minimum UID number that can be used. The default value is 80001.
- **`twist.default_gid`**: Contains the group ID number that a user is assigned to restrict SA users from using certain ports. The default value is 70001.

These parameters are specified as global in the `params.conf` file, which means that they will be written out to the global response file (`oiresponse.global`). This file is generated when the Model Repository export is performed on the First Core server. When you follow the installation instructions and provide the global response file (`oiresponse.global`) as the initial response file to the Subsequent Core server, SA Installer will use the specified values.

For more information, see [Table 33, “Global File System Parameters,” on page 77](#).



After you make changes to these parameters, you must restart the Web Services Data Access Engine server.

7 Multimaster Mesh Installation

This section describes how to run the SA Installer to create a Multimaster Mesh of SA Cores by adding Subsequent Cores linked to a First Core. These instructions are followed by a short list of post-installation tasks.

Multimaster Mesh Installation Basics

A *Multimaster Mesh* is a set of two or more SA Cores that communicate through Management Gateways and can perform real-time synchronization of the data about their Managed Servers contained in their respective Model Repositories over the network. The first SA core installed in any Facility is Multimaster-ready and is called the *First Core*. The second, third, or subsequent cores that you install in that Facility are *Subsequent Cores* and along with the First Core can form a *Multimaster Mesh*.

The Model Repositories in each of the cores of this Multimaster Mesh are continually updated so that they are always exact duplicates of each other. All the servers in a Multimaster Mesh can be managed through a single SAS Web Client. A Multimaster Mesh is best for larger networks that span multiple facilities.

The SA Core Component that propagates and synchronizes changes from each model repository database to all other model repository databases is called the *Model Repository Multimaster Component* and provides replication capabilities. This replication capability allows you to store and maintain a blueprint of software and environment characteristics for each facility making it easy to rebuild your infrastructure in the event of a disaster. It also provides the ability to easily provision additional capacity, distribute updates, and share software builds, templates and dependencies across multiple facilities — all from a single user interface.



The following procedures assume that you have already installed the First Core. If not, follow the installation procedures described in [Chapter 5, “First Core Installation”](#) to install the First Core.

Preparing for Multimaster Mesh Installation

Before you begin installation of Subsequent Cores for a Multimaster Mesh, you should ensure that you have done the following preparation.

The First Core

Before adding Subsequent Cores to a Multimaster Mesh, you must have installed the First Core as described in [Chapter 5, “First Core Installation”](#). You can then perform the tasks in this section to install subsequent cores.

Administrative Tasks

Perform the pre-installation administration tasks, such as configuring your network. See [Chapter 2, “SA System Requirements.”](#)

Adding a Subsequent Core to an Existing Multimaster Mesh (CORD Patches)

When you add a Subsequent Core to an existing Multimaster Mesh and you have applied a CORD patch to that mesh’s existing core(s), your newly added Subsequent Core will not be at the same CORD patch level as your existing mesh. You must apply any CORD patch release already applied to other servers in the mesh to the newly added core to avoid a mixed version Mesh.

Gather Environment Information

Gather information in preparation for the SA Installer interview. This includes such information as the name and ID of the Facility for the core, passwords, IP addresses, and so on. This information will be saved in a Response File during the installation.



You will use the Installer Interview Response File you created and saved during the installation of the First Core. See [Chapter 3, “SA Installation Parameter Reference.”](#)

IP Addresses

Verify that all Core Servers have unique IP addresses within the entire Multimaster Mesh.

Synchronize Time (UTC)

All servers in a Multimaster Mesh must use UTC. After you synchronize the time on all servers within a Facility, synchronize the time between the facilities in the Multimaster Mesh. Synchronize the time with an external time-server that uses Network Time Protocol (NTP) so that all servers are using the same Coordinated Universal Time (UTC).

Network Requirements

Verify that the Multimaster installation meets the same network requirements as a First Core installation. Exceptions are:

- If you run only one DHCP server and disable the DHCP servers on the other cores in the mesh.
- If you do not plan to do any OS provisioning, you can install several cores on a single network.
- If you are well-versed in DHCP configuration, you can configure your DHCP servers to handle several cores in the same network.

tsnnames.ora File

The `tnsnames.ora` file on the First Core contains entries for every Model Repository in the Multimaster Mesh. With this release, the `tnsnames.ora` file is automatically populated with the required entries for the Subsequent Core being installed during the installation procedure.

Oracle RDBMS Versions

Ensure that you do not have conflicting Oracle software versions within the Multimaster Mesh. See [Multiple Oracle Versions and Multimaster Cores](#) on page 166 of [Appendix A, “Oracle Setup for the Model Repository”](#).

Plan Your Core Component Deployment

You must plan your SA component deployment. You must decide whether you want to install the Core Components on a single host or distribute them on multiple servers, whether you will have multiple Slice Component bundle instances, which servers in your Facility will host Subsequent Cores, whether to install the OS Provisioning component bundle, and so on. See the *SA Product Overview and Architecture* guide and [SA Core Performance Scalability](#) on page 34. Distributing components can be a complex undertaking. It is strongly recommended that you do so only with the help of HP Technical Services.

Adding a Subsequent Core to a Multimaster Mesh

This section describes adding Subsequent Cores that, with an existing First Core, create a Multimaster Mesh of SA Cores that can coordinate server management.



If you will be defining and installing multiple Facilities and Subsequent Cores, you must install only one Subsequent Core at a time. In other words, you must define each Subsequent Core's Facility then completely install its core components and content before defining another Facility and installing another Subsequent Core. Simultaneous definition/installation of Facilities/cores is not supported.

Overview of the Installation Process

The following are the typical phases of installing a Subsequent Core:

- 1 *Pre-Installation*: Ensure that all installation prerequisites have been met, that you have the information needed to complete the Installer interview, that you have all necessary permissions to complete the installation, and that you have the SA installation DVDs. For more information, see [Chapter 2, “SA System Requirements”](#).

On the First Core Model Repository Host

- 2 *Define a New Facility*: During this phase you will define the facility in which the new Subsequent Core is to be installed.
- 3 *Export First Core Model Repository Content*: During this phase, you will export the First Core's Model Repository content, copy the resulting export file (along with the cryptographic material bundle (the `db.e` file)) to the new Subsequent Core host.

On the New Subsequent Core Host

- 4 *Install the Oracle Database for the Subsequent Core*: During this phase you can install the HP-supplied Oracle database for the Subsequent Core(s) Model Repository. This database is automatically configured to work with the SA Model Repository. See [Appendix A, “Oracle Setup for the Model Repository”](#)

Alternatively, you can install a database using the Oracle Universal Installer or use an existing Oracle 10g or 11g database installation (Oracle 9i is not supported) and skip Phase 2. However, there are database configuration requirements that must be met in order for such databases to be compatible with the SA Model Repository. See [Appendix A, “Oracle Setup for the Model Repository”](#).

- 5 *Install Subsequent Core*: During this phase, you will install the Subsequent Core's components. You will also import the Model Repository content exported from the First Core into the database.
- 6 *Import the Model Repository Content*: During this phase, you will import the Model Repository content that you exported from the First Core into the new Subsequent Core.
- 7 *Post Installation Tasks*: During this phase you must perform various post-installation tasks to complete the configuration of the new Subsequent Core.



Before proceeding with the installation, confirm that you have addressed the issues in [Preparing for Multimaster Mesh Installation](#) on page 124.

Phase 1: Prepare for Installation

To prepare to add a Subsequent Core to a Multimaster Mesh, perform the following tasks:

- 1 Locate the *SA Product Software DVD* and, if you will install the HP-supplied Oracle database for the Model Repository, the *Oracle_SA DVD*.
- 2 On the First Core's Model Repository server and on the server that will host the new Subsequent Cores Model Repository, mount the *SA Product Software* and *Oracle_SA* DVDs or NFS-mount the directory that contains a copy of the DVD contents.
- 3 On each server that will host other core components of the new Subsequent Core, mount the *SA Product Software* DVD or NFS-mount the directory that contains a copy of the DVD contents.



The Installer must have *read/write root* access to the directories where it installs SA components, even on NFS-mounted network appliances.

Phase 2: Define the New Facility

In this phase, you define a new Facility for the Subsequent Core. After the interview in this phase, a new response file called `oiresponse.add_dc_to_mesh` is created.



The `oiresponse.add_dc_to_mesh` response file you create during this phase will be used later in Phase 3 when you export the Model Repository data, so save it in a secure location.

- 1 On the server that hosts the First Core's *Infrastructure Component bundle*, invoke the Installer with the `-r` (response file name) and the `--interview` (force interview mode) options.

The specified response file must be the file you created when you installed the SA Core that is to be the First Core for this Multimaster Mesh (the default response filename is `oiresponse.slices_master_typical`). You must specify the full path to the response file and to the installer script.

For example:

```
/opsware_system/opsware_installer/install_opsware.sh -r
/usr/tmp/oiresponse.slices_master_typical --interview
```



In the above example, both the `-r` (response file) and `--interview` options are invoked. This is because you need to use many of the parameter values you set for the First Core and specifying the response file created during the First Core installation will make those values the default during this interview. There will be, however, several new parameters that you must supply initial values for.

The Installer Installation Options screen displays the following:

```
Welcome to the Opsware Installer. Please select one of the following
installation options:
```

- ```
1 - Multimaster Opsware Core: First Core
2 - Multimaster Installation: Define New Facility; Export Model Repository
3 - Multimaster Installation: Subsequent Core
```

- 1 At the installation options prompt, select the second option:

```
2- Multimaster Installation: Define New Facility; Export Model Repository
```

- 2 At the interview mode prompt, select one of the following options:

- ```
1 - Simple Interview Mode
2 - Advanced Interview Mode
3 - Expert Interview Mode
```



Advanced and Expert Interview modes are typically only used for complex installations and troubleshooting purposes.

Choose Option 1 to use the default values for the configuration parameters.

Select the Simple interview and accept the interview prompt defaults. If there is no default, specify a value. Follow the on screen instructions to complete the interview. Since you specified the response file from the installation of the First Core, many of your responses will be displayed as the default during this installation.

The installer displays default parameter values in square brackets [].



For the short name of this new Subsequent Core (the `slaveTruth.dcNm` parameter), you must enter a new Facility name. This name must be unique within the Multimaster Mesh. That is, do not use the same Facility short name as the First Core or any other Subsequent Core.

- 3 Complete the interview. When you have completed entering all of the required information, the Installer displays this message:

```
All parameters have values. Do you wish to finish the interview (y/n):
```

If you are satisfied with your answers, press `y`.

If you want to review or change your answers, press `n`. The installer displays the prompts again, showing in brackets [] the values that you just entered during the interview.

After modifying your responses, press `y` to finish the interview.

- 4 Save the response file. After completing the interview, the installer prompts you to provide a filename for the response file (the default is `oiresponse.add_dc_to_mesh`):

```
Name of response file to write  
[/usr/tmp/oiresponse.add_dc_to_mesh]
```

The response file is a text file that contains the answers you entered during the interview. You can enter a path and name for the response file or accept the default location and name. In either case, write down the location and name of the response file for future reference.



The `oiresponse.add_dc_to_mesh` response file you create during this phase will be used later in Phase 3 when you export the Model Repository content, so save it in a secure location.

- 5 The Installer prompts you to indicate whether you want to continue the installation by using the current response file. Press `y` and go to **step 6**.
- 6 You will see the following screen:

```
Welcome to the Opsware Installer. Please select one of the following  
installation options:
```

```
1 - ( ) Define New Facility  
2 - ( ) Export Model Repository (once per mesh)
```

At the Components prompt, select `Define New Facility` and press `c` to continue:

```
1 (*) Define New Facility
```



Do not select `Export Model Repository Content` at this point. Doing so could cause the installation to fail.

Press `c` to continue. SA defines the new Facility. Wait for the installer to finish this operation before continuing with Phase 3. During this process, the Installer registers the new Subsequent Core's Facility with the First Core's Model Repository, automatically generating a unique ID for the Facility.

Phase 3: Export the First Core Model Repository Content

Prepare the Environment

- 1 On the First Core's *Slice Component bundle* host, stop the Data Access Engine (`spin`) and the Web Services Data Access Engine (`twist`), if you have multiple Slice Component bundle instances, you must perform this task on each host:

```
/etc/init.d/opsware-sas stop spin twist
```

- 2 On the First Core's *Infrastructure Component bundle* host, stop the Data Access Engine (`spin`) and the Model Repository Multimaster Component (`vaultdaemon`):

```
/etc/init.d/opsware-sas stop spin vaultdaemon
```

Examine the logs for the Model Repository Multimaster Component to ensure that it started properly. The logs are located in the following directory:

```
/var/log/opsware/vault
```

The log files are named `vault.0.log`, `vault.1.log`, `vault.2.log`, and so on.

Export the First Core Model Repository Content

- 1 Copy the response file `oiresponse.add_dc_to_mesh` that you created in Phase 2 from the First Core's *Infrastructure Component bundle* host to the server that hosts the First Core's *Model Repository*.
- 2 Log in as `root` to the First Core's *Model Repository* host and invoke the installer with the `-r` argument (specify response file), specifying `oiresponse.add_dc_to_mesh`. For example:

```
/opsware_system/opsware_installer/install_opsware.sh -r  
/usr/tmp/oiresponse.add_dc_to_mesh
```

- 3 At the Components prompt, select option 2: Export Model Repository:

```
1 ( ) Define New Facility  
2 (*) Export Model Repository
```

Press `c` to continue. The installer exports the Model Repository content into a gzipped tar file called `truth_data.tar.gz`, which by default resides in the directory `/var/opt/opsware/truth` (or the directory that you specified as the `truth.dest` parameter value during the First Core installation). The installer also creates a response file that you will use when installing the new Subsequent Core's components in Phase 5 called `oiresponse.slave.truth.dcname`.



Depending on the amount of existing First Core content, the content export can take from ten to 90 minutes or more (longer times typically only occur for larger, more complex systems). To track the progress of the export, open a new terminal window and run the following command where `<number>` is the most recent log file number plus one.

```
tail -f /var/log/opsware/install_opsware/truth/truth_exp<number>.log
```

Restart the First Core Components

- 1 On the First Core's *Infrastructure Component bundle* host, start the Data Access Engine (spin) and the Model Repository Multimaster Component (vaultdaemon):

```
/etc/init.d/opsware-sas startsync spin vaultdaemon
```

- 2 On the First Core's *Slice component bundle* host, start the Data Access Engine (spin) and the Web Services Data Access Engine (twist), if you have multiple Slice Component bundle instances, you must perform this task on each host:

```
/etc/init.d/opsware-sas startsync spin twist
```

Examine the logs for the Model Repository Multimaster Component to ensure that it started properly. These logs are located in the following directory:

```
/var/log/opsware/vault
```

The log files are named `vault.0.log`, `vault.1.log`, `vault.2.log`, and so on.

Copy the First Core Model Repository Export File to the New Facility

- 1 Copy the First Core's *Model Repository export file* (`truth_data.tar.gz`) to the server where you will install the *Subsequent Core's Model Repository*.



The Unix `oracle` user must have read access to the `truth_data.tar.gz` file on the Subsequent Core's Model Repository server.

Copy `oiresponse.slave.truth.dcname` to the New Subsequent Core's Model Repository Server

- 1 Copy the response file `oiresponse.slave.truth.dcname`, created in step 3 above, from the First Core's *Model Repository host* to the new *Subsequent Core's Model Repository host*.

Copy the First Core Crypto Material to the New Model Repository

- 1 On the new *Subsequent Core host*, create the following directory:

```
mkdir -p /var/opt/opsware/crypto/cadb/realm
```

- 2 Copy the cryptographic material database (`opsware-crypto.db.e`) from the First Core's *Model Repository host* to the new Subsequent Core host. The cryptographic material database is located in:

```
/var/opt/opsware/crypto/cadb/realm/opsware-crypto.db.e
```

Crypto paths and filenames must match on all servers in a Multimaster Mesh so ensure that this file is located in the same fully qualified directory on all core hosts in a Multimaster Mesh.



The root user must have read access to these directories and files.

Phase 4: Install the Oracle Database for the Model Repository on the Subsequent Core's Model Repository Host

If you plan to use the HP-supplied Oracle database (for the Model repository), you must complete the tasks in this section to install the database. If you plan to use the Oracle Universal Installer to install an Oracle 10g or 11g database or you have an existing Oracle 10g or 11g database you plan to use for the Model Repository and have configured it as described in [Appendix A, “Oracle Setup for the Model Repository”](#), you can skip this section and go to [Phase 2: Define the New Facility](#) on page 127.

- 1 On the server that will host the new Subsequent Core's Model Repository, open a terminal window and log in as root.

- 2 Change to the root directory:

```
cd /
```

- 3 Mount the *Oracle_SA DVD* and run the SA database installer script on the new Subsequent Core's Model Repository host.

You should specify the response file you created in Phase 3. Specify the full path to that response file, for example:

```
/opsware_system/opsware_installer/install_opsware.sh -r  
/usr/tmp/oiresponse.slave.truth.dcname
```

- 4 You will see the following screen:

```
Please select the interview mode. Simple mode uses default values for many of the  
configuration parameters. Advanced mode allows you to fully configure the installation.
```

```
1 - Simple Interview Mode  
2 - Advanced Interview Mode  
3 - Expert Interview Mode
```

```
Please select the interview mode from the menu, type 'h' for help, 'q' to  
quit: 1
```

```
The Installer will now interview you to obtain the installation parameters  
it needs. You can use the following keys to navigate forward and backward  
through the list of parameters:
```

```
Control-P - go to the previous parameter  
Control-N - go to the next parameter  
Return - accept the default (if any) and go to the next parameter  
Control-F - finish parameter entry  
Control-I - show this menu, plus information about the current parameter
```

```
Press Control-F when you are finished. The Opsware Installer will perform  
a final validation check and write out a response file that will be used to  
install the Opsware components.
```

Select 1 to use the Simple Interview. In rare cases, the Advanced Interview is used to modify certain advanced parameters.

- 5 Complete the Interview. You are asked to supply or accept the default values for the following parameters. You *must accept* the defaults which are taken from the values you specified in the response file, `oiresponse.slave.truth.dcname` created in Phase 3.



You must not change these values or the installation will fail.

- `truth.oePwd` (opsware_admin user): This is the password used to connect to the Oracle database.
- `truth.dcname`

For example, if you choose the Simple Interview, you will see a screen similar to this:

```
Parameter 1 of 2 (truth.oePwd)Please enter the password for the
opsware_admin user. This is the password used to connect to the Oracle
database.: opsware_admin
Validating... OK.
```

```
Parameter 2 of 2 (truth.dcname)Please enter the service name (aka TNS name)
of the Model Repository instance in the facility where Opsware Installer is
being run [truth]:
Validating... OK.
```

```
All parameters have values. Do you wish to finish the interview? (y/n): y
```

```
Concluding interview.
```

```
Interview complete.
```

- 6 The interview concludes. You see the following displayed:

```
Name of response file to write [/usr/tmp/oiresponse.oracle_sas]:
Response file written to /usr/tmp/oiresponse.oracle_sas.
```

```
Would you like to continue the installation using this response file? (y/
n): y
```

Press `y` and the Oracle installation begins.

The installer will display a message when the database installation is complete. You can now continue to Phase 5 to install the new Subsequent Core components.

Phase 5: Install the New Subsequent Core Components

- 1 Log in to the new *Subsequent Core Model Repository* host and invoke the Installer using the `-r` argument (specified response file). For this step, specify the fully qualified path to `oiresponse.slave.truth.dcname` created in Phase 3.

For example:

```
/opsware_system/opsware_installer/install_opsware.sh -r
/usr/tmp/oiresponse.slave.truth.dcname
```

The Installer displays following options:

```
Welcome to the Opsware Installer. Please select one of the following
installation options:
```

- 1 - Multimaster Installation: First Core
- 2 - Multimaster Installation: Define New Facility; Export Model Repository
- 3 - Multimaster Installation: Subsequent Core

- 2 At the Installation Options prompt, select option 3 and press `c` to continue:
3- Multimaster Installation: Subsequent Core
- 3 At the Interview Mode prompt, select one of the following options:
1 - Simple Interview Mode
2 - Advanced Interview Mode
3 - Expert Interview Mode



Advanced and Expert Interview modes are typically only used for complex installations and troubleshooting purposes.

Choose Option 1, Simple Interview Mode to use the default values for the configuration parameters.

- 4 Accept the interview prompt defaults. Since you specified the response file `oiresponse.slave.truth.dcname` when invoking the installer, the parameters values you specified in that file will display as your default settings.
The installer displays default parameter values in square brackets [].



Unless you have changed parameter values for the First Core since creating its Response File, accept the default values provided by that file. Parameter values in the Response File used to install the Subsequent Core's components *must match the values for the Multimaster Mesh's First Core*.

Parameter values supplied during this interview must adhere to the following standards:

- The Short Name (`truth.dcNm`) and Model Repository hostname (`truth.host`) must match the values generated when the Subsequent Core's Facility was defined.
 - The path to the Model Repository content export file, `truth_data.tar.gz`, must be the same for both the *First Core's Model Repository server* and the *Subsequent Core's Model Repository server*.
- 5 Complete the interview. When you have completed entering all of the required information, the Installer displays this message:
All parameters have values. Do you wish to finish the interview (y/n):
If you are satisfied with your answers, press `y`.
If you want to review or change your answers, press `n`. The installer displays the prompts again, showing in brackets [] the values that you previously entered.
After modifying your responses, press `y` to finish the interview.
 - 6 Create the response file (the default file name is `oiresponse.slices_slave_typical`). After completing the interview, the installer prompts you to provide a filename for the response file:

```
Name of response file to write  
[/usr/tmp/oiresponse.slices_slave_typical]
```

All of your interview responses will be written to a text response file and saved on the current server at the location you specify. You can enter the full path and name of the response file or accept the SA default location.



Record the fully qualified path to and name of the response file and store it where you can easily find it. You may need to use it again.

- 7 The Installer prompts you to indicate whether you want to continue the installation by using the response file you just created. Select one of the following options:
 - If you are satisfied with the responses you entered in the interview and you are ready to install the new Subsequent Core's Model Repository now, enter `y` to continue and skip Phase 6.
 - If you do not want to install the Model Repository now, enter `n`. You can restart the installation process later using the command:

```
/opsware_system/opsware_installer/install_opsware.sh -r
/usr/tmp/oiresponse.slices_slave_typical
```



You may see Processing object type SCHEMA_EXPORT/JOB errors displayed onscreen. You can safely ignore these messages.

Phase 6: Import the Model Repository Content

- 1 You see the following menu. At the components prompt, select one or more components to install:

```
Welcome to the Opsware Installer.
Please select the components to install.

1 (*) Model Repository, Subsequent Core
2 (*) Infrastructure Components
3 (*) Slice
4 (*) OS Provisioning Component
Enter a component number to toggle ('a' for all, 'n' for none).
When ready, press 'c' to continue, or 'q' to quit.
```

Selection:

Single Host Component Installation: If you are installing all of the components of the new Subsequent Core on a single host, then you can press `a` to select all components and press `c` to continue. The SA Installer begins the installation of the selected components.

Distributed Component Installation: If you plan to distribute components on multiple hosts, you must run the SA Installer (`-r` argument, specifying `oiresponse.slave.truth.dcname`) on each server on which you will distribute components. You must also install the components in the order that they are listed on the *Component Selection* screen (that is, you must install the Model Repository before the Infrastructure Component bundle and the Infrastructure Component bundle before the Slice Component bundle, and so on). In addition, if you plan to install multiple Slice Component bundles on the same or different hosts, you must install all of them before installing the OS Provisioning components.



If the *Model Repository* exists on a server with no other SA components installed on it, you must install a *Server Agent* on that server. See the *SA User Guide: Server Automation* for instructions.

When distributing Core Components across multiple servers, you can install instances of the following components on different servers:

- Infrastructure Component bundle (one per core)
 - Slice Component bundle(s) (multiple per core) (as of SA 7.80 the Slice Component bundle also includes a Software Repository)
 - OS Provisioning Media Server and OS Provisioning Boot Server (typically one per core)
- 2 Perform the post-installation tasks in the next section of this chapter.

Multimaster Mesh Post-Installation Tasks

After you have added a new core to a Multimaster Mesh, you must perform the tasks described in this section.

Associate Customers with the New Facility

Associate the appropriate customers with each new Facility so that servers managed at that Facility are associated with the correct customers accounts. For more information, see the Customer Account Administration section of the *SA Policy Setter Guide*.

Update Permissions for the New Facility

After you have added a new Facility to your Multimaster Mesh, your SA users will not yet have the required permissions to access the new Facility. You must assign the required permissions to the user groups. For more information, see the User Group and Setup section of the *SA Administration Guide*.

Verify Multimaster Transaction Traffic

To verify Multimaster transaction traffic with the target Facility, perform the following tasks:

- 1 Log in to the SAS Web Client as any user who belongs to the `Opware System Administrators` group.
- 2 From the Navigation panel, click **Multimaster Tools** under **Administration**. The **View** window appears.
- 3 In the **State View Window**, note the color of the status box beside each transaction.

A *transaction* is a unit of change to a Model Repository database that consists of one or more updates to rows and has a globally unique transaction ID. If the transactions within the Subsequent Core's Facility are green, the new SA Core is integrated into the Multimaster Mesh.



It is normal for some transactions to display an orange status (not sent) for a short period.

- 4 Click **Refresh** to refresh the cached data until all transactions display green.

For more information, see the Multimaster Mesh Administration section in the *SA Administration Guide*.

8 Satellite Installation

This section provides an overview of Satellites and Satellite installation requirements as well as instructions for installing a Satellite and post-installation tasks.

Satellite Installation Basics

A Satellite installation can be a solution for remote sites that do not have a large enough number of potential Managed Servers to justify a full SA Core installation by allowing you to install only the necessary Core Components for the remote site to function as a Satellite.

If you are unsure of what a Satellite is, see the *SA Product Overview and Architecture* guide for an introduction to SA Satellites.

Installation Summary

The following is an overview of the Satellite installation process. For detailed instructions, see [Satellite Installation](#) on page 145.

- 1 Locate and mount the *SA Satellite Base DVD* (optionally, the *Satellite Base Including OS Provisioning DVD*) or NFS-mount the directory that contains a copy of the DVD contents
- 2 Run the SA Installer in interview mode. The interviewer prompts you for information about your Satellite server environment and saves the information in a new Satellite response file.
- 3 Run the SA Installer and select the Satellite from the list of components to install. The Installer launches the Gateway Installer.
- 4 *[Optional]* Re-run the Installer to install OS Provisioning components.

Satellite Installation Requirements

Before you install a Satellite, verify that you meet following requirements.

- If your Satellite must be able to perform OS Provisioning in a Multimaster Mesh with an SA 9.0 Core, due to changes in OS Provisioning, the Satellite must also be SA 9.0. OS Provisioning does not work in a mixed Core/Satellite version installation.
- If you plan to install an OS Provisioning Boot Server and Media Server in the Satellite, you must adhere to the requirements in [OS Provisioning: DHCP Proxying](#) on page 40.
- The required packages listed in [Required Solaris and Linux Packages for SA Core Servers](#) on page 20 must be installed on the Satellite server.
- The First and Subsequent Core(s) that will provide core component services to the Satellite must be running and accessible.
- The Satellite server must have network connectivity to the server running the First Core's Management Gateway.
- You must be able to log in to the First Core SAS Web Client as a member of the *Administrators* (admin) group as well as a member of a group that has Manage Gateway permissions.
- You must have root access on the First Core Model Repository host so that you can export and copy the database of cryptographic material to the Satellite server.
- The Satellite server uses UTC, as described in [Time and Locale Requirements](#) on page 44. The Satellite server's system time must be synchronized with the First Core server.
- If you plan to locate the Software Repository Cache on a network storage device, the network storage configuration must allow root write access over NFS to the directories in which the Software Repository Cache will be installed.
- You must know how to edit files using the vi editor. By default, the Gateway Installer launches the vi editor during the installation process, which you will use to edit the Gateway Properties File.

Required Linux Packages for SA Satellites

This section describes platform-specific packages and utilities that must be installed for the operating system on the server that will host an SA Core.

Required Red Hat Linux Packages

If you will be installing an SA Satellite under Red Hat Linux, you must ensure that the packages listed in [Table 5](#) are installed for AS 3 and those in [Table 5](#) for AS 4.

Table 4 Required Red Hat AS 3 Linux Packages for Satellite Installations

| Packages | |
|------------------|--|
| at | |
| compat-db | |
| compat-libstdc++ | |

Table 4 Required Red Hat AS 3 Linux Packages for Satellite Installations

| Packages | |
|--------------------|--|
| coreutils | |
| cpp | |
| expat | |
| gcc | |
| glibc-devel | |
| glibc-headers | |
| glibc-kernheaders | |
| iptables | |
| kernel-source | |
| libcap | |
| libstdc++ | |
| libxml2-python | |
| mkisofs | |
| ncompress | |
| nfs-utils | |
| ntp | |
| patch | |
| patchutils | |
| sharutils | |
| strace | |
| unzip | |
| XFree86-libs | |
| XFree86-libs-data | |
| XFree86-Mesa-libGL | |
| xinetd | |
| zip | |

Table 5 Required Red Hat AS 4 Linux Packages for Satellite Installations

| Package | Architecture |
|--------------------|---------------------|
| binutils | x86_64 |
| chkfontpath | x86_64 |
| compat-db | i386 |
| compat-db | x86_64 |
| cpp | x86_64 |
| desktop-file-utils | x86_64 |
| expat | i386 |
| expat | x86_64 |
| gcc-c++ | x86_64 |
| gcc | x86_64 |
| glibc-common | x86_64 |
| glibc-devel | i386 |
| glibc-devel | x86_64 |
| glibc-headers | x86_64 |
| glibc | i686 |
| glibc-kernheaders | x86_64 |
| glibc | x86_64 |
| iptables | x86_64 |
| kernel-smp-devel | x86_64 |
| kernel-smp | x86_64 |
| libaio | i386 |
| libaio | x86_64 |
| libcap | i386 |
| libcap | x86_64 |
| libgcc | i386 |
| libgcc | x86_64 |
| libpng10 | i386 |
| libpng10 | x86_64 |
| libpng | i386 |
| libpng | x86_64 |

Table 5 Required Red Hat AS 4 Linux Packages for Satellite Installations (cont'd)

| Package | Architecture |
|--------------------------|---------------------|
| libstdc++ | i386 |
| libstdc++ | x86_64 |
| libtermcap | i386 |
| libtermcap | x86_64 |
| libxml2 | i386 |
| libxml2 | x86_64 |
| libxml2-python | x86_64 |
| make | x86_64 |
| mkisofs | x86_64 |
| ncompress | x86_64 |
| nfs-utils | x86_64 |
| ntp | x86_64 |
| patchutils | x86_64 |
| patch | x86_64 |
| pdksh | x86_64 |
| popt | i386 |
| popt | x86_64 |
| readline | i386 |
| readline | x86_64 |
| rpm-build | x86_64 |
| sharutils | x86_64 |
| strace | x86_64 |
| sysstat | x86_64 |
| tcp_wrappers | i386 |
| tcp_wrappers | x86_64 |
| ttmkfdir | x86_64 |
| unzip | x86_64 |
| xinetd | x86_64 |
| xinitrc | noarch |
| xorg-x11-deprecated-libs | i386 |
| xorg-x11-deprecated-libs | x86_64 |

Table 5 Required Red Hat AS 4 Linux Packages for Satellite Installations (cont'd)

| Package | Architecture |
|------------------------------|---------------------|
| xorg-x11-font-utls | x86_64 |
| xorg-x11-libs | i386 |
| xorg-x11-libs | x86_64 |
| xorg-x11-Mesa-libGL | i386 |
| xorg-x11-Mesa-libGL | x86_64 |
| xorg-x11-Mesa-libGLU | i386 |
| xorg-x11-Mesa-libGLU | x86_64 |
| xorg-x11 | x86_64 |
| xorg-x11-xauth | x86_64 |
| xorg-x11-xf86-input-libinput | x86_64 |
| xorg-x11-Xvfb | x86_64 |
| xterm | x86_64 |
| zip | x86_64 |
| zlib | i386 |
| zlib | x86_64 |

Required SUSE Linux Packages

If you will be installing an SA Satellite under SUSE Enterprise Linux 10, you must ensure that the packages listed in [Table 6](#) are installed

Table 6 Required SUSE Linux Enterprise Server 10 Packages for Satellites

| Required Packages | Architecture |
|--------------------------|---------------------|
| binutils | x86_64 |
| cpp | x86_64 |
| desktop-file-utils | x86_64 |
| expat | x86_64 |
| gcc-c++ | x86_64 |
| gcc | x86_64 |
| glibc | x86_64 |
| glibc-32bit | x86_64 |
| glibc-devel | x86_64 |
| glibc-devel-32bit | x86_64 |

Table 6 Required SUSE Linux Enterprise Server 10 Packages for Satellites

| Required Packages | Architecture |
|--------------------------|---------------------|
| iptables | x86_64 |
| kernel-smp | x86_64 |
| kernel-source | x86_64 |
| libaio | x86_64 |
| libaio-32bit | x86_64 |
| libaio-devel | x86_64 |
| libcap | x86_64 |
| libcap-32bit | x86_64 |
| libelf | x86_64 |
| libgcc | x86_64 |
| libstdc++ | x86_64 |
| libstdc++-devel | x86_64 |
| libpng | x86_64 |
| libpng-32bit | x86_64 |
| libxml2 | x86_64 |
| libxml2-32bit | x86_64 |
| libxml2-python | x86_64 |
| make | x86_64 |
| mDNSResponder-lib | x86_64 |
| mkisofs | x86_64 |
| ncompress | x86_64 |
| nfs-utils | x86_64 |
| patch | x86_64 |
| popt | x86_64 |
| popt-32bit | x86_64 |
| readline | x86_64 |
| readline-32bit | x86_64 |
| rpm | x86_64 |
| sharutils | x86_64 |
| strace | x86_64 |
| sysstat | x86_64 |

Table 6 Required SUSE Linux Enterprise Server 10 Packages for Satellites

| Required Packages | Architecture |
|---------------------|--------------|
| termcap | x86_64 |
| unzip | x86_64 |
| vim | x86_64 |
| xinetd | x86_64 |
| xntp | x86_64 |
| xorg-x11-libs | x86_64 |
| xorg-x11-libs-32bit | x86_64 |
| xorg-x11 | x86_64 |
| xterm | x86_64 |
| zip | x86_64 |
| zlib | x86_64 |
| zlib-32bit | x86_64 |

Required Open Ports

The ports listed in [Table 7](#) must be open for use by the Satellite's Gateway. The port numbers listed in the table are default values. You can select other values during the installation.

Table 7 Open Ports for a Satellites

| Port | Description |
|------|---|
| 1002 | Agent |
| 1003 | Wordcache |
| 1006 | Wordcache |
| 2001 | The port used by a tunnel end-point listener. This port is used when you install other Gateways that tunnel to the Satellite. |
| 3001 | The proxy port on which Agents contact the Satellite. |
| 4040 | The Gateway ident service port, used by the Software Repository Cache. |



If you plan to install the OS Provisioning Boot Server and Media Server in the Satellite, then additional ports must be open. For a list of these ports, see [Table 17 on page 39](#).

Required Packages for SUSE Linux Enterprise Server 9

In addition to the packages listed in [Required Solaris and Linux Packages for SA Core Servers](#) on page 20, a Satellite on a server running SUSE Linux Enterprise Server 9 requires that the `compat-2004.7.1-1` package be installed.

Satellite Installation

This section describes how to install a Satellite with the simple topology: a Satellite with a Single Core.

This topology has the following characteristics:

- The Satellite contains one Software Repository Cache.
- The Satellite communicates with a single Management Gateway on a core server. No other gateways should communicate with the Satellite.

Required Information

You will be prompted to supply the following information during the installation process. You can note the values in the right-hand column of [Table 8](#):

Table 8 Satellite Installation Required Information Checklist

| Requirement | Description | Value |
|-----------------------|--|-------|
| Decryption password | The password required to decrypt cryptographic material | |
| Management Gateway IP | The IP address of the server running the First Core's Management Gateway | |
| Satellite server IP | The IP address of the server on which you will install the Satellite | |

Table 8 Satellite Installation Required Information Checklist (cont'd)

| Requirement | Description | Value |
|----------------------------------|--|-------|
| opswgw.TunnelDst parameter | The port number through which tunnel connections to the First Core's Management Gateway will pass. (The default port is 2001.) The Management Gateway listens on this port for connection requests from the Satellite. In the Management Gateway Properties File, this port specified with the opswgw.TunnelDst parameter The path to the Core's Gateway Properties file is: /etc/opt/opsware/ opswgw-mgw0-<facility>/ opswgw.properties | |
| admin user username and password | The admin username and password. You can also use the username and password of any user that belongs to the Administrators group | |
| Satellite name | The name of the new Satellite. The default directory on the Satellite server in which this Gateway will be installed is: /opt/opsware/opswgw/bin | |
| Realm name | The name of the new Realm to be serviced by the Satellite. SA uses the Realm name and the IP address of a managed server to uniquely identify a managed server. The Gateway Installer assigns the Realm name to the new Satellite facility. The Core and Satellite facility names must be different. | |



You may want to name the Realm according to the physical location of the Satellite's data center, for example, the building, corporate site, or city. The SAS Web Client lists the facility names of the core and its Satellites.

Before Installing the New Satellite

- If you already have an SA Server Agent installed on the server you plan to use for the new Satellite, you must *uninstall* it before running the Satellite Installer.

- Make note that after the installation process completes, the new Satellite server is owned by the customer “Opware”. You should take into account any effects this may have on access rights before beginning the installation.

Phase 1: Prepare for Installation

- 1 Locate the *SA Satellite Base DVD* or, optionally, the *SA Satellite Base Including OS Provisioning DVD*.
- 2 On the server where you will install the new Satellite, mount the Satellite Base DVD (optionally, the Satellite Base Including OS Provisioning DVD) or NFS-mount the directory that contains a copy of the DVD contents.

▶ Whether you choose to install the “Satellite Base” DVD or the “Satellite Base Including OS Provisioning” DVD depends on whether you plan to install the OS Provisioning components. See [SA Installation Configuration Parameters](#) on page 47 for information about each of the SA DVDs.

▶ The Installer must have *read/write root* access to the directories where it will install the SA Core Components, including NFS-mounted network appliances.

- 3 In a terminal window, log in as root.
 - 4 Create the Realm directory:
- ```
mkdir -p /var/opt/opsware/crypto/cadb/realm
```
- 5 Copy the database of cryptographic material (`opsware-crypto.db.e`) from any Core server in the facility to the Satellite server. On the Core server, the database and the zipped tar file are located in:

```
/var/opt/opsware/crypto/cadb/realm/opsware-crypto.db.e
```

▶ The database of cryptographic material must be copied to the same directory path and filenames on the Satellite server. The directory and database must be readable by the root user.

- 6 Change to the root directory:
- ```
cd /
```
- 7 Go to Phase 2.

Phase 2: Complete the Installer Interview/Save the Response File

- 1 On the Satellite host, run the Installer script in interview mode by invoking it with no command-line options:

```
# /opsware_system/opsware_installer/install_opsware.sh
```

You must specify the full path to the script. The directory path shown in this step assumes that you copied an SA Satellite DVD (the Satellite Base DVD or the Satellite Base Including OS Provisioning DVD) to a local disk or a network share using the required directory structure.

- 2 At the Interview mode prompt, select one of the following options:

- 1 - Simple Interview Mode
- 2 - Advanced Interview Mode
- 3 - Expert Interview Mode



Advanced and Expert Interview modes should be used only by HP technical staff.

Choose Option 1 to use the default values for certain configuration parameters.

Choose Option 2 to specify all configuration parameters during the interview.

- 3 Provide values for parameters presented during the interview or accept defaults.

The parameter values requested during the interview depend on the interview mode:

- a (truth.oaPwd)Please enter the password for the opsware_admin user
- Simple/Advanced/OS Provisioning
- b (decrypt_passwd)Please enter the password for the cryptographic material
- Advanced
- c (word_root)Please enter the root directory for the Package Repository
[/var/opt/opsware/word]
- Advanced
- d (media_server.linux_media)Please enter the pathname of the Linux media
[/media/opsware/linux]
- Advanced OS Provisioning
- e (media_server.sunos_media)Please enter the pathname of the Solaris media
media [/media/opsware/sunos]
- Advanced OS Provisioning
- f (media_server.windows_media)Please enter the pathname of the Windows media
[/media/opsware/windows]
- Advanced OS Provisioning
- g (boot_server.speed_duplex)Please enter the default network speed/duplex setting for Solaris SPARC servers [autoneg]
- OS Provisioning
- h (bootagent.host)Please enter the OS Provisioning Boot Server ip or hostname
- Simple/Advanced OS Provisioning
- i (agent_gw_list_args)Please enter the IP address and port number (ip:port) on which agents can contact the gateway in this facility
- Advanced

- 4 Supply values for the parameters. When you have completed entering all of the required information, the Installer displays this message:

All parameters have values. Do you wish to finish the interview (y/n):

If you are satisfied with your answers, press y.

If you want to review or change your answers, press n. The installer displays the prompts again, showing in brackets [] the values that you just entered during the interview.

After modifying your responses, press y to finish the interview.

- 5 Save the response file. After completing the interview, the installer prompts you to provide a filename for the response file:


```
Name of response file to write
[/usr/tmp/oiresponse.satellite]
```

The response file is a text file that contains the answers you entered during the interview. You can enter a path and name for the response file or accept the default location and name. In either case, write down the location and name of the response file for future reference.

- 6 The Installer prompts you to indicate whether you want to continue the installation by using the current response file. Select one of the following options:
 - If you are satisfied with the responses you entered in the interview and you are ready to install the Satellite now, enter `y` to continue. Go to Phase 3
 - If you do not want to install the Satellite now, enter `n`. Go to **step 7**.

- 7 *If you entered `y` in the previous step, skip this step and go to Phase 3.* If you entered `n` in the previous step, when you are ready to complete the installation later, log in to the server on which you will install the Satellite and invoke the Installer using the `-r` (response file) option and follow the instructions in Phase 3. The response file is the file you create in Phase 2, [step 5](#) on page 148 (default: `/usr/tmp/oiresponse.satellite`). For example:

```
/opsware_system/opsware_installer/install_opsware.sh -r
<full_path_to_response_file>
```

Phase 3: Install a Satellite

- 1 The Components to Install menu is displayed:

```
Welcome to the Opsware Installer.
Please select the components to install.
1 ( ) Satellite (Interactive Install)
2 ( ) OS Provisioning Boot Server
3 ( ) OS Provisioning Media Server
Enter a component number to toggle ('a' for all, 'n' for none).
When ready, press 'c' to continue, or 'q' to quit.

Selection: 1
```

At the components prompt, select Satellite (Interactive Install) to install the Satellite. Press `c` to continue.



The selections for the OS Provisioning Boot Server and OS Provisioning Media Server only appear if you are running the installation from the *Satellite Base Including OS Provisioning DVD*.

- 2 The Installer launches the Gateway Installer, which displays the following banner:

```
*****
*
*           Opsware Gateway Installer           *
*   Copyright (C) 2004-2010: Opsware Inc.       *
*           support@opsware.com                 *
*
*****
```

- 3 You should already have the required information for this step as described in the section [Required Information](#) on page 145. If not, get it now before continuing. The Gateway Installer displays the following message:

```
For a new install please have the following information
available before you begin:
```

- 1) Opsware administrator username and password.
- 2) The Realm name this Gateway will service.
- 3) If the Realm is new what type will it be.
- 4) The unique Gateway name for this Gateway.

```
Are you ready to proceed? [y/n]
```

```
Press y.
```

- 4 Enter the name of the Realm for the Satellite you are installing:

```
=====
Create/Verify Realm
=====
Enter the Gateway's Realm name:
You entered '<realm-name>', is this correct [y/n]
```

- 5 The installer displays the following:

```
I must now contact an Opsware Core to continue the installation...
There are three ways this can be done:
```

- 1) Via an existing Gateway's ProxyPort
- 2) Via direct connections (no NATs)
- 3) Via a temporary (local) Gateway

```
Enter option number: 3
```

There are three ways for the installer to contact the Core. A temporary (local) gateway is appropriate for almost all systems. Options 1 and 2 are available for rare network topologies. If you think you need to use Option 1 or 2, contact your support representative.

- 6 Enter the IP address of a server in your core running a Management Gateway at the following prompt:

```
Enter IP of a remote GW:
```

- 7 Enter the tunnel destination port for the Management Gateway at the following prompt. The default port is 2001.

```
Enter TunnelDst port of the remote GW: 2001
```

- 8 At the next prompt, press y.

```
Is the tunnel listener at <ip-addr:port>
using SSL? [y/n] y
```

- 9 Enter the admin username and password or the username and password of any SA user that belongs to the Administrators group:

```
=====
Connect to Opsware
=====
```

```
Log in to Opsware as an administrator
```

```
Enter username:admin
Enter password:
```

- 10 The Gateway Installer displays the following:

```
=====
Checking time synchronization
=====

Gateway time looks good.
```

- 11 At the next prompt, create a new Realm for this Satellite by selecting Create a new Satellite DC named '<realm-name>' and supplying the Realm name to create a new Satellite.

If you are adding the Realm to an existing DC, select 2 and supply the Realm name. You also have the option to exit at this point by entering 3.

```
=====
Configure Realm
=====
```

```
The realm '<realm-name>' does not exist. You have two options:
  1) Create a new Satellite DC named '<realm-name>'.
  2) Add a new Realm, '<realm-name>', to an existing DC.
  3) Exit.
Enter option number: 1
```

- 12 At the next prompt, enter the name for the new Satellite that you are installing.

```
=====
Gateway Configuration
=====
```

Enter the Gateway's name:

- 13 The Gateway Installer opens the Gateway Properties File in the vi text editor. The following lines are at the top of this file:

```
#####
#
# Opsware Gateway Properties File for a SAT Gateway
#
#####
```

The fully qualified path to the Gateway Properties File is:

```
/etc/opt/opsware/<gateway_name>/opswgw.properties
```

Where <gateway_name> is the name you specified in **step 12**.

- 14 For the opswgw.GWAddress parameter, enter the IP address of the server on which you are installing this Satellite (the server you are running this installation on). For example:

```
opswgw.GWAddress=192.168.198.92
```

- 15 For the opswgw.TunnelSrc parameter, change the placeholder IP address of 10.0.0.11 to the IP address of the server running the Core Management Gateway. The port following the IP address is the tunnel destination of the Core Gateway. (The default port is 2001.) For example:

```
opswgw.TunnelSrc=192.168.165.242:2001:100:0:/var/opt/opsware/crypto/
<gateway-name>/opswgw.pem
```

- 16 After you've finished editing the Gateway Properties File, save it and exit `vi`. You will see a prompt asking if you want to proceed. Enter `y`. The Gateway Installer performs several more tasks then displays the following messages:

```
Gateway Crypto Generation
. . .
Wordcache Crypto Generation
. . .
Starting Opsware Gateway
. . .
Verify Gateway Startup
```

[and so on...]

When the installer is finished, it displays a message that the installation was successful.

Phase 4: Install the OS Provisioning Components

The OS Provisioning *Boot Server* and *Media Server* are required only if you want to use the OS Provisioning feature in the Satellite. The OS Provisioning Boot Server and Media Server can reside on a different server than the Satellite.

- 1 **[OS Provisioning Components on Satellite Host]** If you are installing the OS Provisioning components on a non-Satellite host, go to **step 3**.

If you are installing the OS Provisioning components on the same host as the Satellite, invoke the Installer again with the `-r` option to specify the response file created by the interview in [step 5](#) on page 148:

```
/opsware_system/opsware_installer/install_opsware.sh -r
<full_path_to_response_file>
```

- 2 At the components prompt, select one or more components to install:

```
Welcome to the Opsware Installer.
Please select the components to install.
1 ( ) OS Provisioning Boot Server
2 ( ) OS Provisioning Media Server
```

```
Enter a component number to toggle ('a' for all, 'n' for none).
When ready, press 'c' to continue, or 'q' to quit.
```

Selection:

Select OS Provisioning Boot Server and OS Provisioning Media Server. Press `c` to continue. the SA Installer installs the OS Provisioning components.



If you plan to install the OS provisioning Boot Server on the Satellite, but install the Media Server on a different host, select only OS Provisioning Boot Server, install that component then log on to the server that will host the Media Server and invoke the install script again with the response file specified and install the Media Server.

- 3 **[OS Provisioning Components on non-Satellite Host]** If you are installing the OS Provisioning components on a *different* server than the Satellite, follow the instructions in this step.

- a Copy the database of cryptographic material from the *Satellite host* to the OS Provisioning components host. These file are found on the Satellite host in the following location:

```
/var/opt/opsware/crypto/cadb/realm/opsware-crypto.db.e
```

The database of cryptographic material must have the same paths and filenames on both servers. The directory and files also need to be readable by the root user.

- b Copy the response file created by the interview in [step 5](#) on page 148 to the server that will host the OS Provisioning components.
- c Invoke the Installer again with the `-r` option to specify the response file created by the interview in [step 5](#) on page 148:

```
/opsware_system/opsware_installer/install_opsware.sh -r  
<full_path_to_response_file>
```

- d At the components prompt, select one or more components to install:

```
Welcome to the Opsware Installer.
```

```
Please select the components to install.
```

```
1 ( ) OS Provisioning Boot Server  
2 ( ) OS Provisioning Media Server
```

```
Enter a component number to toggle ('a' for all, 'n' for none).  
When ready, press 'c' to continue, or 'q' to quit.
```

```
Selection:
```

```
Select OS Provisioning Boot Server and OS Provisioning Media Server. Press c  
to continue. the SA Installer installs the OS Provisioning components.
```

Post-Satellite Installation Tasks

After you install the Satellite, perform the tasks listed in the following sections. For more information, see the *Satellite Administration* section of the *SA Administration Guide*.

Facility Permission Settings

The SA Gateway Installer assigns the Realm name to the facility name of the Satellite. To access managed servers in the Satellite, an SA user must belong to a group that has the necessary permissions for the Satellite's facility. Until you set the facility permissions, SA users cannot view or modify the managed servers associated with the Satellite's facility. For example, you might set the permissions for the Satellite facility to Read & Write for the Advanced Users group, enabling members of this group to modify the servers managed by the Satellite.

For instructions, see “Setting the Facility Permissions of a User Group” in the *SA Administration Guide*.

Checking the Satellite

To verify that the Core Management Gateway is communicating with the Satellite, perform the following steps:

- 1 Log in to the SAS Web Client as a member of a users group that has the Manage Gateway permission.
- 2 From the Navigation panel, click **Administration ► Gateway**.
- 3 Verify that the upper left corner of the Manage Gateway page displays a link for the new Satellite.

If the Manage Gateway page does not display the link for the Satellite, you might need to correct the properties file of the Satellite. The full path name of the properties file follows:

```
/etc/opt/opsware/opswgw/opswgw.properties
```

If you modify the properties file, you must restart the Satellite:

```
/etc/init.d/opsware-sas restart opswgw
```

- 4 Log in to the SAS Web Client as a member of a users group that has the Read (or Read & Write) permission on the Satellite's facility.
- 5 From the Navigation panel, click **Servers ► Manage Servers**.
- 6 Verify that the Manage Server page displays the host name of the Satellite server.

DHCP Configuration for OS Provisioning

After you install the OS Provisioning Boot Server component, you must set up a DHCP server. For more information, see [DHCP Configuration for OS Provisioning](#) on page 109.

9 SA Configuration

SA Configuration

After you have installed the first SA Core, whether as part of a single host or Multimaster Mesh installation, the SA Core Components will be running and you will be able to log in to that core's SAS Web Client. You can now configure SA so that end users can start managing servers in their operational environment.

The following sections provide a general outline of the SA configuration tasks you will need to do and pointers to the HP documentation that contains the detailed instructions needed to complete the tasks.

Configure e-mail Alerts

You can configure SA to send e-mail alerts to the SA administrator (or other designated users) when certain conditions are met, such as Managed Server error conditions, Multimaster Mesh conflicts, and Code Deployment and Rollback errors. To do so, your e-mail administrator must configure the SA Core and Managed Servers as Sendmail clients. You should configure e-mail alerts in the SAS Web Client when you install Server Agents on your managed servers. For information about e-mail alerts, see the *SA Administration Guide*.

Set Up SA Groups and Users

You must assign the necessary access rights and permissions to SA administrators, users, and user groups. For example, to log in to the SAS Web Client, you specify a user name and password. Each user belongs to a user group, and each user group has a set of permissions that control access to features (actions), managed servers, and folders. For information about user access rights and permissions, see the *SA Administration Guide*.

Create SA Customers

When you installed the First Core, whether Single Core or Multimaster, you specified a single default SA customer. For information about creating and assigning additional customers to a facility, see the *SA Policy Setter Guide*.

Define Software Management Policies

Software policies allow you to install software and configure applications simultaneously. A software policy can contain packages, RPM packages, patches, application configurations, and other software policies. After creating a software policy, you can attach

it to servers or groups of servers. When you remediate a server or group of servers, the patches, packages, RPM packages, and application configurations specified in the attached policy are automatically installed and applied.

See the *SA Policy Setter Guide* for information.

Deploy Server Agents on Unmanaged Servers

After you install an Server Agent on an unmanaged server, it can be managed by HP Server Automation. For more information about deploying Server Agents on your unmanaged servers, see the *SA User Guide: Server Automation*.

Prepare SA for OS Provisioning

OS Provisioning is a feature that allows you to remotely install and uninstall operating systems (and related configurations, packages, and applications) on your servers. During OS Provisioning, a Server Agent is also installed, allowing the server to be immediately managed. For more information about configuring OS Provisioning, see the *SA Policy Setter Guide*.

Prepare SA for Patch Management

The Patch Management for Windows feature enables you to identify, install, and remove Microsoft® Windows patches. With the SA Client user interface, you can identify and install patches for the Windows 2000, Windows 2003, and Windows NT4.0 operating systems. These patches include Service Packs, Update Rollups, and hotfixes. This feature also supports patching on 64 bit for Windows 2003 operating systems and for 32 bit for Windows XP operating systems.

For information about Windows patch management, see the *SA User's Guide: Application Automation*.

SA Monitoring

SA provides several methods that you can use to ensure that your system is performing correctly:

- **Agent reachability tests:** to determine the current reachability of a specific Agent, you can run a Communication Test in the SAS Web Client to find those servers that have unreachable agents. For more information about the Communications Test, see the *SA User Guide: Server Automation*.
- **System Diagnostic tests:** several system diagnostics tests are available in the SAS Web Client that can help you determine that your SA installation is operating correctly and help you troubleshoot when there are problems. For more information about the SA System Diagnostic Tests, see the *SA Administration Guide*.
- **Core Component logs:** SA components have logs that can help you troubleshoot problems. For more information about Component Logs, see the *SA Administration Guide*.

10 SA Core Uninstallation

This section describes how to uninstall a Single Core, remove a core from a Multimaster Mesh, and how to uninstall all cores of a Multimaster Mesh.

Uninstall Basics

There are several reasons that you might choose to uninstall an SA core:

- Removing test installations
- Removing demonstration installations
- Merging or modifying a Facility's Multimaster Mesh Cores
- Decommissioning or moving a Facility

Make backups of your Model Repository, Software repository, and your database of cryptographic material unless you are certain that you no longer need that data, because a complete Core uninstall also removes the Model Repository and the cryptographic material database and permanently deletes all the data. You can preserve the SA data in the Model Repository database by doing a database backup before uninstalling.



Before you uninstall an SA Core, you should back up the Oracle database running on the server where that core's Model Repository is installed. See [Oracle Database Backup Methods](#) on page 214.

Like an SA installation, the uninstall is done using a script that you run from the server hosting the Core to be uninstalled.

Procedures for Uninstalling Cores

You can perform any of the following four uninstallation procedures according to your requirements:

- [Uninstall a Single Core](#)
- [Uninstall a Single Core in a Multimaster Mesh](#)
- [Uninstall All Cores in a Multimaster Mesh](#)
 - [Decommission a Facility using the SAS Web Client](#)

Uninstall a Single Core

To uninstall a Single Core, perform the following tasks:

- 1 Before uninstalling a single core, you must deactivate all servers that host components for that Core using the SAS Web Client. For more information about deactivating Core Component servers, see *Deactivating a Server* in the *Basic Server Management Tasks* section of the *SA User Guide: Server Automation*.

- 2 On the server hosting the core to be uninstalled, log in as root.

- 3 Change to the root directory:

```
cd /
```

- 4 Run the `uninstall_opsware.sh` script with the `-r` (specify response file) argument. You need to use the response file you created when you installed the SA Core you are uninstalling:

```
/opsware_system/opsware_installer/uninstall_opsware.sh -r <response-file>
```

You must specify the full path the response file.

- 5 A menu similar to the following appears:

```
Welcome to the Opsware Installer.
Please select the components to uninstall.
1 ( ) OS Provisioning
2 ( ) Slice
3 ( ) Infrastructure
4 ( ) Model Repository
5 ( ) Oracle RDBMS for SAS
```

Select one or more or all components to uninstall:

Press a to select all components. If you must uninstall components one-at-a-time, for example due to a custom installation, the components must be uninstalled in the order they appear on the menu above. For example, you would first log on to the OS

Provisioning component host, run

```
uninstall_opsware.sh -r <response-file>
```

 and uninstall that component, then log into the Slice Component bundle host and run the uninstall script to remove that component, and so on down the list.

You will be asked if you want to preserve the database of Cryptographic Material. If you respond `y`, the directory containing the database will not be removed during the uninstall.

You will also see this prompt:

Are you absolutely sure you want to remove users' OGFS home and audit directories? (home and audit directories will only be removed if they are stored on the Software Repository server) (y/n)?

Select *y* if you want to remove the OGFS home and audit directories. If you press *n*, the directories will not be removed. Note that, if you have placed the OGFS home and audit directories on a server other than the server hosting the Software Repository, the `uninstall` will not remove those directories even if you press *y*.

- 6 After you have uninstalled all components, remove the `/var/opt/opsware/install_opsware` directory.



If you specified during the uninstall that you want to preserve the database of cryptographic material, you should *not* delete the `/var/opt/opsware/crypto` directory. This directory contains the database of your cryptographic material.

Uninstall a Single Core in a Multimaster Mesh



Do not uninstall the First Core (primary core) unless you plan to uninstall the entire Multimaster Mesh and all its cores. See [Uninstall All Cores in a Multimaster Mesh](#) on page 161 in this chapter for more information. This section describes only uninstalling *Subsequent Cores* from a Multimaster Mesh.

To uninstall a single Subsequent Core in a Multimaster Mesh, perform the following tasks

- 1 Log in to any SAS Web Client available for that Mesh:
 - a Using the System Configuration feature, update the `listeners` configuration parameter by removing the entry for the Subsequent Core that you will uninstall. Update the `listeners` parameter by selecting **Model Repository, Multimaster Component** on the **System Configuration** page.
 - b If the Subsequent Core to be uninstalled has a Data Access Engine that is currently serving in the Primary (Multimaster central) role, you must first assign Data Access Engine in another Core to serve as the Primary Data Access Engine.
*See [Reassigning the Data Access Engine to a Secondary Role](#) in the *SA Administration Guide*.*
 - c Verify that all transactions have propagated to the other facilities in the Multimaster Mesh.

For more information about verifying transaction traffic, see [Verify Multimaster Transaction Traffic](#) on page 135.

- 2 Decommission the facility for the core you will uninstall.
 - a See “Decommission a Facility using the SAS Web Client” on page 162.
 - b On the *Infrastructure Component bundle host* in the core you are decommissioning, run the following command:

```
/opt/opsware/bin/python2
disk001/opsware_installer/tools/reload_vaults.pyc --certfile
/var/opt/opsware/crypto/gateway/spin.srv
```

Successful output will be similar to this:

| Core ID | Peers IDs Known To This Core |
|---------|------------------------------|
| ----- | ----- |
| <nnn> | <nnn> |

- 3 Stop and start the *Model Repository Multimaster Component* in all cores except the core that you will uninstall by entering the following command as root on the server running the engine:

```
/etc/init.d/opsware-sas stop vaultdaemon
```

```
/etc/init.d/opsware-sas start vaultdaemon
```

- 4 Stop the Command Center (OCC) component (part of the Slice Component bundle) in the core that you will uninstall by entering the following command as root:

```
/etc/init.d/opsware-sas stop occ.server
```

- 5 In the core that you will uninstall, stop all *Data Access Engines* (part of the Infrastructure Component bundle).

Log in as root to the server where the Data Access Engine is running and enter the following command:

```
/etc/init.d/opsware-sas stop spin
```

- 6 If the Command Center and the Data Access Engine are installed on different servers, you must also run the `spin stop` command on the Command Center server.

- 7 Stop the *Model Repository Multimaster Component* in the core that you will uninstall by entering the following command as root on the server running the engine:

```
/etc/init.d/opsware-sas stop vaultdaemon
```

- 8 Restart the *Data Access Engine* that is serving as the Primary Data Access Engine (Multimaster Central) by entering the following commands as root:

```
/etc/init.d/opsware-sas stop spin
```

```
/etc/init.d/opsware-sas start spin
```

- 9 On the server hosting the core to be uninstalled, log in as root.

- 10 Change to the root directory:

```
cd /
```

- 11 Run the `uninstall_opsware.sh` script:

```
/opsware_system/opsware_installer/uninstall_opsware.sh -r <response-file>
```

- 12 At the components prompt, select one or more or all components to uninstall:

```
Welcome to the Opsware Installer.
Please select the components to uninstall.
1 ( ) OS Provisioning
2 ( ) Slice
3 ( ) Infrastructure
2 ( ) Model Repository
1 ( ) Oracle RDBMS for SAS
```

Select a for all. If you want to uninstall components separately, they must be uninstalled in the order they appear on the menu above. To do so, enter the number of the component to uninstall.

If the gateway does not run on a separate server, uninstall it last. You will be asked if you want to preserve the database of Cryptographic Material. If you respond `y`, the directory containing the database will not be removed during the uninstall.

You will also see this prompt:

```
Are you absolutely sure you want to remove users' OGFS home and audit
directories? (home and audit directories will only be removed if they are
stored on the Software Repository server) (y/n)?
```

Select `y` if you want to remove the OGFS home and audit directories. If you press `n`, the directories will not be removed. If you chose to place the OGFS home and audit directories on a server other than the server hosting the Software Repository, the uninstall will not remove those directories even if you press `y`.



If you installed the core using Custom Mode, it is important that you uninstall the components in the reverse order that they were installed.

13 After the uninstall has completed, remove the `/var/opt/opsware/install_opsware` directory.



If you specified during the uninstall that you want to preserve the database of cryptographic material, you should *not* delete the `/var/opt/opsware/crypto` directory. This directory contains the database of cryptographic material.

Uninstall All Cores in a Multimaster Mesh

To uninstall all cores in a Multimaster Mesh, perform the following steps:

- 1 Stop the OCC by logging on as root to the server where the OCC is running and enter the following command:

```
/etc/init.d/opsware-sas stop occ.server
```

- 2 Stop the Data Access Engine.

Log in as root to the server where the Data Access Engine is running and enter the following command:

```
/etc/init.d/opsware-sas stop spin
```

If the OCC and the Data Access Engine are installed on different servers, you must also run the `stop spin` command on the OCC server.

- 3 Stop the Model Repository Multimaster Component in all cores by logging in to the servers running the engines and running the following command as root:

```
/etc/init.d/opsware-sas stop vaultdaemon
```

- 4 In each core, uninstall the SA components on the servers where they are installed. On the servers hosting the cores to be uninstalled, log in as root.

- 5 Change to the root directory:

```
cd /
```

- 6 Run the `uninstall_opsware.sh` script:

```
/opsware_system/opsware_installer/uninstall_opsware.sh -r <response-file>
```

- 7 At the components prompt, select one or more or all components to uninstall:

```
Welcome to the Opsware Installer.
Please select the components to uninstall.
1 ( ) OS Provisioning
2 ( ) Slice
3 ( ) Infrastructure
2 ( ) Model Repository
1 ( ) Oracle RDBMS for SAS
```

Select a for all. If you want to uninstall components separately, they must be uninstalled in the order they appear on the menu above. To do so, enter the number of the component to uninstall.

If the gateway does not run on a separate server, uninstall it last. You will be asked if you want to preserve the database of Cryptographic Material. If you respond y, the directory containing the database will not be removed during the uninstall.

You will also see this prompt:

```
Are you absolutely sure you want to remove users' OGFS home and audit
directories? (home and audit directories will only be removed if they are
stored on the Software Repository server) (y/n)?
```

Select y if you want to remove the OGFS home and audit directories. If you press n, the directories will not be removed. If you chose to place the OGFS home and audit directories on a server other than the server hosting the Software Repository, the uninstall will not remove those directories even if you press y.



If you installed the core using Custom Mode, it is important that you uninstall the components in the reverse order that they were installed.

8 After the uninstall has completed, remove the `/var/opt/opsware/install_opsware` directory.



If you specified during the uninstall that you want to preserve the database of cryptographic material, you should *not* delete the `/var/opt/opsware/crypto` directory. This directory contains the database of cryptographic material.

Decommission a Facility using the SAS Web Client



Performing this procedure does not shut down or uninstall SA in a facility. Decommission facilities with care, because this task cannot be undone.

When you decommission a facility, the facility is still listed in the SAS Web Client, however, it is grayed out. After a short name is used, even if it is decommissioned, that name cannot be reused.

To decommission a facility, perform the following steps:

- 1 In the SAS Web Client, deactivate the server running the core for the facility that you want to decommission. (For instructions, see “Deactivating a Server” in the *SA User Guide: Server Automation*.)
- 2 From the navigation panel, click **Environment** ► **Facilities**. The Facilities page appears.
- 3 Select the facility that you want to decommission.

- 4 On the Properties tab, note the answer to the following question:
Is this facility in use?
If the answer is No, the **Decommission** button is displayed.
- 5 Click **Decommission**.

A Oracle Setup for the Model Repository

This appendix explains how to install, configure, and maintain an Oracle database to support the Model Repository.

Oracle RDBMS Install Basics

The Model Repository is an SA Core Component that stores information in an Oracle database. It stores the following information:

- database users
- database user privileges
- schema information
- baseline data

The SA distribution Media includes a separate Oracle 11g RDBMS software and database installation dual layer DVD. You can simply mount this DVD on the server you plan to use to host the Model Repository and run the installation. See [Using the HP-Supplied Oracle RDBMS Software and Database](#) on page 175 in this chapter for information about the installation steps

You can also use the Oracle Universal Installer to manually install an Oracle 10g or 11g database, however, you will need to perform certain tasks that the HP-supplied database performs automatically on installation. If you plan to use an existing database installation, you must ensure that the database is configured correctly for use with the SA Model Repository.

If you plan to use the Oracle Universal Installer to install the Oracle RDBMS software and database, or will use an existing Oracle database, then you should read the following sections:

- [Supported Oracle Versions](#) on page 166
- [Hardware Requirements](#) on page 167
- [Operating System Requirements](#) on page 169
- [HP-Supplied RDBMS Configuration Details](#) on page 176
- [Pre-Installation Tasks \(Oracle Universal Installer\)](#) on page 179
- [Manually Creating the Oracle Database](#) on page 180
- [Post-Oracle Installation Tasks](#) on page 185



The Oracle database must be created before you install the Model Repository.

Supported Oracle Versions

Support for the Model Repository is limited to certain versions of Oracle running on certain versions of operating systems. HP strongly recommends that you also apply the latest Oracle CPU patches. For manual installations, SA supports both the Oracle Standard Edition, Standard Edition One, and the Oracle Enterprise Edition. [Table 9](#) lists the supported Oracle versions.

Table 9 Supported Operating Systems and Oracle Versions

| Operating System | Supported Oracle Versions (Standard or Enterprise Edition) |
|--|---|
| SunOS 10 (SPARC)-64 bits | 10.2.0.2, 10.2.0.4, 11.1.0.7 |
| Red Hat Enterprise Linux AS 3 x86_32 | 10.2.0.2, 10.2.0.4 |
| Red Hat Enterprise Linux AS 4 x86_64 | 10.2.0.2, 10.2.0.4, 11.1.0.7 |
| Red Hat Enterprise Linux AS 5 x86_64 | 10.2.0.4, 11.1.0.7 |
| SUSE Linux Enterprise Server 10 x86_64 | 10.2.0.4, 11.1.0.7 |



Oracle 10.2.0.3 is not supported by SA due to known incompatibilities.

Multiple Oracle Versions and Multimaster Cores

For the database export to succeed during the installation of a Multimaster core, the version of the target database cannot be 10.x if the source database is 11.x. [Table 10](#) lists these allowed version combinations.

Table 10 Database Versions Allowed for Multimaster

| Source Database Version | Target Database Version | Allowed? |
|-------------------------|-------------------------|----------|
| 10 | 10 | Y |
| 10 | 11 | Y |
| 11 | 10 | N |
| 11 | 11 | Y |

Hardware Requirements

The server that will host the Oracle database for the Model Repository must meet the hardware requirements listed in this section.

Linux Requirements

The following are hardware requirements for running Oracle 11g under Linux:

- The recommended physical memory is 8 GB. An HP-supplied Oracle installation will use around 1.6-1.7GB of memory. The Oracle SGA memory can be increased after database installation. You can use the following command to check memory status:

```
grep MemTotal /proc/meminfo
```

- Recommended swap space: between 1-2 GB RAM, (1.5 times the size of RAM, between 2-8 GB RAM, equal to the size of RAM).

You can use the following command to check swap space:

```
grep SwapTotal /proc/meminfo
```

- Recommended shared memory available required for automatic memory management should be greater than 1GB.

You can use the following command to check available shared memory:

```
df -k /dev/shm/
```

- Free tmp space should be 400MB or more

You can use the following command to check tmp space:

```
df -k /tmp | grep / | awk '{ print $4 }'
```

- Required Kernel version:
 - Red Hat AS 4: 2.6.9 or later
 - Red Hat AS 5: 2.6.18 or later
 - SUSE Linux 10: 2.6.16.21 or later

You can use the following command to check the kernel versions:

```
uname -r
```

You can use the following command to check the platform:

```
uname -mi
```

You can use the following command to check the processor type:

```
grep "model name" /proc/cpuinfo
```

Solaris Requirements

The following are hardware requirements for running Oracle 11g under Solaris:

- The recommended physical memory is 8 GB. An HP-supplied Oracle installation will use around 1.6-1.7GB of memory. The Oracle SGA memory can be increased after database installation.

You can use the following command to check the physical memory:

```
/usr/sbin/prtconf | grep "Memory"
```

- Recommended swap space: between 1-2 GB RAM, (1.5 times the size of RAM, between 2-8 GB RAM, equal to the size of RAM).

You can use the following command to check the swap space:

```
/usr/sbin/swap -s
```

- Free tmp space should be 400MB or more

You can use the following command to check tmp space:

```
df -k /tmp | grep / | awk '{ print $3 }'
```

- Required operating system version is: 5.10

You can use the following command to check the operating system version:

```
uname -a
```

- System architecture should show 64-bit sparcv9 kernel modules

You can use the following command to check system architecture:

```
isainfo -kv
```

Model Repository (Database) Disk Space Requirements

Additional disk space is required for the Oracle software and the Model Repository data files. Keep in mind that storage requirements for the database grow as the number of managed servers and database activity grows.

As a benchmark figure, you should allow an additional 3.1 GB of database storage for every 1,000 servers in the facility that SA manages. When sizing the tablespaces, follow the general guidelines described in [Table 11](#). If you need to determine a more precise tablespace sizing, contact your technical support representative.

Table 11 Tablespace Sizes

| Tablespace | Minimum Size |
|------------|--------------|
| AAA_DATA | 256 MB |
| AAA_INDX | 256 MB |
| AUDIT_DATA | 256 MB |
| AUDIT_INDX | 256 MB |
| LCREP_DATA | 1,500 MB |
| LCREP_INDX | 800 MB |
| TRUTH_DATA | 700 MB |
| TRUTH_INDX | 400 MB |
| STRG_DATA | 700 MB |
| STRG_INDX | 400 MB |

Hostname Setup

You must be able to ping the database server hostname. To verify this, enter the following command:

Linux/Red Hat Linux

```
# ping <hostname>
```

or, on the database server, enter the following command:

```
# hostname
```

SUSE Linux

```
# hostname -f
```

If the hostname is not configured correctly, Oracle will not start and you will encounter the following error:

```
ORA-00600: internal error code, arguments: [keltnfy-ldmInit], [46], [1],  
[], [], [], [], []
```

Operating System Requirements

The following sections list the operating system requirements for Oracle 11g. The SA Installer performs an automated check to ensure that these requirements are met on the Oracle host before proceeding with the installation of the Oracle 11g software and database.



If you create the database using the Oracle Universal Installer rather than the SA Installer, you must check for these packages and patches manually.

Required Packages for Red Hat Enterprise Linux AS 4 x_64

The following packages are required for Oracle 11g on Red Hat Enterprise Linux AS 4 64 x86_64. These packages must be the versions listed or higher.

Table 12 Packages Required by Oracle 11g under Red Hat Enterprise Linux AS 4 x86_64

| Required Packages | Architecture | Version |
|-----------------------|--------------|-------------|
| binutils | x86_64 | 2.15.92.0.2 |
| compat-libstdc++-33 | i386 | 3.2.3 |
| compat-libstdc++-33 | x86_64 | 3.2.3 |
| elfutils-libelf | x86_64 | 0.97 |
| elfutils-libelf-devel | x86_64 | 0.97 |
| gcc | x86_64 | 3.4.5 |

Table 12 Packages Required by Oracle 11g under Red Hat Enterprise Linux AS 4 x86_64

| Required Packages | Architecture | Version |
|--------------------------|---------------------|----------------|
| gcc-c++ | x86_64 | 3.4.5 |
| glibc | i686 | 2.3.4-2.19 |
| glibc | x86_64 | 2.3.4-2.19 |
| glibc-common | x86_64 | 2.3.4 |
| glibc-devel | i386 | 2.3.4 |
| glibc-devel | x86_64 | 2.3.4 |
| libaio | i386 | 0.3.105 |
| libaio | x86_64 | 0.3.105 |
| libaio-devel | x86_64 | 0.3.105 |
| libgcc | i386 | 3.4.5 |
| libgcc | x86_64 | 3.4.5 |
| libstdc++ | x86_64 | 3.4.5 |
| libstdc++ | i386 | 3.4.5 |
| libstdc++-devel | x86_64 | 3.4.5 |
| make | x86_64 | 3.80 |
| sysstat | x86_64 | 5.0.5 |

Required Packages for Red Hat 5 Server x86_64

The following packages are required for Oracle 11g on Red Hat Enterprise Linux 5 Server x86_64. These packages must be the versions listed or higher.

Table 13 Required Packages for Red Hat 5 Server x86_64

| Required Packages | Architecture | Version |
|--------------------------|---------------------|----------------|
| binutils | x86_64 | 2.17.50.0.6 |
| compat-libstdc++-33 | i386 | 3.2.3 |
| compat-libstdc++-33 | x86_64 | 3.2.3 |
| elfutils-libelf | x86_64 | 0.125 |
| elfutils-libelf-devel | x86_64 | 0.125 |
| gcc | x86_64 | 4.1.1 |

Table 13 Required Packages for Red Hat 5 Server x86_64

| Required Packages | Architecture | Version |
|--------------------------|---------------------|----------------|
| gcc-c++ | x86_64 | 4.1.1 |
| glibc | i686 | 2.5-12 |
| glibc | x86_64 | 2.5-12 |
| glibc-common | x86_64 | 2.5 |
| glibc-devel | i386 | 2.5-12 |
| glibc-devel | x86_64 | 2.5 |
| libaio | i386 | 0.3.106 |
| libaio | x86_64 | 0.3.106 |
| libaio-devel | x86_64 | 0.3.106 |
| libgcc | i386 | 4.1.1 |
| libgcc | x86_64 | 4.1.1 |
| libstdc++ | i386 | 4.1.1 |
| libstdc++ | x86_64 | 4.1.1 |
| libstdc++-devel | x86_64 | 4.1.1 |
| make | x86_64 | 3.81 |
| sysstat | x86_64 | 7.0.0 |

Required Packages for SUSE Linux Enterprise Server 10 x86_64

The following packages are required for Oracle 11g on SUSE Linux Enterprise Server 10 x86_64. These packages must be the versions listed or higher

Table 14 Packages Required by Oracle 11g under Suse Linux Enterprise Server 10 x86_64

| Required Packages | Architecture | Version |
|--------------------------|---------------------|----------------|
| binutils | x86_64 | 2.16.91.0.5 |
| compat-libstdc++ | x86_64 | 5.0.7-22.2 |
| gcc | x86_64 | 4.1.0 |
| gcc-c++ | x86_64 | 4.1.0 |
| glibc | x86_64 | 2.4-31.2 |
| glibc-32bit | x86_64 | 2.4-31.2 |
| glibc-devel | x86_64 | 2.4 |

Table 14 Packages Required by Oracle 11g under Suse Linux Enterprise Server 10 x86_64 (cont'd)

| Required Packages | Architecture | Version |
|-------------------|--------------|---------|
| glibc-devel-32bit | x86_64 | 2.4 |
| libaio | x86_64 | 0.3.104 |
| libaio-32bit | x86_64 | 0.3.104 |
| libaio-devel | x86_64 | 0.3.104 |
| libelf | x86_64 | 0.8.5 |
| libgcc | x86_64 | 4.1.0 |
| libstdc++ | x86_64 | 4.1.0 |
| libstdc++-devel | x86_64 | 4.1.0 |
| make | x86_64 | 3.80 |
| sysstat | x86_64 | 6.0.2 |

To verify whether these RPMs are installed on the OS, enter the following command:

```
rpm -q --qf '%{NAME}-%{VERSION}-%{RELEASE} (%{ARCH})\n' <rpm_name>
```

Required Packages for Solaris 10

The following packages are required for Oracle 11g on Solaris 10 servers. These packages must be the versions listed or higher:

Oracle 11g

Solaris 10 must have the following packages for Oracle 11g:

```
SUNWarc
SUNWbash
SUNWbtool
SUNWhea
SUNWlibC
SUNWlibm
SUNWlibms
SUNWsprot
SUNWtoo
SUNWilof
SUNWilcs
SUNWil5cs
SUNWxwfont
SUNWpool
SUNWpoolr
```


Required Patches for Solaris 10

The following patches are required on Solaris 10 for Oracle 11g:

Table 15 Required Patches for Solaris 10

| Patch | Version | Comment |
|--------|---------|---------------|
| 127111 | 02 | #libc patch |
| 137111 | 04 | #kernel patch |

Required Patch for Manual Oracle 11g Installations

If you plan to install Oracle 11g (for the Model Repository) using the Oracle Universal Installer or use an existing Oracle 11g installation, you must ensure that Oracle Bug Patch 8300752 has been applied to that database. This patch has already been applied to the HP-supplied Oracle RDBMS.

Oracle 10g on Solaris 10 Servers

When Oracle 10.2 is installed on T2000 hardware with the Solaris 10 operating system, the SA Installer hangs during the installation of the Model Repository. The Oracle alert.log includes errors, such as the following:

```
MMNL absent for 28552 secs; Foregrounds taking over
Wed Aug 2 12:45:57 2006
MMNL absent for 28853 secs; Foregrounds taking over
Wed Aug 2 12:50:57 2006
MMNL absent for 29151 secs; Foregrounds taking over
```

Customers should look at Bug 6385446 from Sun Microsystems and apply Patches 118833-18, 119578-24 and 119254-24 as per:

<http://sunsolve.sun.com/search/document.do?assetkey=1-26-102289-1>

Oracle RDBMS State Checker Script

You can run the `truth_oracle_state_checker.sh` script before installing or upgrading the Model Repository. The Oracle RDBMS database must be running when this script is run. The script does not modify anything in the database. It simply verifies that certain required parameters are specified in the database and warns you when the parameters are not specified according to SA requirements.

The script is compatible with Oracle versions 9i, 10g, and 11g.

This script is located in the distribution `/tools` directory.



If you have multiple cores in a Multimaster Mesh, you must run the script on each Oracle server in the mesh.

To run the script:

- 1 Open a command shell as root on the server where Oracle is installed.

- 2 Copy all of the files in the /tools directory to a directory on the Oracle server.
- 3 Change the working directory (cd) to the directory where you copied the files.
- 4 Execute the following command:

```
./ora_sa_check.sh <oracle_home> <oracle_sid>
```

For example:

```
./ora_sa_check.sh /u01/app/oracle/product/10.2.0/db_1 truth
```

The output of the script should appear as follows (for example) if Oracle is correctly configured:

```
Detected Oracle 11g
Checking parameters. Misconfigured values will be shown below.
Your database parameters meet Server Automation requirements.
Checking for required tablespaces...
All required tablespaces are present.
Checking OPSWARE_ADMIN...
OPSWARE_ADMIN user is correct.
Checking PUBLIC privileges...
PUBLIC privileges are correct.
Checking for required users...
All required users are correct.

Checking PUBLIC privileges...
PUBLIC privileges are correct.
Checking for required users...
All required users are correct.
Task completed.
```

If one or more items are not configured correctly, specific messages are displayed that describe the non-compliant condition. For example:

```
Detected Oracle 11g
Checking parameters. Misconfigured values will be shown below.
open_cursors = 300 ; required to be >= 1000
Finished checking parameters.
Checking for required tablespaces...
All required tablespaces are present.
Checking OPSWARE_ADMIN...
Account status of user OPSWARE_ADMIN is EXPIRED. It is required to be OPEN.
Finished checking OPSWARE_ADMIN.
Checking PUBLIC privileges...
PUBLIC privileges are correct.
Checking for required users...
The account status of user SPIN is EXPIRED. It is required to be OPEN
The account status of user TWIST is EXPIRED. It is required to be OPEN
The account status of user VAULT is EXPIRED. It is required to be OPEN
Finished checking users.
Task completed.
```

Using the HP-Supplied Oracle RDBMS Software and Database



If you are manually installing the Oracle RDBMS software and database, skip this section and go to [Pre-Installation Tasks \(Oracle Universal Installer\)](#) on page 179.

The SA distribution Media includes an Oracle 11g database installation DVD. You can simply mount this DVD on the server you plan to use to host the Model Repository and enter the following command to begin the Oracle installation.

```
/<distro>/oracle_sas/install_opsware.sh --verbose
```

You will see a screen similar to this:

```
Install Type: "Oracle RDBMS for SAS"
```

```
Please select the interview mode. Simple mode uses default values for many of the configuration parameters. Advanced mode allows you to fully configure the installation.
```

- 1 - Simple Interview Mode
- 2 - Advanced Interview Mode

```
Please select the interview mode from the menu, type 'h' for help, 'q' to quit: 1
```

The Opware Installer will now interview you to obtain the installation parameters it needs. You can use the following keys to navigate forward and backward through the list of parameters:

- Control-P - go to the previous parameter
- Control-N - go to the next parameter
- Return - accept the default (if any) and go to the next parameter
- Control-F - finish parameter entry
- Control-I - show this menu, plus information about the current parameter

Press Control-F when you are finished. The Opware Installer will perform a final validation check and write out a response file that will be used to install the Opware components.

Enter 1 for the Simple Interview or 2 for the Advanced Interview (which allows you to modify additional parameters, if necessary). For example, if you choose the Simple Interview, you will see a screen similar to this:

```
Parameter 1 of 2 (truth.oaPwd)Please enter the password for the opsware_admin user. This is the password used to connect to the Oracle database.:  
opsware_admin  
Validating... OK.
```

```
Parameter 2 of 2 (truth.dcNm)Please enter the short name of the facility where Opware Installer is being run (no spaces).:  
Validating... OK.
```

```
All parameters have values. Do you wish to finish the interview? (y/n): y
```

Concluding interview.

Interview complete.

You are then asked to supply the name of the response file in which to store your interview responses. The default is `oiresponse.oracle.sas`:

```
Name of response file to write [/usr/tmp/oiresponse.oracle_sas]:  
Response file written to /usr/tmp/oiresponse.oracle_sas.
```

Would you like to continue the installation using this response file? (y/n): y

You will then see this screen:

```
Welcome to the Opsware Installer.  
Please select the components to install.  
1 ( ) Oracle RDBMS for SAS  
Enter a component number to toggle ('a' for all, 'n' for none).  
When ready, press 'c' to continue, or 'q' to quit.
```

Selection:

Select 1 and press c to begin the database installation. When the installation is complete, a message to that effect is displayed. You can now continue with the SA installation.

HP-Supplied RDBMS Configuration Details

The HP-supplied Oracle database requires that certain system and Oracle environment variables be specified for use with SA. These changes are made automatically during SA installation.

SA Installer Changes to Database Configuration and Files

When you install the HP-supplied Oracle RDBMS using the SA Installer Oracle installation option, the installer:

- Checks that all requirements are met on the host server (see [Hardware Requirements](#) on page 167 and [Operating System Requirements](#) on page 169).
- Sets certain kernel parameters to required values. For details about these parameter changes, see [Kernel Parameter Values](#) on page 177.
- Creates the Unix user `oracle` locally in `/etc/passwd`.
- Creates the Unix groups `dba` and `oinstall` locally in `/etc/group`.
- Sets the `$ORACLE_HOME` environment variable to the following directory:
`/u01/app/oracle/product/11.1.0/db_1`
- Sets the `$ORACLE_SID` environment variable to `truth`.
- Creates an Oracle instance with the required `init.ora` parameters.
- Creates the tablespaces and data and index files under the following directories:

```
/u01/oradata/truth
```

```
/u02/oradata/truth
/u03/oradata/truth
/u04/oradata/truth
```

- The system administrator can configure the /u01, /u02, /u03, /u04 directories before installing the Oracle RDBMS software.
- Gets the service name (TNS name) from the SA Installer interview (truth.servicename prompt) and inserts it into the tnsnames.ora file in \$ORACLE_HOME/network/admin and /var/opt/oracle. The SA Installer changes the value of the host parameter to the value returned by the Unix hostname command.
- In the /\$ORACLE_HOME/network/admin/listener.ora file, changes the value of the host parameter to the value returned by the Unix hostname command.

The listener is password protected and OS authenticated. (The default password is opsware.) By default, it listens on port 1521.

- Creates the /etc/init.d/opsware-oracle script, which you can use to start up and shut down the database and listener.

This script is linked to corresponding scripts in the /etc/rc*.d directories.

- Creates the user opsware_admin with the required privileges.
- After installation is complete, you can examine the logs that are created here:

```
/var/log/opsware/install_opsware
```

Kernel Parameter Values

During the SA Installer installation of the HP-supplied Oracle RDBMS, the installation also sets the values for certain parameters in various files. If you manually install the Oracle database, or use an existing database, you must insure that these values are specified correctly. This section lists the parameters set by the installer that can be changed without adversely affecting SA.

Changing Kernel Parameter Values for Linux

This section identifies the kernel parameters you can change for Red Hat Linux Enterprise Server AS 4 x86_64, Red Hat Linux Enterprise Server AS 5 x86_64, and SUSE Linux Enterprise Server 10 x86_64.



For Oracle 11g, the typical number of open file descriptors used under normal usage has increased. For larger systems, HP recommends that you increase the value of `fs.file-max`. The recommended value is `fs.file-max = 6815744`.

You can change values for the following parameters in `/etc/sysctl.conf`:

```
kernel.shmmax=2147483648
kernel.shmall=2097152
kernel.shmmni=4096
kernel.sem=250 32000 100 128
net.core.rmem_default=4194304
net.core.wmem_default=262144
net.core.rmem_max=4194304
net.core.wmem_max=262144
fs.file-max=6815744
net.ipv4.ip_local_port_range=1024 65000
```

```
net.ipv4.tcp_wmem=262144 262144 262144
net.ipv4.tcp_rmem=4194304 4194304 4194304
```

You can change values for the following parameters in `/etc/security/limits.conf`:

```
oracle soft nofile 1024
oracle hard nofile 65536
oracle soft nproc 2047
oracle hard nproc 16384
```

You can change values for the following parameters in `/etc/pam.d/login`:

```
session required /lib/security/pam_limits.so
```

You can change values for the following parameters in `/etc/fstab`:

```
shmfs /dev/shm tmpfs size=4g 0
```

Additional Modifiable SUSE Kernel Parameter Values

This section identifies additional required settings for SUSE Linux Enterprise Server 10 x86_64 when running Oracle 11g:

- Enter the following command to cause the system to read the `/etc/sysctl.conf` file when it restarts:

```
# /sbin/chkconfig boot.sysctl on
```
- You must enter the GID of the `oinstall` group as the value for the parameter `/proc/sys/vm/hugetlb_shm_group`. Doing this grants members of `oinstall` a group permission to create shared memory segments.

For example, where the `oinstall` group GID is 501:

```
# echo 501 > /proc/sys/vm/hugetlb_shm_group
```

After running this command, use `vi` to add the following text to `/etc/sysctl.conf`, and enable the `boot.sysctl` script to run on system restart:

```
vm.hugetlb_shm_group=501
```



Only one group can be defined as the `vm.hugetlb_shm_group`.

Changing Kernel Parameter Values for Solaris 10

To change a kernel parameter for Solaris 10, perform the following steps:

- 1 Enter `set noexec_user_stack=1` in `/etc/system`.
- 2 Run the following commands:

```
projadd -U oracle -K "project.max-shm-memory=(priv,2048MB,deny)"
user.oracle
```

```
projmod -s -K "project.max-sem-ids=(priv,100,deny)" user.oracle
projmod -s -K "process.max-sem-nsems=(priv,256,deny)" user.oracle
```

```
projmod -s -K "project.max-shm-ids=(priv,100,deny)" user.oracle
```

```
echo "oracle::::project=user.oracle" >> /etc/user_attr
```

- 3 Use the vi editor for /etc/project and /etc/user_attr to verify the changes made in step 2.

Pre-Installation Tasks (Oracle Universal Installer)



If you plan to install the HP-supplied Oracle RDBMS software and database using the SA Installer, you do not need to perform the tasks in this section. The tasks in this section are only for Oracle databases installed using the Oracle Universal Installer and are required for compatibility with SA.

This section discusses the prerequisites for an installation of the Oracle RDBMS using the Oracle Universal Installer for use with SA. For more detailed information about installing Oracle, see the *Oracle Installation Guide* for your operating system. Each operating system and Oracle version has a different guide. The Oracle documentation is available at the following URL:

<http://www.oracle.com/technology/documentation/index.html>

Before installing the Oracle RDBMS software, perform the following steps:



The sample files referenced in these steps can be obtained from your HP Support representative. See [Oracle/SA Installation Scripts, SQL Scripts, and Configuration Files](#) on page 181.

- 1 Verify that the server has the hardware and software listed in [Hardware Requirements](#) on page 167 and [Operating System Requirements](#) on page 169.
- 2 Obtain the sample files and unzip them.
- 3 Set the kernel parameters.

The easiest way to set these parameters is by copying and editing the following sample files:

```
kernel_params_redhat.txt
kernel_params_solaris.txt
```

These two files contain instructions, Unix commands, and lines of text for configuration files.

- 4 Create the required Unix users and groups by running the following commands. (If you use a directory different than /u01/app/oracle, modify the commands accordingly):

```
mkdir -p /u01/app/oracle
groupadd oinstall
groupadd dba
groupadd dboper
useradd -g oinstall -G dba \
  -d /u01/app/oracle -s /usr/bin/sh oracle
chown oracle:oinstall /u01/app/oracle
Set the environment variables for the oracle user.
```

The easiest way to set these variables is by obtaining and editing the following sample files:

```
bash_profile
profile
```

Now you should be ready to install the Oracle RDBMS. For instructions, see the *Oracle Installation Guide* for your operating system.

Baseline Data Installation

The following steps are required for Red Hat Enterprise Linux AS 4 x86_64, Red Hat Enterprise Linux AS 5 x86_64, Sun Solaris x86_64, and SUSE Enterprise Linux 10 x86_64 because, during a Model Repository fresh install, baseline data is not inserted completely. Oracle does not insert some of the baseline data in `role_classes` and other tables and there are no errors, failures or trace files generated by Oracle. This is a silent failure and an intermittent problem. The Model Repository installs successfully because there are no error messages returned from Oracle, but later the Data Access Engine (Spin) install fails due to missing baseline data.

Before installing Oracle on Red Hat Enterprise Linux AS 4 x86_64, Red Hat Enterprise Linux AS 5 x86_64, Sun Solaris x86_64, or SUSE Enterprise Linux 10 x86_64 on the Model Repository (truth)/database host, run the following commands:

```
# Su - oracle
# Sqlplus "/ as sysdba"

SQL> ALTER SYSTEM SET EVENT='12099 trace name context forever,
level 1' SCOPE=SPFILE;
SQL> Shutdown immediate;
SQL> Startup
SQL> Exit
```

Now, you can run the SA Installer and install the Model Repository.

Oracle XDB Component Installation Requirements

During a Multimaster installation, SA exports the database using Oracle's Export utility. Due to an Oracle bug, the Export utility fails if the XDB component is installed *and* `NLS_LENGTH_SEMANTICS=CHAR` (as required for SA). To avoid this error, you must install Oracle excluding the XDB component.

Manually Creating the Oracle Database



If you will install the HP-supplied Oracle RDBMS software and database, you do not need to perform the tasks in this section. The tasks in this section are only for Oracle installed using the Oracle Universal installer and are required for compatibility with SA.

When the SA Installer installs the Oracle RDBMS software and database, it runs certain scripts that do configuration tasks, create users, set password and parameter values, etc.

When you manually install the Oracle RDBMS, certain of these scripts must be run, others are optional (you can manually make the required modifications to Oracle settings for SA or you can run the script `truth.sh` which will automatically run all the required scripts in the correct order).

The SQL scripts that must be run or edited are:

- `CreateDB.sql`
- `CreateDBFiles.sql`

- CreateUserOpware_Admin.sql
- init.ora

Oracle/SA Installation Scripts, SQL Scripts, and Configuration Files

The following describes the script files, SQL scripts, and configuration files that are run or edited when you run the `truth.sh` script. These files are available from your HP Support representative.

- **truth.sh:** A shell script that creates directories and then launches the `truth.sql` script. Running this script causes all the tasks performed in this list to be performed automatically.
- **truth.sql:** Prompts for passwords of the SYS and SYSTEM users and then launches the remainder of the SQL scripts in this list.
- **CreateDB.sql:** Creates a database with the UTF8 character set (as required by SA), the data and index files, the default temporary tablespace, the undo tablespace, and the log files.



The database must have the character set UTF8 available.

- **CreateDBFiles.sql:** Creates the following tablespaces that are required by SA:

```
LCREP_DATA
LCREP_INDX
TRUTH_DATA
TRUTH_INDX
AAA_DATA
AAA_INDX
AUDIT_DATA
AUDIT_INDX
STRG_DATA
STRG_INDX
```

See [Tablespace Sizes](#) on page 33 in Chapter 2 for information about for additional tablespace sizing information.

- **CreateDBCatalog.sql:** Runs Oracle scripts to create data system catalog objects.
- **JServer.sql:** Sets up the Oracle Java environment.
- **CreateAdditionalDBFiles.sql:** Adds data and index files to certain tablespaces and allocates additional disk space. This script is optional, but recommended.
- **CreateUserOpware_Admin.sql:** Creates the `opware_admin` database user and grants permissions (privileges) to this user (required by SA).
- **postDBCcreation.sql:** Creates the `spfile` from the `pfile` (parameter file).
- **init.ora:** Contains initialization parameters for the database. Certain parameter values are required by SA. See [Required and Suggested Parameters for init.ora](#) on page 183.
- **tnsnames.ora:** Enables resolution of database names used internally by SA.
- **listener.ora:** Contains configuration parameters for the listener. SA by default listens on port 1521. You can change the default port during installation or by editing the `tnsnames.ora` file.

- **bash_profile**: Sets environment variables and sets shell limits for the oracle Unix user.
- **profile**: Sets environment variables for the oracle Unix user.
- **kernel_params_redhat.txt**: Contains kernel parameters for Red Hat Enterprise Linux 3 AS.
- **kernel_params_solaris.txt**: Contains kernel parameters for Solaris 10.
- **opsware-oracle**: A script residing in /etc/init.d that starts up and shuts down the database and listener.
Note that the /etc/init.d/opsware-sas script, which starts and stops the SA components, does not start and stop the database and listener. For more information on the opsware-sas script, see the *SA Administration Guide*.
- **Export-Import**: A directory that contains parameter files and instructions for performing full database exports and imports.

Files that Must be Run or Edited for a Manual Oracle Installation

Even if you plan to configure your Oracle installation manually and not run `truth.sh` to automatically configure the Oracle installation, the following scripts must be run and `init.ora` must have certain parameter values edited or added as shown in [Required and Suggested Parameters for init.ora](#) on page 183.

- **CreateDB.sql**: Creates a database with the UTF8 character set (as required by SA), the data and index files, the default temporary tablespace, the undo tablespace, and the log files.
- **CreateDBFiles.sql**: Creates the following tablespaces that are required by SA:

```
LCREP_DATA
LCREP_INDX
TRUTH_DATA
TRUTH_INDX
AAA_DATA
AAA_INDX
AUDIT_DATA
AUDIT_INDX
STRG_DATA
STRG_INDX
```

See [Tablespace Sizes](#) on page 33 in Chapter 2 for information about for additional tablespace sizing information.

- **CreateUserOpware_Admin.sql**: Creates the `opsware_admin` database user and grants permissions (privileges) to this user (required by SA). If you plan to create the `opsware_admin` without running this script, see [Create the User Opware_Admin](#) on page 182.
- **init.ora**: Must be edited as shown in [Required and Suggested Parameters for init.ora](#) on page 183.

Create the User Opware_Admin

The following explains how to create this user:

To create the `opsware_admin` user after a manual Oracle installation, log in to SQL*Plus and enter the following:

```
# Su - oracle
# Sqlplus "/" as sysdba"
```

```

SQL> create user opsware_admin identified by opsware_admin
      default tablespace truth_data
      temporary tablespace temp
      quota unlimited on truth_data;

SQL> grant alter session to opsware_admin with admin option;
grant create procedure to opsware_admin with admin option;
grant create public synonym to opsware_admin with admin option;
grant create sequence to opsware_admin with admin option;
grant create session to opsware_admin with admin option;
grant create table to opsware_admin with admin option;
grant create trigger to opsware_admin with admin option;
grant create type to opsware_admin with admin option;
grant create view to opsware_admin with admin option;
grant delete any table to opsware_admin with admin option;
grant drop public synonym to opsware_admin with admin option;
grant select any table to opsware_admin with admin option;
grant select_catalog_role to opsware_admin with admin option;
grant query rewrite to opsware_admin with admin option;
grant restricted session to opsware_admin with admin option;

grant execute on dbms_utility to opsware_admin with grant option;
grant analyze any to opsware_admin;
grant insert, update, delete, select on sys.aux_stats$ to opsware_admin;
grant gather_system_statistics to opsware_admin;
grant create job to opsware_admin;

grant alter system to opsware_admin;
grant create role to opsware_admin;
grant create user to opsware_admin;
grant alter user to opsware_admin;
grant drop user to opsware_admin;
grant create profile to opsware_admin;
grant alter profile to opsware_admin;

grant create any directory to opsware_admin;
grant drop any directory to opsware_admin;

grant drop profile to opsware_admin;

```

Required and Suggested Parameters for init.ora

(Both Oracle 10g and 11g) For SA, the following init.ora entries are either suggested or required:

```

log_buffer>=1048576
db_block_size>=8192
session_cached_cursors=>50
nls_length_semantics=CHAR
nls_sort=GENERIC_M
processes >=1024
undo_management=AUTO (Suggested)
undo_tablespace=UNDO (Suggested)
query_rewrite_integrity=TRUSTED

```

```

query_rewrite_enabled=true
optimizer_mode=all_rows
optimizer_index_cost_adj=20
optimizer_index_caching=80
cursor_sharing=SIMILAR (value can be set to SIMILAR(preferred) or EXACT,
recommended only if you encounter an Oracle error)
recyclebin=OFF
event="12099 trace name context forever, level 1"
_complex_view_merging=false

```

(Oracle 10g only) For SA, the following `init.ora` entries are either suggested or required:

```

open_cursors >=300
sga_max_size >=1GB
db_cache_size>=629145600
shared_pool_size>=262144000
java_pool_size>=52428800
large_pool_size>=52428800
job_queue_processes>=10
sessions >=1152
pga_aggregate_target >=104857600
workarea_size_policy=auto
remote_login_passwordfile=EXCLUSIVE

```

(Oracle 11g only) For SA, the following `init.ora` entries are either suggested or required:

```

open_cursors >=1000
memory_target=1616M
job_queue_processes>=1000 (default)
remote_login_passwordfile=EXCLUSIVE

```

Creating the Database using the HP-Supplied Scripts

To create the Oracle database using the HP-supplied scripts, perform the following steps:

- 1 Obtain the database creation scripts from your HP support representative.
- 2 Configure the scripts. See [Oracle/SA Installation Scripts, SQL Scripts, and Configuration Files](#) on page 181
- 3 Log in to the server as the Unix user `oracle`.
- 4 Copy the HP-supplied `init.ora` file to the following directory:

```
$ORACLE_BASE/admin/truth/create
```

- 5 Examine the SQL scripts that you will run in **step 7**. If necessary, edit the scripts to conform to your organization's policies.
- 6 Log on to the server as the `oracle` user and change the mode of the HP-supplied `truth.sh` script:

```
chmod 755 truth.sh
```

- 7 Launch the SQL scripts that create the database by running the `truth.sh` script:

```
./truth.sh
```

- 8 After the scripts launched by `truth.sh` complete, check the log files in the following directory for errors:

```
/u01/app/oracle/admin/truth/scripts/*.log
```

Post-Oracle Installation Tasks



If you will install the HP-supplied Oracle database, you do not need to perform the tasks in this section. The tasks in this section are only for Oracle databases installed using the Oracle Universal installer and are required for compatibility with SA.

After creating the database, but before installing the Model Repository with the SA Installer, perform the following steps:

- 1 Create the `tnsnames.ora` file in the following directory:
`$ORACLE_HOME/network/admin`
Verify that the file conforms to the rules listed in [tnsnames.ora File Requirements](#) on page 186.
- 2 If it does not exist, create the following directory:
`mkdir -p /var/opt/oracle`
- 3 Create the following symbolic link:
`ln -s $ORACLE_HOME/network/admin/tnsnames.ora \
/var/opt/oracle/tnsnames.ora`
- 4 Make sure that the oracle Unix user has read-write permission on the `tnsnames.ora` file.
- 5 For Red Hat Enterprise Linux 3 AS, create another symbolic link:
`ln -s /etc/oratab /var/opt/oracle/oratab`
- 6 Copy the sample `opsware-oracle` script to `/etc/init.d/`.
- 7 Link `/etc/init.d/opsware-oracle` to corresponding scripts in the `/etc/rc*` directories. For example:
`ln -s /etc/init.d/opsware-oracle \
/etc/rc0.d/K02opsware-oracle`
`ln -s /etc/init.d/opsware-oracle \
/etc/rc1.d/K02opsware-oracle`
`ln -s /etc/init.d/opsware-oracle \
/etc/rc2.d/S60opsware-oracle`
`ln -s /etc/init.d/opsware-oracle \
/etc/rcS.d/K02opsware-oracle`
- 8 Copy the sample `listener.ora` file to `$ORACLE_HOME/network/admin`.
- 9 In `listener.ora`, change the value of the `host` parameter to the host name of server running the database.

Location of Additional Oracle Data Files

If you want to add data files to a database created with the SA Installer, you can add them to the following directories:

```
/u01/oradata/truth  
/u02/oradata/truth  
/u03/oradata/truth  
/u04/oradata/truth
```

tnsnames.ora File Requirements

The `tnsnames.ora` file enables resolution of database names used internally by the core components. SA has the following requirements for the `tnsnames.ora` file:

- The file must reside in the following location:
`/var/opt/oracle/tnsnames.ora`
- If the core is installed across multiple servers, a copy of the file must reside on the servers hosting the following components:
 - Model Repository
 - Infrastructure Component bundle (required by the Data Access Engine, Model Repository Multimaster Component, Software Repository Store)
 - Slice Component bundle (required by the Command Center, Web Services Data Access Engine, Global File System)
- For a core installed on multiple servers, the directory path of the `tnsnames.ora` file must be the same on each server.
- In a Single Core installation, the `tnsnames.ora` file must contain an entry for the Model Repository, as in the following example:

```
truth =
(DESCRIPTION=
(ASSOCIATION=(HOST=magenta.example.com)(PORT=1521)
(PROTOCOL=tcp))
(CONNECT_DATA=(SERVICE_NAME=truth)))
```

tnsnames.ora: Multimaster Mesh Requirements

In a Multimaster Mesh, the `tnsnames.ora` file must be set up for a Source Core and a Destination Core using the following guidelines.

Source Core

The `tnsnames.ora` file must contain an entry for its own Model Repository. The port number must be set to the port that you have designated that the Oracle listener process use, such as 1521 (default), 1526, and so on.

The `tnsnames.ora` file must also contain an entry that specifies the Source Core Management Gateway. This port is used by the Data Access Engine for Multimaster traffic. The port number is derived from the following formula: (20000) + (facility ID of the Destination Core).

Example: In the following example, the TNS service name of the Source Core is `orange_truth`, which runs on the host `orange.example.com`. The TNS name of the Destination Core is `cyan_truth`, which has a facility ID of 556. Note that the entry for `cyan_truth` specifies `orange.example.com`, which is the host running the Source Core's Management Gateway.

```
orange_truth=(DESCRIPTION=(ADDRESS=(HOST=orange.example.com)(PORT=1521)
(PROTOCOL=tcp))(CONNECT_DATA=(SERVICE_NAME=truth)))
cyan_truth=(DESCRIPTION=(ADDRESS=(HOST=orange.example.com)(PORT=20556)
(PROTOCOL=tcp))(CONNECT_DATA=(SERVICE_NAME=truth)))
```

Destination Core

The `tnsnames.ora` file must contain an entry for its own Model Repository. The port number must be set to the port that you have designated that the Oracle listener process use, such as 1521 (default), 1526, and so on. The `tnsnames.ora` file does not require any entries for other cores in the mesh.

Example: In the following example, the TNS service name of the Destination Core is `cyan_truth`, and the core runs on the host, `cyan.example.com`.

```
cyan_truth=(DESCRIPTION=(ADDRESS=(HOST=cyan.example.com)(PORT=1521)
(PROTOCOL=tcp))(CONNECT_DATA=(SERVICE_NAME=truth)))
```

Requirements for Enabling Oracle Daylight Saving Time (DST)

To enable Daylight Saving Time for the Oracle database, you must apply database tier patches. To apply these patches, perform the following steps:

- 1 Verify that your database is running on Oracle 10g or higher. If you are on an earlier database release, use one of the following MetaLink Notes to upgrade your database:
10gR2 Database: MetaLink Note 362203.1
- 2 Use MetaLink Note 359145.1 to apply Oracle Database time zone fixes specific to your database version.
- 3 Use MetaLink Note 359145.1 to apply time zone fixes to the Oracle Java Virtual Machine (JVM) in the Oracle Database specific to your E-Business Suite database version.

Installing the Model Repository Database on a Remote Server

To install or upgrade the Model Repository Oracle database on a remote server, perform the following steps:

- 1 Perform the following tasks on the server on which you will run the SA Installer:
 - a Ensure that the hostname `truth` resolves to the remote database server, not to the server on which you'll be running the SA Installer.
 - b Install the Oracle client software. The software must be owned by the OS user `oracle`. For a Multimaster install, you need the full Oracle client; for a Single Core (standalone) installation, the Oracle Instant client will suffice. The client software must be owned by the OS user `oracle`. Install the Oracle client in a location like

```
/opt/opsware/oracle_client_model_repo.
```

— You can copy the Oracle instant client from an existing core. The Oracle Instant client is by default installed under `/opt/opsware/oracle_client` on the Web Services Data Access Engine (`twist`) host.

— Otherwise, download the appropriate Oracle full client from

```
http://www.oracle.com/technology/software/products/database/index.html
```

- c (For an Oracle Full client install, this step is not necessary.) Copy the database server's `$ORACLE_HOME/jdbc/lib/classes12.zip` to the client's Oracle home, for example:

```
# scp oracle@truth:$ORACLE_HOME/jdbc/lib/classes12.zip \  
/opt/opsware/oracle_client_model_repo/jdbc/lib
```

- d Copy the database server's `/var/opt/oracle/tnsnames.ora` file to the client host and ensure that the hostname in the file resolves properly.
 - e Ensure that the SA Installer response file has the correct path to the client `tnsnames.ora` file (`%truth.tnsdir`), oracle client home (`%truth.orahome`), listener port (`%truth.port`), SA Installer machines subdomain (`%truth.dcSubDom`), etc. Based on the above steps your parameter values will be:
 - `%truth.tnsdir=/var/opt/oracle`
 - `%truth.orahome=/opt/opsware/oracle_client_model_repo`
 - `%truth.port=1521`
 - `%truth.dcSubDom=prod.example.com`
- 2 Set up the following on the Model Repository host (Oracle database server):
- a Log in as user `oracle`
 - b `cd $ORACLE_HOME/network/admin`
 - c Ensure that the `listener.ora` file has the following `SID_LIST_*` section:


```
SID_LIST_<your_listener_name> =
  (SID_LIST =
    (SID_DESC=
      (SID_NAME=truth)
      (ORACLE_HOME=<oracle_home>
    )
  )
```
 - d Ensure that the listener is started with the command


```
lsnrctl start <your_listener_name>
```

Oracle RAC Support

The following information is in addition to that found in the *SA Planning and Installation Guide: Appendix A* and the document, *Oracle Setup for the Model Repository*.

Concurrent with the SA 7.82 patch release, SA adds support for Oracle Real Application Clusters (RAC).



Oracle RAC support requires a new installation of both Oracle and SA. Therefore, in order to enable Oracle RAC support in SA, you must first install SA 7.80 and Oracle 10.2.0.4 or 11.1.0.7 configured as described in the following sections.

Supported Oracle Versions

SA support for Oracle RAC includes these Oracle Enterprise Edition versions:

- 10.2.0.4
- 11.1.0.7

Supported Operating Systems

- Red Hat Enterprise Linux AS 4 x86_64
- Red Hat Enterprise Linux AS 5 x86_64

Set up the Oracle RAC Database/Instances

SA supports any valid Oracle RAC configuration, such as any number of nodes, ASM or regular disks, and so on.

However, SA requires that the Oracle database be configured for use with SA. You will require your Oracle DBA's help to configure the Oracle RAC/instances, the required initialization parameters, the required tablespaces, the `opsware_admin` database user, and the `listener.ora` and `tnsnames.ora` files.

You can also run the `truth_oracle_state_checker` script to check if the initialization parameters are set correctly. The `truth_oracle_state_checker` file is located in the `distribution /tools` directory.

Create the Database with the Required Initialization Parameters

Before installing Oracle, the following scripts must be run and `init.ora` must have certain parameter values edited or added as shown in [Required and Suggested Parameters for `init.ora`](#) on page 183.

- 1 Create a database with the UTF8 character set (as required by SA), the data and index files, the default temporary tablespace, the undo tablespace, and the log files.

Create the Required Tablespaces

- 2 Create the following tablespaces that are required by SA:

```
LCREP_DATA
LCREP_INDX
TRUTH_DATA
TRUTH_INDX
AAA_DATA
AAA_INDX
AUDIT_DATA
AUDIT_INDX
STRG_DATA
STRG_INDX
```

See “Tablespace Sizes” in the *SA Planning and Installation Guide* for additional tablespace sizing information.

Required and Suggested Parameters for `init.ora`

- 3 The file `init.ora` must be edited as follows:

(Both Oracle 10g and 11g) For SA, the following `init.ora` entries are either suggested or required:

```
log_buffer>=1048576
db_block_size>=8192
session_cached_cursors=>50
```

```

nls_length_semantics=CHAR
nls_sort=GENERIC_M
processes >=1024
undo_management=AUTO (Suggested)
undo_tablespace=UNDO (Suggested)
query_rewrite_integrity=TRUSTED
query_rewrite_enabled=true
optimizer_mode=all_rows
optimizer_index_cost_adj=20
optimizer_index_caching=80
cursor_sharing=SIMILAR (value can be set to SIMILAR(preferred) or EXACT,
recommended only if you encounter an Oracle error)
recyclebin=OFF
event="12099 trace name context forever, level 1"
_complex_view_merging=false

```

(Oracle 10g only) For SA, the following `init.ora` entries are either suggested or required:

```

open_cursors >=300
sga_max_size >=1GB
db_cache_size>=629145600
shared_pool_size>=262144000
java_pool_size>=52428800
large_pool_size>=52428800
job_queue_processes>=10
sessions >=1152
pga_aggregate_target >=104857600
workarea_size_policy=auto
remote_login_passwordfile=EXCLUSIVE

```

(Oracle 11g only) For SA, the following `init.ora` entries are either suggested or required:

```

memory_target=1616M
job_queue_processes>=1000 (default)
remote_login_passwordfile=EXCLUSIVE

```

Create the User `opsware_admin`

- 4 You can use the script, `CreateUserOpsware_Admin.sql`, to create the `opsware_admin` database user and grant permissions (privileges) to the user (required by SA) or create the user manually.

If you plan to create the `opsware_admin` user manually, follow the procedure below:

Manual Creation of the User `Opsware_Admin`

To create the `opsware_admin` user after a manual Oracle installation, log in to SQL*Plus and enter the following:

```

# Su - oracle
# Sqlplus "/ as sysdba"

```

```

SQL> create user opsware_admin identified by opsware_admin
      default tablespace truth_data
      temporary tablespace temp
      quota unlimited on truth_data;

```

```

SQL> grant alter session to opsware_admin with admin option;
grant create procedure to opsware_admin with admin option;
grant create public synonym to opsware_admin with admin option;
grant create sequence to opsware_admin with admin option;
grant create session to opsware_admin with admin option;
grant create table to opsware_admin with admin option;
grant create trigger to opsware_admin with admin option;
grant create type to opsware_admin with admin option;
grant create view to opsware_admin with admin option;
grant delete any table to opsware_admin with admin option;

grant drop public synonym to opsware_admin with admin option;
grant select any table to opsware_admin with admin option;
grant select_catalog_role to opsware_admin with admin option;
grant query rewrite to opsware_admin with admin option;
grant restricted session to opsware_admin with admin option;

grant execute on dbms_utility to opsware_admin with grant option;
grant analyze any to opsware_admin;
grant insert, update, delete, select on sys.aux_stats$ to opsware_admin;
grant gather_system_statistics to opsware_admin;
grant create job to opsware_admin;

grant alter system to opsware_admin;
grant create role to opsware_admin;
grant create user to opsware_admin;
grant alter user to opsware_admin;
grant drop user to opsware_admin;
grant create profile to opsware_admin;
grant alter profile to opsware_admin;

grant drop profile to opsware_admin;

```

Installing the Model Repository

In most production environments with Oracle RAC, the Model Repository installation can be done from any SA server. The database server or RAC nodes in this case are considered to be remote.

The examples used in the following sections assume this configuration:

Two (active-active) Node RAC environment:

```

# Public Network
192.168.173.210 rac1pub rac1pub.dev.opsware.com (instance_name=truth1,
db name=truth)
192.168.173.211 rac2pub rac2pub.dev.opsware.com (instance_name=truth2,
db name=truth)

# Private network
172.16.1.100 rac1prv rac1prv.dev.opsware.com
172.16.1.101 rac2prv rac2prv.dev.opsware.com

# Public Virtual IP (VIP)
192.168.173.212 rac1-vip rac1-vip.dev.opsware.com
192.168.173.213 rac2-vip rac2-vip.dev.opsware.com

```

SA server:
192.168.173.214 rac1sa.dev.opsware.com

Model Repository Installation on a Remote Database (truth) RAC Server

In an Oracle RAC environment, only one of the RAC nodes is used during the SA installation/upgrade process. The SA Installer connects to only one Oracle RAC instance to install/modify the Model Repository. During the regular SA operations, all RAC nodes are used.

Perform the following tasks on the SA server on which you will run the SA Installer, for example rac1sa.dev.opsware.com.

Model Repository Hostname Resolution

- 1 On the server where you will run the SA Installer, ensure that the Model Repository hostname `truth` resolves to the remote database server, not to the server on which you will be running the SA Installer:

In `/etc/hosts`, enter the public IP address of one of the RAC nodes/instances. For example the

`/etc/hosts` file on rac1sa.dev.opsware.com would have the following entry:

```
192.168.173.210    truth    rac1pub    rac1pub.dev.opsware.com
```

Install the Oracle 11g Full Client on the SA server

- 1 The SA Installer will use the Oracle Full Client to connect to the SA server and install the Model Repository. Below are sample commands for installing the Oracle full client.

Create user `oracle` for the Oracle Full Client installation:

```
root@rac1sa ~]# mkdir -p /u01/app/oracle
root@rac1sa ~]# mkdir -p /u01/app/orainventory
root@rac1sa ~]# groupadd oinstall
root@rac1sa ~]# groupadd dba
root@rac1sa ~]# useradd -c "Oracle Client software owner" -g oinstall -G
dba -d /u01/app/oracle -s /bin/bash oracle
root@rac1sa ~]# chown -R oracle:oinstall /u01/app
root@rac1sa ~]# chmod -R 775 /u01/app
root@rac1sa ~]# passwd oracle (change oracle user password )
```

- 2 Create the `.bash_profile` file

In `/u01/app/oracle` create the `.bash_profile` file.



Temporarily comment out `ORACLE_HOME` and `ORACLE_PATH`. You will uncomment these entries after the Oracle client installation is complete.

Sample `.bash_profile` file

```
# .bash_profile

# Get the aliases and functions
if [ -f ~/.bashrc ]; then
. ~/.bashrc
fi

# User specific environment and startup programs
PATH=$PATH:$HOME/bin
export PATH
```

```

#SA-OracleRAC parameters begin
#unset USERNAME
export ORACLE_BASE=/u01/app/oracle
#export ORACLE_HOME=$ORACLE_BASE/product/11.1.0/client_1
#PATH=$ORACLE_HOME/bin:$ORACLE_HOME/OPatch:$PATH
export PATH

if [ -t ]; then
stty intr ^C
fi

umask 022
#SA-OracleRAC parameters end

```

3 Install the Oracle Full Client

Install the Oracle Full Client as described in your Oracle documentation. You can create a share to access the Oracle Full Client binaries.

4 Set Up Terminals

You will need two X window terminals to install the Oracle Full Client:

Terminal 1: log in as root and enter the commands:

```
Terminal 1> xhost +
```

```
Terminal 2: ssh -X oracle@<new_oracle_full_client_host>
```

5 Start Oracle Full Client installation

From Terminal 2 run the Oracle Universal Installer (OUI) installer. The Oracle Full Client is installed in:

```
/u01/app/oracle/product/11.1.0/client_1
```

6 Run the Oracle Universal Installer to install Oracle Full Client. The directories in this example assume an Oracle 11g Full Client on Linux.

a `cd /location_of_oracle_full_client`

b `/runInstaller`

c At the **Welcome** Screen, click **Next**.

d Specify the Inventory Directory and Credentials (`/u01/app/oraInventory` and `/u01/app/oinstall`)

e For **Select Installation Type**, choose Administrator, click **Next**.

f For ORACLE_BASE select: `/u01/app/oracle`, click **Next**.

g The Oracle Universal Installer performs some checks. If the checks are not successful, fix the issue and re-run this step. If the checks are successful the click on 'Next'

h Oracle OUI will list of products that will be installed. Click on 'Install'

i OUI will show the progress bar when installing

j On the 'Welcome to Oracle Net Configuration Assistant' window click on 'Next'

k Click on 'Finish' once the installation is complete.

l The following two configuration scripts need to be executed as "root" upon installation being complete:

```
- /u01/app/oraInventory/orainstRoot.sh
```

```
- /u01/app/oracle/product/11.1.0/client_1/root.sh
```

- 7 Verify that the `.bash_profile` file for user `oracle` is correct.
- 8 Uncomment `$ORACLE_HOME` and `$ORACLE_PATH`.

Making changes to `tnsnames.ora` on SA server

By default the `tnsnames.ora` file is located in `/var/opt/oracle`.

- 1 Login as root on the SA Server.
- 2 Enter the command:

```
mkdir -p /var/opt/oracle
```

- 3 Copy `tnsnames.ora` from the remote database server to the directory you created above. For the RAC environment, copy it from RAC Node 1 (for example, `rac1pub.dev.opsware.com`).

The SA Installer puts the database in a restricted mode during the Model Repository installation. The database is removed from the restricted mode after successful installation/upgrade of the Model Repository. When the database is in restricted mode, only certain privileged users are allowed to connect to the database.

To accommodate the remote Model Repository installation process, two sets of `tnsnames.ora` are required on the SA server.

- `tnsnames.ora-install_upgrade` – this copy of `tnsnames.ora` is used during SA installation/upgrade. The file can be renamed.
- `tnsnames.ora-operational` – this copy of `tnames.ora` is used during normal SA operation. The file can be renamed.

You can use softlinks to point `tnsnames.ora` to either `tnsnames.ora-install_upgrade` or `tnsnames.ora-operational`.

```
ln -s tnsnames.ora-install_upgrade tnsnames.ora
```

`tnsnames.ora-install_upgrade` sample file

Make a note of the text that is in BOLD letters. The `tnames.ora` file should contain the SID and not the service name. These examples have `TRUTH` as the `truth.servicename`. Ensure that the `HOST` references the same server as the `truth` entry in `/etc/hosts` file. `truth.servicename` is case sensitive.

```
# Generated by Oracle configuration tools.
```

```
TRUTH =  
  (DESCRIPTION =  
    (ADDRESS = (PROTOCOL = TCP)(HOST = rac1pub.dev.opsware.com)(PORT = 1521))  
    (CONNECT_DATA =  
      (SID = truth1)  
    )  
  )
```

```
LISTENER_TRUTH =  
  (ADDRESS_LIST =  
    (ADDRESS = (PROTOCOL = TCP)(HOST = rac1pub.dev.opsware.com)(PORT = 1521))  
    (CONNECT_DATA =  
      (SID = truth1)  
    )  
  )
```

Use softlinks to link the file to `tnsnames.ora` file. Do this before you start the SA Model Repository installation or upgrade

```
ln -s tnsnames.ora-install_upgrade tnsnames.ora
```



During installation the SA Installer adds a SA Gateway entry into `tnsnames.ora` (linked to `tnsnames.ora.install-upgrade`) file on the First SA Core. When installation completes, copy this entry into the `tnsname.ora.operational` file. If this entry is not present in `tnsname.ora.operational`, Multimaster Mesh transactions will not flow. Below is a sample gateway entry from `tnsnames.ora`:

```
Rac2sa_truth=(DESCRIPTION=(ADDRESS=(HOST=192.168.173.214)(PORT=20002)
(PROTOCOL=tcp))(CONNECT_DATA=(SERVICE_NAME=truth)))
```

Making changes to listener.ora on one of the RAC node server (instance)

In an Oracle RAC environment, only one of the RAC nodes or instances is used during installation/upgrade process. The SA Installer connects to only one Oracle instance to modify the Model Repository. During the regular SA operations, all the RAC nodes are used.

The SA Installer puts the database in a restricted mode during the Model Repository installation. The database is removed from the restricted mode after successful installation/upgrade of the Model Repository. When the database is in restricted mode, only certain privileged users are allowed to connect. To accommodate the remote truth installation process, two sets of `listener.ora` files are required on the SA server. The files can be given any name. By default the `listener.ora` files are located in `$ORACLE_HOME/network/admin`.

- `listener.ora-install_upgrade` – this copy of `listener.ora` is used during SA install/upgrade
- `listener.ora-operational` – this copy of `listener.ora` is used during normal SA operation.

You can use softlinks to point `listener.ora` to either `listener.ora.install_upgrade` or `listener.ora.operational`:

```
ln -s listener.ora-install_upgrade listener.ora
```

Sample Listener.ora-install_upgrade

This file is used during the SA installation/upgrade process. Make a note of the text that is in BOLD letters. The `listener.ora` file should contain the `SID_NAME` and not the service name. The `SID_NAME` is case sensitive. Ensure that the `listener.ora` changes are made on the same server that is referenced in SA servers `/etc/hosts` file.

This example uses `LISTENER_RAC1PUB` as the listener name.

```
# Generated by Oracle configuration tools.
LISTENER_RAC1PUB =
  (DESCRIPTION_LIST =
    (DESCRIPTION =
      (ADDRESS = (PROTOCOL = IPC)(KEY = EXTPROC1))
      (ADDRESS = (PROTOCOL = TCP)(HOST = rac1-vip.dev.opsware.com)(PORT =
1521)(IP = FIRST))
      (ADDRESS = (PROTOCOL = TCP)(HOST = 192.168.173.210)(PORT = 1521)(IP =
FIRST))
    )
  )
SID_LIST_LISTENER_RAC1PUB =
```

```
(SID_LIST =
  (SID_DESC=
    (SID_NAME=truth1)
    (ORACLE_HOME=/u01/app/oracle/product/11.1.0/db_2)
  )
  (SID_DESC =
    (SID_NAME = PLSExtProc)
    (ORACLE_HOME = /u01/app/oracle/product/11.1.0/db_2)
    (PROGRAM = extproc)
  )
)
```

You can use softlinks to link the file to listener.ora:

```
ln -s listener.ora-install_upgrade listener.ora.ora
```

Ensure that you start the listener as follows:

```
> lsnrctl start LISTENER_RAC1PUB
```

Testing connection from SA machine to database

Before starting the Model Repository installation/upgrade, you can perform the following tests to verify that your tnsnames.ora and listener.ora files are configured correctly and if the SA Installer can connect to the database in restricted mode.

- 1 Verify that the SA server's /var/opt/oracle/tnsnames.ora file is configured correctly as described in [Making changes to tnsnames.ora on SA server](#) on page 194.
- 2 Verify that the database servers or RAC node's \$ORACLE_HOME/network/admin/listener.ora file is configured correctly as described in [Making changes to listener.ora on one of the RAC node server \(instance\)](#) on page 195.
- 3 On the SA server:
 - a Login as oracle or root or su - twist/spin - if these users exist
 - b export ORACLE_HOME=/u01/app/oracle/product/11.1.0/client_1 (or where you installed the Oracle Full Client)
 - c export LD_LIBRARY_PATH=\$ORACLE_HOME/lib
 - d export TNS_ADMIN=/var/opt/oracle
 - e set \$PATH \$ORACLE_HOME/bin path
 - f sqlplus sys/password@truth as sysdba;
where truth is the service_name or entry from the tnsnames.ora file
 - g select logins from v\$instance;
 - h alter system enable restricted session;
 - i select logins from v\$instance;
? db should be restricted
 - j connect opsware_admin/<password>@truth

If you are able to logon to the database then all files are configured correctly.

- k sqlplus sys/password@truth as sysdba
- l alter system disable restricted session;

SA Installer Response File

You can now start the installation of the SA Model Repository. Ensure that you have the correct parameters values for the installation interview or that you have a previous response file.

Verify the paths to the client's `tnsnames.ora` file (`%truth.tnsdir`), oracle client home (`%truth.orahome`), listener port (`%truth.port`), and so on.

- `%truth.tnsdir=/var/opt/oracle`
- `%truth.orahome=/u01/app/oracle/product/11.1.0/client_1`
- `%truth.port=1521`

You can now install the SA Core as described in the *SA Planning and Installation Guide*.

Post SA installation process

After you install the SA Core, perform the following tasks in order to use all the nodes in the Oracle RAC environment.

Making changes to `tnsnames.ora` on the SA server

After SA install is complete, the `tnsnames.ora` file should point/link to the `tnsnames.ora-operational` file.

The SA Installer puts the database in a restricted mode during the Model Repository installation. The database is removed from the restricted mode after successful installation/upgrade of the Model Repository. When the database is in restricted mode, only certain privileged users are allowed to connect to the database. To accommodate the remote truth installation process, two sets of `tnsnames.ora` are required on the SA server.

- `tnsnames.ora-install_upgrade` – this copy of `tnsnames.ora` is used during SA installation/upgrade. You can rename the file.
- `tnsnames.ora-operational` – this copy of `tnames.ora` is used during normal SA operation. You can rename the file.

You can use softlinks to point `tnsnames.ora` to either `tnsnames.ora-install_upgrade` or `tnsnames.ora-operational`:

```
ln -s tnsnames.ora-operational tnsnames.ora
```

tnsnames.ora-operational sample file

Make a note of the text that is in **BOLD** letters. This `tnsnames.ora` file is used during normal SA operation and contains the RAC parameters.

```
#This entry is for connecting to RAC virtual machines.
TRUTH =
  (DESCRIPTION =
    (ADDRESS = (PROTOCOL = TCP)(HOST = rac1-vip.dev.opsware.com)(PORT = 1521))
    (ADDRESS = (PROTOCOL = TCP)(HOST = rac2-vip.dev.opsware.com)(PORT = 1521))
    (LOAD_BALANCE = yes)
    (CONNECT_DATA =
      (SERVER = DEDICATED)
      (SERVICE_NAME = truth)
      (FAILOVER_MODE =
        (TYPE = SELECT)
        (METHOD = Preconnect)
        (RETRIES = 180)
```

```

        (DELAY = 5))
    )
)

LISTENERS_TRUTH =
  (ADDRESS_LIST =
    (ADDRESS = (PROTOCOL = TCP)(HOST = rac1-vip.dev.opsware.com)(PORT = 1521))
    (ADDRESS = (PROTOCOL = TCP)(HOST = rac2-vip.dev.opsware.com)(PORT = 1521))
  )

#This entry is for connecting to node2 via service_name. This entry is
optional
TRUTH2 =
  (DESCRIPTION =
    (ADDRESS = (PROTOCOL = TCP)(HOST = rac2-vip.dev.opsware.com)(PORT = 1521))
    (CONNECT_DATA =
      (SERVER = DEDICATED)
      (SERVICE_NAME = truth)
      (INSTANCE_NAME = truth2)
    )
  )
)
LISTENER_TRUTH2 =
  (ADDRESS = (PROTOCOL = TCP)(HOST = rac2-vip.dev.opsware.com)(PORT = 1521))

#This entry is for connecting to node1 via service_name. This entry is
optional
TRUTH1 =
  (DESCRIPTION =
    (ADDRESS = (PROTOCOL = TCP)(HOST = rac1-vip.dev.opsware.com)(PORT = 1521))
    (CONNECT_DATA =
      (SERVER = DEDICATED)
      (SERVICE_NAME = truth)
      (INSTANCE_NAME = truth1)
    )
  )
)
LISTENER_TRUTH1 =
  (ADDRESS = (PROTOCOL = TCP)(HOST = rac1-vip.dev.opsware.com)(PORT = 1521))

```

Use softlinks to link the file to `tnsnames.ora` file after SA installation is complete and you are ready to start SA in operational mode.

```
ln -s tnsnames.ora- operational tnsnames.ora
```



During installation the SA Installer adds an SA Gateway entry into `tnsnames.ora` (linked to `tnsnames.ora.install-upgrade`) file on the First SA Core. When installation is complete, copy that entry into `tnsname.ora.operational`. If this entry is not present in the `tnsname.ora.operational`, Multimaster Mesh transactions will not flow. The following is a sample gateway entry from `tnsnames.ora`:

```
Rac2sa_truth=(DESCRIPTION=(ADDRESS=(HOST=192.168.173.214)(PORT=20002)(PROTOCOL=tcp))(CONNECT_DATA=(SERVICE_NAME=truth)))
```

Making changes to listener.ora on one of the RAC node server (instance)

After SA installation is complete, the listener.ora file should point/link to the listener.ora-operational file.

In an Oracle RAC environment, only one of the RAC nodes or instances is used during installation/upgrade process. The SA Installer connects to only one Oracle instance to modify the Model Repository. During the normal SA operations, all the RAC nodes are used.

The SA Installer puts the database in a restricted mode during the Model Repository installation. The database is removed from the restricted mode after successful installation/upgrade of the Model Repository. When the database is in restricted mode, only certain privileged users are allowed to connect. To accommodate the remote truth installation process, two sets of listener.ora files are required on the SA server. The files can be given any name. By default the listener.ora files can be found in \$ORACLE_HOME/network/admin.

Listener.ora-operational – this copy of tnames.ora is used during normal SA operation.

You can use softlinks to point listener.ora.ora to either listener.ora.ora-install_upgrade or listener.ora.ora-operational.

```
ln -s listener.ora-operational listener.ora.ora (before SA regular operations)
```

listener.ora-operational - this file is used to start the listener when SA is running in normal operational mode. Make a note of the text that is in **BOLD** letters.

```
# listener.ora.rac1pub Network Configuration File: /u01/app/asm/product/11.1.0/db_1/network/admin/listener.ora.rac1pub
# Generated by Oracle configuration tools.
```

```
LISTENER_RAC1PUB =
  (DESCRIPTION_LIST =
    (DESCRIPTION =
      (ADDRESS = (PROTOCOL = IPC)(KEY = EXTPROC1))
      (ADDRESS = (PROTOCOL = TCP)(HOST = rac1-vip.dev.opsware.com)(PORT = 1521)(IP = FIRST))
      (ADDRESS = (PROTOCOL = TCP)(HOST = 192.168.173.210)(PORT = 1521)(IP = FIRST))
    )
  )
```

```
SID_LIST_LISTENER_RAC1PUB =
  (SID_LIST =
    (SID_DESC =
      (SID_NAME = PLSExtProc)
      (ORACLE_HOME = /u01/app/oracle/product/11.1.0/db_2)
      (PROGRAM = extproc)
    )
  )
```

Use softlink to link the file to listener.ora file

```
ln -s listener.ora-operational listener.ora.ora
```

Ensure that you start the listener as follows:

```
> lsnrctl start LISTENER_RAC1PUB
```

Vault.conf File Changes

In an Oracle RAC environment, the `vault.conf` file must be modified after SA installation is complete. Modify `/etc/opt/opsware/vault/vault.conf` to specify the complete `tnsname` definition instead of the `SID`. For example:

- Before:

```
truth.sid: truth
```

- After:

```
truth.sid=(DESCRIPTION = (ADDRESS = (PROTOCOL = TCP)(HOST =  
rac1-vip.dev.opsware.com)(PORT = 1521)) (ADDRESS = (PROTOCOL = TCP)  
(HOST = rac2-vip.dev.opsware.com)(PORT = 1521)) (LOAD_BALANCE = yes)  
(CONNECT_DATA = (SERVER = DEDICATED) (SERVICE_NAME = truth)  
(FAILOVER_MODE = (TYPE = SELECT) (METHOD = Preconnect) (RETRIES = 180)  
(DELAY = 5))))
```

```
truth.port: 1521
```

Restart the `vaultdaemon`:

```
/etc/init.d/opsware-sas restart vaultdaemon
```

Upgrading the Model Repository

To upgrade the Model Repository in an Oracle RAC environment, follow the same procedure as [Installing the Model Repository](#) on page 191. If you are doing a remote database installation, then make sure that you modify your `listener.ora` is on one of the RAC instances and `tnsnames.ora` on the server where the SA Installer is run. It is recommended that you test the connection as suggested in section [Testing connection from SA machine to database](#) on page 196.

Troubleshooting Remote Model Repository Installation

When you install or upgrade the Model Repository on a remote database server, Oracle gives the following error and the installer aborts:

```
Error: ORA-12526: TNS:listener: all appropriate instances are in restricted  
mode
```

Problem

When SA installs or upgrades the schema in the Oracle database, it puts the database in a *restricted mode*. In Oracle 10g and 11g, the standard listener will reject connections if the database is in a restricted mode. In Oracle 10g and 11g, a database administrator can only access the restricted instance locally from the machine that the instance is running on.

Solution

In Oracle10g and 11g, if the listener has the `SID_LIST_*` paragraph in the `listener.ora` file, then the users with *restricted session* privilege are able to connect to a remote database, even if the database is in restricted more. If the `listener.ora` file does not have the `SID_LIST_*` paragraph, then the listener rejects the client connections and gives an `ORA-12526: TNS: listener: all appropriate instances are in restricted mode error`.

Example: A listener.ora Entry

```
OPSCORE1 =
  (DESCRIPTION_LIST =
    (DESCRIPTION =
      (ADDRESS = (PROTOCOL = TCP)(HOST = opscore1.mycompany.com)(PORT = 1521))
      (ADDRESS = (PROTOCOL = IPC)(KEY = EXTPROC))
    )
  )

SID_LIST_OPSCORE1 =
  (SID_LIST =
    (SID_DESC=
      (SID_NAME=truth)
      (ORACLE_HOME=/u01/app/oracle/product/10.2.0/db_1)
    )
    (SID_DESC =
      (SID_NAME = PLSExtProc)
      (ORACLE_HOME = /u01/app/oracle/product/10.2.0/db_1)
      (PROGRAM = extproc)
    )
  )
)
```

In this example, the listener alias is `OPSCORE1`.

To start, stop, or check the status of the listener, enter the following commands:

```
# su - oracle
```

To start the listener:

```
> lsnrctl start opscore1
```

To stop the listener:

```
> lsnrctl stop opscore1
```

To check the status of the listener:

```
> lsnrctl status opscore1
```

Garbage Collection

The Garbage Collector (GC) is a stored procedure written in PL/SQL that runs in the database on a schedule. The GC procedures look at the `AUDIT_PARAMS` table to determine the retention period to use to delete the old data. The GC PL/SQL procedures are managed by Oracle's `dba_jobs`.



The first run of the Garbage Collection will take longer than subsequent runs. The job now deletes Sessions that have RECURRING sessions correctly and deletes old data increasing the job duration.

Data Retention Period

When GC runs, it looks at the values in the AUDIT_PARAMS table to determine what retention period to use when deleting objects.



The AUDIT_PARAMS table is not replicated, so there is a possibility that these retention periods may become out of synch, which can cause severe Multimaster conflict issues. You must ensure that the values in the AUDIT_PARAMS table are exactly the same for all the cores in a mesh.

```
# Sqlplus "/ as sysdba"
SQL> col name format a20;
SQL> col value format a20;
SQL> col AUDIT_PARAM_ID format a15;
SQL> select AUDIT_PARAM_ID, NAME, VALUE from audit_params;
```

The parameters from AUDIT_PARAMS table and their default values are:

| AUDIT_PARAM_ID | NAME | VALUE | |
|----------------|----------------------|-----------|--|
| 2 | DAYS_WAY | 30 | (These are the completed way sessions) |
| 3 | DAYS_CHANGE_LOG | 180 | (These are the server history events) |
| 4 | LAST_DATE_WAY | 04-APR-09 | |
| 5 | LAST_DATE_CHANGE_LOG | 05-NOV-08 | |
| 6 | DAYS_AUDIT_LOG | 180 | (These are the audit logs) |
| 7 | LAST_DATE_AUDIT_LOG | 05-NOV-08 | |



As of SA 9.0, the DAY_TRAN parameter that controlled retention time for transactions has been removed. To control transaction retention time, instead use the system configuration parameter `vault.garbageCollector.daysToPreserve`.

From the SAS Web Client **Navigation** panel, select **System Configuration > Model Repository Multimaster Component** to change the value for the parameter (the default is 7).

Modifying the Retention Period Values

To update the data, run a SQL command similar to the following example as user LCREP:

```
# Su - oracle
# Sqlplus "/ as sysdba"
SQL> grant create session to lcrep;
SQL> connect lcrep/<password>
SQL> update AUDIT_PARAMS set value=30 where name = 'DAYS_AUDIT_LOG';
```



The values in the AUDIT_PARAMS table must be exactly the same for all the cores in a mesh.

Viewing GC DBA_JOBS

When the Model Repository is installed, the SA Installer sets up these jobs, which perform garbage collection.

GC jobs can be viewed by logging in to SQL*Plus and running the following SQL commands:

```
# Su - oracle
# Sqlplus "/ as sysdba"
SQL> col schema_user format a10
SQL> col what format a50
SQL> set line 200
SQL> select job, schema_user, last_date, this_date, next_date, broken,
what from dba_jobs where priv_user= 'GCADMIN';
```

```
JOB SCHEMA_USE LAST_DATE THIS_DATE NEXT_DATE B WHAT
-----
4 GCADMIN 04-MAY-09 05-MAY-09 N WAYPURGE.GC_SESSIONS;
5 GCADMIN 04-MAY-09 05-MAY-09 N CHANGELOGPURGE.GC_CHANGELOGS;
6 GCADMIN 04-MAY-09 05-MAY-09 N AUDITPURGE.GC_AUDITLOGS;
7 GCADMIN 04-MAY-09 05-MAY-09 N STORAGEINITIATORPURGE.GC_STORAGEINITIATORS;
```

where:

WAYPURGE.GC_SESSIONS - Performs a sessions garbage collection

CHANGELOGPURGE.GC_CHANGELOGS - Performs a changelogs garbage collection

AUDITPURGE.GC_AUDITLOGS - Performs auditlogs garbage collection

STORAGEINITIATORPURGE.GC_STORAGEINITIATORS - Performs storage data garbage collection

Manually Running GC Jobs

You can run GC jobs by logging in to SQL*Plus and entering the following:

```
# Su - oracle
# Sqlplus "/ as sysdba"

SQL> grant create session to gcadmin
SQL> connect gcadmin/<password>
SQL> exec dbms_job.run(<job no>);
```

For example, this sample command runs the waypurge_gc job:

```
SQL> exec dbms_job.run(4);
```

Monitor the ERROR_INTERNAL_MSG Table

The garbage collection jobs write exceptions to the truth.ERROR_INTERNAL_MSG table. You can monitor this table for errors (checking daily is recommended). For example:

```
# Su - oracle
# Sqlplus "/ as sysdba"

SQL> set line 200
SQL> col ERR_ID format 999999
```

```

SQL> col ERR_USER format a8
SQL> col ERR_TABLE format a25
SQL> col ERR_TABLE_PK_ID format a10
SQL> col ERR_CODE format 9999999
SQL> col ERR_TEXT format a20
SQL> col ERR_INFO format a30

SQL> select ERROR_INTERNAL_MSG_ID ERR_ID,
        ERR_DATE,
        ERR_USER,
        ERR_TABLE,
        ERR_TABLE_PK_ID,
        ERR_CODE,
        ERR_TEXT,
        DELETE_FLG,
        ERR_INFO
from ERROR_INTERNAL_MSG
order by ERR_DATE;

```

Database Monitoring Strategy

Because the Model Repository is a critical component of SA, the DBA should implement a monitoring strategy. The DBA can write custom monitoring scripts or use third-party products.

This section contains example commands for monitoring the Oracle database used by the Model Repository. When issuing the commands shown in this section, you must be logged on to the server as the user oracle:

```
$ su - oracle
```

The SQL commands shown in this section are entered in the `sqlplus` command-line utility. To run `sqlplus`, log on as `oracle` and enter the following command:

```
$ sqlplus "/ as sysdba"
```

Verify that the Database Instances are Up and Responding

To verify that the Database Instances are up and running, perform the following steps:

- 1 Check to see if the Oracle processes are running by entering the following command:

```
ps -ef | grep ora_
```

This `ps` command should generate output similar to the following lines:

```

oracle      1883      1  0 Jul24 ?           00:00:00 ora_pmon_truth
oracle      1885      1  0 Jul24 ?           00:00:00 ora_psp0_truth
oracle      1887      1  0 Jul24 ?           00:00:00 ora_mman_truth
oracle      1891      1  0 Jul24 ?           00:00:45 ora_dbw0_truth
oracle      1895      1  0 Jul24 ?           00:01:11 ora_lgwr_truth
oracle      1897      1  0 Jul24 ?           00:00:02 ora_ckpt_truth
oracle      1899      1  0 Jul24 ?           00:00:24 ora_smon_truth
oracle      1901      1  0 Jul24 ?           00:00:00 ora_reco_truth
oracle      1903      1  0 Jul24 ?           00:00:02 ora_cjq0_truth

```



```

oracle    2391      1  0 Jul24 ?          00:00:00 ora_qmnc_truth
oracle    2513      1  0 Jul24 ?          00:00:00 ora_q000_truth
oracle    2515      1  0 Jul24 ?          00:00:00 ora_q001_truth
oracle    18837     1  0 03:04 ?          00:00:00 ora_mmon_truth
oracle    18839     1  0 03:04 ?          00:00:00 ora_mmln_truth
oracle    25184 24635   0 21:35 pts/1      00:00:00 grep ora_

```

- 2 Verify that the database status is ACTIVE by entering the following command in sqlplus:

```
select database_status from v$instance;
```
- 3 Verify that the open mode is READ WRITE by entering the following command in sqlplus:

```
select name, log_mode, open_mode from v$database;
```

Verify that the Data Files are Online

To verify that the data files are online, in SQL*Plus, enter the following commands:

```

Col file_name format a50
Col status format a10
Set line 200
Select file_id, status, bytes, file_name from dba_data_files order by
tablespace_name;

```

The status should be AVAILABLE for all the data files.

Verify That the Listener is Running

To verify that the listener is running, perform the following steps:

- 1 Check to see if the Oracle listener processes are running by entering the following command:

```

ps -ef | grep tns

oracle    1762      1  0 Jul24 ?          00:00:01 /u01/app/oracle/product/
10.2.0/db_1/bin/tnslsnr LISTENER -inherit
oracle    25231 25189   0 21:39 pts/1      00:00:00 grep tns

```

- 2 Check the status of the listener with the lsnrctl command:

```
lsnrctl status
```

The listener should be listening on port 1521 (default), or on the port that you have designated that the Oracle listener process use, with the TCP protocol, and should be handling the instance named truth. The lsnrctl command should generate output similar to the following lines:

```

. . .
Connecting to (ADDRESS=(PROTOCOL=tcp)
(HOST=perl.performance.qa.example.com)(PORT=1521))
. . .
Instance "truth", status READY, has 1 handler(s) for this service...

```

- 3 Test connectivity to the instance from the Data Access Engine (spin) and Web Services Data Access Engine (twist) hosts by running the tnsping utility:

```
tnsping truth
```

The OK statement displayed by the `tnsping` utility confirms that the listener is up and can connect to the instance. The `tnsping` utility should generate output similar to the following lines:

```
. . .
Used parameter files:

Used HOSTNAME adapter to resolve the alias
Attempting to contact
(DESCRIPTION=(CONNECT_DATA=(SERVICE_NAME=truth.performance.qa.example.com
))(ADDRESS=(PROTOCOL=TCP)(HOST=192.168.165.178)(PORT=1521)))
OK (0 msec)
```

```
Attempting to contact
(DESCRIPTION=(ADDRESS=(HOST=localhost)(PORT=1521)(PROTOCOL=tcp))(CONNECT_
DATA=(SERVICE_NAME=truth)))
OK (0 msec)
```

As an alternative to running the `tnsping` utility in this step, you can check the connectivity by running `sqlplus` and connecting to the database instance with the service name (TNS alias), for example:

```
sqlplus myuser/mypass@truth
```

Examine the Log Files

To examine the log files, perform the following steps:

- 1 Look for errors in the `alert.log` file.

For each instance, locate the `alert.log` file in the background dump destination directory:

Oracle 10g

```
$ORACLE_BASE/admin/<SID>/bdump
```

Oracle 11g

```
$ORACLE_BASE/diag/rdbms/<SID>/<SID>/trace/
```

Here is an example `bdump` directory for an instance with the `truth` SID:

Oracle 10g

```
/u01/app/oracle/admin/truth/bdump
```

Oracle 11g

```
/u01/app/oracle/diag/rdbms/truth/truth/trace/
```

- 2 Look for errors in the other log and trace files, located in the following directories:

Oracle 10g

```
$ORACLE_BASE/admin/<SID>/cdump
$ORACLE_BASE/admin/<SID>/adump
$ORACLE_BASE/admin/<SID>/udump
```

Oracle 11g

Various directories under:

Check for Sufficient Free Disk Space in the Tablespaces

To check for sufficient disk space, perform the following steps:

- 1 Enter the following commands in sqlplus:

```
column dummy noprint
column pct_used format 999.9 heading "Pct|Used"
column name format a16 heading "Tablespace Name"
column Kbytes format 999,999,999 heading "Current|File Size|MB"
column used format 999,999,999 heading "Used MB "
column free format 999,999,999 heading "Free MB"
column largest format 999,999,999 heading "Largest|Contiguous|MB"
column max_size format 999,999,999 heading "Max Possible|MB"
column pct_max_used format 999.999 heading "Pct|Max|Used"
break on report
compute sum of kbytes on report
compute sum of free on report
compute sum of used on report

select nvl(b.tablespace_name,
          nvl(a.tablespace_name,'UNKOWN')) name,
       kbytes_alloc Kbytes,
       kbytes_alloc-nvl(kbytes_free,0) used,
       nvl(kbytes_free,0) free,
       ((kbytes_alloc-nvl(kbytes_free,0))/
        kbytes_alloc)*100 pct_used,
       nvl(largest,0) largest,
       nvl(kbytes_max,kbytes_alloc) Max_Size,
       ((kbytes_alloc-nvl(kbytes_free,0))/kbytes_max)*100 pct_max_used
from ( select sum(bytes)/1024/1024 Kbytes_free,
             max(bytes)/1024/1024 largest,
             tablespace_name
       from sys.dba_free_space
       group by tablespace_name ) a,
     ( select sum(bytes)/1024/1024 Kbytes_alloc,
             sum(decode(maxbytes,0,bytes,maxbytes))/1024/1024 Kbytes_max,
             tablespace_name
       from sys.dba_data_files
       group by tablespace_name
       union all
       select sum(bytes)/1024/1024 Kbytes_alloc,
             sum(decode(maxbytes,0,bytes,maxbytes))/1024/1024 Kbytes_max,
             tablespace_name
       from sys.dba_temp_files
       group by tablespace_name) b
where a.tablespace_name (+) = b.tablespace_name
order by 1
/
```

In the output generated by the preceding commands, compare the numbers under the Used and Free headings.

- 2 To list the existing data, index, and temporary files, enter the following commands in sqlplus:

```
Select file_id, bytes, file_name from dba_data_files;
Select file_id, bytes, file_name from dba_temp_files;
```

- 3 If a tablespace has auto-extended to its maximum size and is running out of disk space, then add new data files by entering the ALTER TABLESPACE command in sqlplus.

The following example commands add data files to four of the tablespaces. For a full list of tablespaces and data files, see the output generated by the commands in the preceding two steps.

```
ALTER TABLESPACE "AAA_DATA"
ADD DATAFILE '/u01/oradata/truth/aaa_data10.dbf'
SIZE 32M AUTOEXTEND ON NEXT 128M MAXSIZE 4000M ;
```

```
ALTER TABLESPACE "AAA_INDX"
ADD DATAFILE '/u02/oradata/truth/aaa_indx11.dbf'
SIZE 32M AUTOEXTEND ON NEXT 128M MAXSIZE 4000M ;
```

```
ALTER TABLESPACE "UNDO"
ADD DATAFILE '/u03/oradata/truth/undo12.dbf' SIZE 32M AUTOEXTEND ON NEXT
128M MAXSIZE 4000M ;
```

```
ALTER TABLESPACE "TEMP" ADD
TEMPFILE '/u04/oradata/truth/temp14.dbf' SIZE 32M AUTOEXTEND ON NEXT 128M
MAXSIZE 4000M ;
```

Verify that the Database Jobs (System/Schema Statistics and Garbage Collection) Ran Successfully

When the Model Repository is installed, the SA Installer sets up the System/Schema Statistics and the Garbage Collection jobs in Oracle's dba_jobs. dba_jobs runs these jobs at specified time-intervals. The jobs perform system/schema statistics collection and garbage collection. If the system/schema statistics collection jobs do not run successfully, database performance will degrade. If the garbage collection jobs do not run, then old data will accumulate requiring additional disk space. Performance can also be affected.

To verify that the Jobs in DBA_JOBS ran successfully, perform the following steps:

- 1 Enter the following commands in SQL*Plus:

```
# Su - oracle
# Sqlplus "/ as sysdba"
SQL> set line 200
SQL> col priv_user format a14
SQL> col last format a17
SQL> col next format a17
SQL> col this format a17
SQL> col what format a50
SQL> col broken format a1
```

```
SQL> select job, priv_user, to_char(LAST_DATE, 'MM/DD/YY HH:MI:SS') last,
to_char(NEXT_DATE, 'MM/DD/YY HH:MI:SS') next, broken, what from dba_jobs;
```

In the output generated from the preceding statement, the value of the WHAT column indicates the type of job. If the value of WHAT is DBMS_STATS* or GATHER_*, the job performs statistics collection. The jobs owned by GCADMIN perform the garbage collection. Sample output looks like this:

```

JOB PRIV_USER          LAST                NEXT                B WHAT
-----
21 TRUTH              05/04/09 11:00:03 05/06/09 11:00:00 N DBMS_STATS.GATHER_SCHEMA_STATS(ownname=>'TRUTH', estimate_percent=>dbms_stats.auto_sample_size, degree=>10, method_opt=>'FOR ALL COLUMNS SIZE AUTO', options=>'GATHER', cascade=>TRUE, gather_temp=>TRUE);

22 AAA                05/04/09 11:00:03 05/06/09 11:00:00 N DBMS_STATS.GATHER_SCHEMA_STATS(ownname=>'AAA', estimate_percent=>dbms_stats.auto_sample_size, degree=>10, method_opt=>'FOR ALL COLUMNS SIZE AUTO', options=>'GATHER', cascade=>TRUE, gather_temp=>TRUE);

23 LCREP              05/04/09 11:00:03 05/06/09 11:00:00 N gather_lcrep_stats;
24 GCADMIN            05/05/09 09:00:04 05/06/09 09:00:00 N WAYPURGE.GC_SESSIONS;
25 GCADMIN            05/05/09 09:00:04 05/06/09 09:00:00 N CHANGELOGPURGE.GC_CHANGELOGS;
26 GCADMIN            05/05/09 09:00:04 05/06/09 09:00:00 N AUDITPURGE.GC_AUDITLOGS;
27 GCADMIN            05/05/09 05:25:08 05/05/09 06:25:08 N STORAGEINITIATORPURGE.GC_STORAGEINITIATORS;
28 OPSWARE_ADMIN       05/04/09 06:00:02 05/11/09 06:00:00 N DBMS_STATS.GATHER_SYSTEM_STATS(gathering_mode=>'INTERVAL', interval=>30);

```

8 rows selected.

where:

JOB - job id

SCHEMA_USER - the user who with permissions to run the job

LAST_DATE - last date-time when the job was run

NEXT_DATE - next date the job will run

BROKEN - value N = job was successful, value = Y - job failed

WHAT - the type of job

Changes to the Database Statistics Job

The following changes have been made to the database statistics collection jobs. These jobs can be found in the dba_jobs table. These changes are only relevant to upgraded SA Cores.

To view the jobs you can run the following from SQL*plus

```

# Su - oracle
# Sqlplus "/ as sysdba"
set line 200
col priv_user format a14
col what format a50
col job format 999
select job, priv_user, what from dba_jobs where priv_user in ('AAA','TRUTH');

```

Your output should be as follows:

SA 7.50:

```

## TRUTH DBMS_STATS.GATHER_SCHEMA_STATS(ownname=>'TRUTH', options=>'GATHER AUTO');
## AAA   DBMS_STATS.GATHER_SCHEMA_STATS(ownname=>'AAA', options=>'GATHER AUTO');

```

SA 7.80 and above:

```

## TRUTH DBMS_STATS.GATHER_SCHEMA_STATS(ownname=>'TRUTH',
estimate_percent=>dbms_stats.auto_sample_size,
degree=>10, method_opt=>'FOR ALL COLUMNS SIZE AUTO',
options=>'GATHER', cascade=>TRUE, gather_temp=>TRUE);

```

```
## AAA  DBMS_STATS.GATHER_SCHEMA_STATS(ownname=>'AAA',
estimate_percent=>dbms_stats.auto_sample_size,
degree=>10, method_opt=>'FOR ALL COLUMNS SIZE AUTO',
options=>'GATHER', cascade=>TRUE, gather_temp=>TRUE);
```

Backups of the dba_jobs.what information Table

During the SA 9.0 Model Repository Guide upgrade, the SA 7.50 dba_jobs.what information table is backed up and then replaced by the SA 7.8 dba_jobs.what table. You can view the backed up information by logging in to SQL*Plus and entering the following commands:

```
# Su - oracle
# Sqlplus "/ as sysdba"
SQL> set line 200
SQL> col ERR_ID format 999999
SQL> col ERR_USER format a8
SQL> col ERR_TABLE format a10
SQL> col ERR_TABLE_PK_ID format a10
SQL> col ERR_CODE format 9999999
SQL> col ERR_TEXT format a20
SQL> col ERR_INFO format a30

SQL> select ERROR_INTERNAL_MSG_ID ERR_ID,
SQL> ERR_DATE,
SQL> ERR_USER,
SQL> ERR_TABLE,
SQL> ERR_TEXT,
SQL> ERR_INFO
SQL> from ERROR_INTERNAL_MSG where ERR_TEXT = 'SA7.8 Model Repository Upgrade'
order by ERR_DATE;
```

Output will look similar to the following:

| ERR_ID | ERR_DATE | ERR_USER | ERR_TABLE | ERR_TEXT | ERR_INFO |
|--------|-----------|----------|-----------|--------------------------------|--|
| 6 | 07-MAY-09 | TRUTH | DBA_JOBS | SA7.8 Model Repository Upgrade | Pre SA7.8 dba_jobs.what value was: DBMS_STATS.GATHER_SCHEMA_STATS(ownname=>'TRUTH', options=>'GATHER AUTO'); |
| 5 | 07-MAY-09 | AAA | DBA_JOBS | SA7.8 Model Repository Upgrade | Pre SA7.8 dba_jobs.what value was: DBMS_STATS.GATHER_SCHEMA_STATS(ownname=>'AAA', options=>'GATHER AUTO'); |

Running the dba_jobs manually

If you need to run the System/Schema Statistics and the Garbage Collection jobs manually, you must first grant the following privilege.

```
SQL> grant create session to truth, aaa, lcrep;
```

To run the statistics collection jobs manually in SQL*Plus, use the commands shown below.

If you copy and paste the following command examples, replace the variables like schema_user_value with the values of the schema_user column displayed by the preceding select statement. Substitute the variables such as job_no_value with the values of the job column displayed by the same select statement.

```
SQL> connect <schema_user_value>/<password>
SQL> exec dbms_job.run(<job_no_value>)
```

After you are done running the jobs, you should revoke the privileges granted above. Log in to SQL*Plus and enter the following command:

```
SQL> revoke create session from truth, aaa, lcrep;
```

Changing the Time Jobs are Run

dba_jobs are run at UTC time. To change the time at which the jobs are run, follow these instructions:

```
sqlplus "/ as sysdba"
set line 300
col what format a40
col next format a17
col last format a17
col interval format a30
col priv_user format a10
```

```
select job,broken, priv_user,to_char(last_date,'MM-DD-YY HH:MI:SS') last,
to_char(next_date,'MM-DD-YY HH:MI:SS') next , interval, what from dba_jobs;
```

The above statement provides information about a job. Note the job number and the user that has the privilege to run this job.

The output of the above statement is similar to the following (formatting is compressed due to space limitations):

| JOB | BRO | PRIV_USER | LAST | NEXT | INTERVAL | WHAT |
|-----|-----|------------|-------------------|-------------------|--|---|
| 90 | N | LCREP | 10-25-07 11:00:05 | 10-27-07 11:00:00 | TRUNC(SYSDATE+2)+11/24 | gather_lcrep_stats; |
| 92 | N | TRUTH | 10-25-07 11:00:05 | 10-27-07 11:00:00 | TRUNC(SYSDATE+2)+11/24 | DBMS_STATS.GATHER_SCHEMA_STATS(ownname=>'TRUTH', options=>'GATHER AUTO'); |
| 91 | N | AAA | 10-25-07 11:00:05 | 10-27-07 11:00:00 | TRUNC(SYSDATE+2)+11/24 | DBMS_STATS.GATHER_SCHEMA_STATS(ownname=>'AAA', options=>'GATHER AUTO'); |
| 93 | N | GCADMIN | 10-25-07 09:00:03 | 10-26-07 09:00:00 | TRUNC(SYSDATE+1)+9/24 | TRANPURGE.GC_TRANSACTIONS; |
| 94 | N | GCADMIN | 10-25-07 09:00:03 | 10-26-07 09:00:00 | TRUNC(SYSDATE+1)+9/24 | WAYPURGE.GC_SESSIONS; |
| 95 | N | GCADMIN | 10-25-07 09:00:03 | 10-26-07 09:00:00 | TRUNC(SYSDATE+1)+9/24 | CHANGELOGPURGE.GC_CHANGELOGS; |
| 96 | N | GCADMIN | 10-25-07 09:00:03 | 10-26-07 09:00:00 | TRUNC(SYSDATE+1)+9/24 | AUDITPURGE.GC_AUDITLOGS; |
| 97 | N | GCADMIN | 10-25-07 06:18:45 | 10-25-07 07:18:45 | SYSDATE+1/24 | STORAGEINITIATORPURGE.GC_STORAGEINITIATORS; |
| 98 | N | OPSWARE_AD | 10-22-07 06:00:00 | 10-29-07 06:00:00 | TRUNC(SYSDATE+1) + 18/24 + mod | DBMS_STATS.GATHER_SYSTEM_STATS(gathering |
| | | MIN | | | (abs(to_number(to_char(sysdate '_mode=>'INTERVAL', interval=>30); + 1,'D')) - 7) + 2, 7) | |

9 rows selected.

In this example user truth changes the time/interval at which the job is run. Any other user can be substituted for user truth.

```
sqlplus "connect / as sysdba"
SQL> grant create session to truth;
Grant succeeded.
```

In the example:

- job no=92

- `priv_user = truth`

Job 92 is currently running at 9:00a.m. UTC time. To change this to 7:00a.m. UTC time, the command is:

```
SQL> connect truth/<password_for_truth>
Connected.
SQL> exec dbms_job.interval(92,'TRUNC(SYSDATE+2)+7/24');
```

Monitor Database Users

To monitor database users, perform the following steps:

- 1 To check the database users, enter the following command in sqlplus:

```
Select username, account_status, default_tablespace,
temporary_tablespace from dba_users;
```

Monitoring the ERROR_INTERNAL_MSG Table

Various SA internal PL/SQL procedures write exceptions to the `truth.ERROR_INTERNAL_MSG` table. You should monitor this table for errors (daily checks are recommended) on all Model Repository (Oracle) databases.

Executing the SQL below lists the data in `error_internal_msg` from the last fifteen days.



You can remove the `WHERE` clause if you want to display all data in the `truth.ERROR_INTERNAL_MSG` table.

```
# Su - oracle
# Sqlplus "/" as sysdba
SQL> set line 200
SQL> col ERR_ID format 999999
SQL> col ERR_USER format a8
SQL> col ERR_TABLE format a25
SQL> col ERR_TABLE_PK_ID format a10
SQL> col ERR_CODE format 9999999
SQL> col ERR_TEXT format a20
SQL> col ERR_INFO format a30

SQL> select ERROR_INTERNAL_MSG_ID ERR_ID,
ERR_DATE,
ERR_USER,
ERR_TABLE,
ERR_TABLE_PK_ID,
ERR_CODE,
ERR_TEXT,
DELETE_FLG,
ERR_INFO
from ERROR_INTERNAL_MSG
where ERR_DATE > sysdate - 15
order by ERR_DATE;
```


Rebuilding the SHADOW_FOLDER_UNIT Table

The procedure SHADOW_FOLDER_UNIT_RELOAD is provided in case the contents of SHADOW_FOLDER_UNIT table becomes out of synchronization or there are multiple records of the type (shadow_folder_unit.folder_id = -1).

The table can be rebuilt without stopping the system. Simply connect as user TRUTH, TWIST, SPIN, or OPSWARE_ADMIN and issue the command:

```
exec SHADOW_FOLDER_UNIT_UTIL.SHADOW_FOLDER_UNIT_RELOAD
```

Check the results from monitoring the ERROR_INTERNAL_MSG table. If the results contain:

```
'ERR_TABLE' = 'UNIT_RELATIONSHIPS'
```

do the following:

- 1 Check if there are records in truth.SHADOW_FOLDER_UNIT of the type (folder_id = -1).

```
SQL> connect / as sysdba
```

```
SQL> select count(*) from shadow_folder_unit where folder_id = -1;
```

- 2 If the above SQL returns more than zero rows, then run the following during low database usage time:

```
SQL> grant create session to truth;
```

```
SQL> connect truth/<password>
```

```
SQL> exec SHADOW_FOLDER_UNIT_UTIL.SHADOW_FOLDER_UNIT_RELOAD;
```

- 3 Run the SQL from [Monitoring the ERROR_INTERNAL_MSG Table](#) on page 212 and check if the procedure has listed any faulty records. SHADOW_FOLDER_UNIT_UTIL.SHADOW_FOLDER_UNIT_RELOAD is idem potent therefore the faulty records can be fixed and you can rerun SHADOW_FOLDER_UNIT_UTIL.SHADOW_FOLDER_UNIT_RELOAD.

HP recommends that you gather table statistics after the data reload:

```
SQL> connect truth/<password>
```

```
SQL> exec dbms_stats.gather_table_stats (  
    ownname=> 'TRUTH',  
    tabname=> 'SHADOW_FOLDER_UNIT',  
    estimate_percent=> DBMS_STATS.AUTO_SAMPLE_SIZE,  
    cascade => true);
```

- 4 Revoke the permissions given to user truth:

```
SQL> connect / as sysdba
```

```
SQL> revoke create session to truth;
```

Troubleshooting System Diagnosis Errors

If an additional privilege (permission) has been made manually to the database, when SA performs a system diagnosis on the Data Access Engine, an error message might be generated. For example, if an additional grant has been made to the truth.facilities table, the following error appears:

```
Test Information
```

```
Test Name: Model Repository Schema
```

```
Description: Verifies that the Data Access Engine's version of the schema  
matches the Model Repository's version.
```

```
Component device: Data Access Engine (spin.blue.qa.example.com)
Test Results: The following tables differ between the Data Access Engine
and
the Model Repository: facilities.
```

To fix this problem, revoke the grant. For example, if you need to revoke a grant on the `truth.facilities` table, log on to the server with the database and enter the following commands:

```
su - oracle
sqlplus "/ as sysdba"
grant create session to truth;
connect truth/<truth passwd>;
revoke select on truth.facilities from spin;
exit
sqlplus "/ as sysdba"
revoke create session from truth;
```

Oracle Database Backup Methods

It is important that you back up the database on a regular basis. Be sure to use more than one backup method and to test your recovery process.

You can use the following methods to back up the Oracle database:

- **Export-Import:** An export extracts logical definitions and data from the database and writes the information to a file. Export-import does not support point-in-time recoveries. Do not use Export-Import as your only backup and recovery strategy.

See the information on the `Export-Import` subdirectory in [Oracle/SA Installation Scripts, SQL Scripts, and Configuration Files](#) on page 181.

- **Cold or Off-Line Backups:** This procedure shuts the database down and backs up all data, index, log, and control files. Cold or off-line backups do not support point-in-time recoveries.
- **Hot or Online Backups:** During these backups, the database must be available and in ARCHIVELOG mode. The tablespaces are set to backup mode. This procedure backs up tablespace files, control files, and archived redo log files. Hot or online backups support point-in-time recoveries.
- **RMAN Backups:** While the database is either off-line or on-line, use the `rman` utility to back up the database.

Regardless of your backup strategy, remember to back up all required Oracle software libraries, parameter files, password files, and so forth. If your database is in ARCHIVELOG mode, you also need to back up the archived log files.

For more information on backing up Oracle databases, see the following Oracle documents:

- *Oracle Database 2 Day DBA*
- *Oracle Database Concepts*
- *Oracle Database Administrator's Guide*

These guides are on the Oracle web site at the following URL:

```
http://www.oracle.com/technology/documentation/index.html
```

Useful SQL

The following SQL commands help you manage information in the Oracle database that the Model Repository uses.

Locked and Unlocked User

A user in Oracle 10.2.0.2 will be locked out after ten unsuccessful log on attempts.

To verify whether the user has been locked or unlocked, enter the following SQL command:

```
select username, account_status from dba_users;
```

To unlock the user, enter the following SQL command:

```
>ALTER USER <username> ACCOUNT UNLOCK;
```

GATHER_SYSTEM_STATS

Sometimes the GATHER_SYSTEM_STATS job will be suspended. To remove this from 'AUTOGATHERING' mode, perform the following steps:

- 1 Select PNAME, pval2 from SYS.AUX_STATS\$ where pname = 'STATUS' ; .
- 2 If the PVAL2 status is "AUTOGATHERING", run GATHER_SYSTEM_STATS with gathering_mode=('STOP') ; .
- 3 Run your job 'exec dbms_job.run(xxx) ; .

BIN\$ Objects

If the SA Installer discovers the existence of BIN\$ objects in the database, enter the following SQL commands:

```
show parameter recyclebin;

SELECT owner,original_name,operation,type FROM dba_recyclebin;
connect <owner>/password
purge recyclebin; or purge table BIN$xxx;
```

By default, recyclebin is set to OFF.

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