

Veritas Storage Foundation[™] Installation Guide

Linux

5.0

Veritas Storage Foundation Installation Guide

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Storage Foundation 5.0

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Veritas Volume Manager is a licensed product. See the *Veritas Storage Foundation Installation Guide* for license installation instructions.

Technical support

For technical assistance, visit <http://support.veritas.com> and select phone or email support. Use the Knowledge Base search feature to access resources such as TechNotes, product alerts, software downloads, hardware compatibility lists, and our customer email notification service.

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Preinstallation instructions

Topics covered in this chapter include:

- [“Veritas Storage Foundation product suites”](#) on page 10
- [“General installation requirements”](#) on page 12
- [“Preinstallation instructions”](#) on page 14
- [“Persistent network interface names on SUSE clusters”](#) on page 17
- [“Accessing Storage Foundation commands”](#) on page 17
- [“Accessing manual pages and documentation directories”](#) on page 18

Follow the preinstallation instructions outlined in this chapter if you are installing one of the following Veritas Storage Foundation products by Symantec:

- Veritas Storage Foundation (Standard, Enterprise, Enterprise HA Editions)
- Veritas Storage Foundation for DB2 (Standard, Enterprise, Enterprise HA Editions)
- Veritas Storage Foundation for Oracle (Standard, Enterprise, Enterprise HA Editions)

Note: If you are installing Veritas Volume Replicator, see the *Veritas Volume Replicator Installation Guide* on the product disc. The *Veritas Volume Replicator Installation Guide* explains how to install the product and directs you to the Veritas Volume Replicator documentation.

Review the information in these sections and make any changes that are required to your system before you install Veritas Storage Foundation, Veritas Storage Foundation for DB2, or Veritas Storage Foundation for Oracle.

Veritas Storage Foundation product suites

The following table lists the Symantec products and optionally licensed features available with each Veritas Storage Foundation product suite.

Table 1-1 Contents of Veritas Storage Foundation products

Storage Foundation version	Products and features
Storage Foundation Basic	Veritas File System Veritas Volume Manager
Storage Foundation Standard	Veritas File System Veritas Volume Manager Optionally licensed features: Veritas Volume Replicator
Storage Foundation Standard HA	Veritas File System Veritas Volume Manager Veritas Cluster Server Optionally licensed features: Veritas Volume Replicator
Storage Foundation Enterprise	Veritas File System Veritas Volume Manager Optionally licensed features: Veritas Volume Replicator
Storage Foundation Enterprise HA	Veritas File System Veritas Volume Manager Veritas Cluster Server Optionally licensed features: Veritas Volume Replicator
Storage Foundation for DB2 Standard	Veritas File System Veritas Volume Manager Veritas Quick I/O option Optionally licensed features: Veritas Volume Replicator

Table 1-1 Contents of Veritas Storage Foundation products

Storage Foundation version	Products and features
Storage Foundation for DB2 Enterprise	Veritas File System Veritas Volume Manager Veritas Quick I/O option Veritas Storage Checkpoint option Veritas Storage Mapping option Optionally licensed features: Veritas Volume Replicator
Storage Foundation for DB2 Enterprise HA	Veritas File System Veritas Volume Manager Veritas Cluster Server Veritas Quick I/O option Veritas Storage Checkpoint option Veritas Storage Mapping option Optionally licensed features: Veritas Volume Replicator
Storage Foundation for Oracle Standard	Veritas File System Veritas Volume Manager Veritas Quick I/O option Veritas Extension for Oracle Disk Manager option Optionally licensed features: Veritas Volume Replicator
Storage Foundation for Oracle Enterprise	Veritas File System Veritas Volume Manager Veritas Quick I/O option Veritas Extension for Oracle Disk Manager option Veritas Storage Checkpoint option Veritas Storage Mapping option Optionally licensed features: Veritas Volume Replicator

Table 1-1 Contents of Veritas Storage Foundation products

Storage Foundation version	Products and features
Storage Foundation for Oracle Enterprise HA	Veritas File System Veritas Volume Manager Veritas Cluster Server Veritas Quick I/O option Veritas Extension for Oracle Disk Manager option Veritas Storage Checkpoint option Veritas Storage Mapping option Optionally licensed features: Veritas Volume Replicator

Note: If you are installing Veritas Volume Replicator, see the *Veritas Volume Replicator Installation Guide* on the product disc. The *Veritas Volume Replicator Installation Guide* explains how to install the product and directs you to the Veritas Volume Replicator documentation.

General installation requirements

Before installing Veritas Storage Foundation, read the following sections to make sure you understand and comply with the basic requirements of the software.

Centralized management considerations

Veritas Storage Foundation Management Server by Symantec ties together the Storage Foundation product offerings to ensure that the hosts in your data center use storage as efficiently as possible. You can use it to centrally monitor, visualize, and manage Storage Foundation hosts and generate reports about the hosts and the storage resources they consume.

The central console seamlessly integrates a wide range of management tasks like monitoring and reporting.

SF Management Server also offers customizable policy-based management that helps you automate:

- notification
- recovery
- other user-definable actions

SF Management Server is not available on the Storage Foundation and High Availability Solutions release and must be obtained separately. For information on ordering SF Management Server, visit:

<http://www.symantec.com/enterprise/sfms>

Symantec product licensing

This product includes a License Key certificate. The certificate specifies the product keys and the number of product licenses purchased. A single key lets you install the product on the number and type of systems for which you purchased the license. A key may enable the operation of more products than are specified on the certificate; however, you are legally limited to the number of product licenses purchased.

The product installation procedure describes how to activate the key. If you encounter problems while licensing this product, visit the Symantec licensing support website at:

<http://www.veritas.com/buy/vLicense/vLicenseHome.jhtml>

The VRTSvlic package enables product licensing. After the VRTSvlic is installed, the following commands and their manual pages are available on the system:

- `vxlicinst` Installs a license key for a Symantec product
- `vxlicrep` Displays currently installed licenses
- `vxlictest` Retrieves features and their descriptions encoded in a license key

Even though other products are included on the enclosed software discs, you can only install the Symantec software products for which you have purchased a license.

Supported Linux operating systems

The Veritas 5.0 release operates on the following operating systems and hardware:

- Red Hat Enterprise Linux 4 (RHEL 4) with Update 3 (2.6.9-34 kernel) on AMD Opteron or Intel Xeon EM64T (x86_64).
- SUSE Linux Enterprise Server 9 (SLES 9) with SP3 (2.6.5-7.244, 252 kernels) on AMD Opteron or Intel Xeon EM64T (x86_64).

Note: If your system is running an older version of either Red Hat Enterprise Linux or SUSE Linux Enterprise Server, you must upgrade it before attempting to install the Veritas Storage Foundation software. Consult the Red Hat or SUSE documentation for more information on upgrading or reinstalling your system.

Read the following Veritas Technical Support TechNote for the latest information on updates, patches, and software issues regarding this release:

<http://support.veritas.com/docs/277033>

Database requirements

The table identifies supported database and Linux combinations if you plan to use Veritas Storage Foundation for DB2 or Veritas Storage Foundation for Oracle.

Table 1-2 Supported database and Linux combinations

Database	Red Hat Enterprise Linux 4 (RHEL 4) with Update 3	SUSE Linux Enterprise Server 9 (SLES 9) with SP3
DB2		
8.2 (also referred to as DB2 8.1 with FixPak 7)	Yes	Yes
Oracle		
9.2.0.6	Yes	Yes
10g	Yes	Yes
10gR2	Yes	Yes

Preinstallation instructions

Review the following items and make any appropriate changes *before* you install the Veritas Storage Foundation software:

- Review the *Veritas Storage Foundation Release Notes*, `sf_notes.pdf` located on the Veritas software disc under the `storage_foundation/release_notes` directory.

Because product release notes and installation guides are not installed by any packages, Veritas recommends that you copy them from the software disc to the `/opt/VRTS/docs` directory so that they are available for future reference.

- The `VRTSspt` package provides a group of tools for troubleshooting a system and collecting information on its configuration. The tools can gather Veritas File System and Veritas Volume Manager metadata information and establish various benchmarks to measure file system and volume manager performance. The tools are not required for operation of any Veritas product, and they may adversely impact system performance if not used correctly. Veritas provides these tools to analyze systems if you suspect that there are performance problems. The tools should be used only under the direction of a Veritas Technical Support Engineer.
- To enable Storage Foundation features, obtain a license key. You will be asked to enter your license keys during the installation process. See [“Symantec product licensing”](#) on page 13.

Required disk space

Before installing any of the Veritas Storage Foundation products, confirm that your system has enough free disk space. Use the “Perform a Preinstallation Check” (P) option of the product installer to determine whether there is sufficient space.

The following table shows the approximate disk space used by the Storage Foundation products for all (both the required and optional) packages:

Table 1-3 Required disk space

	Minimum space required (without optional packages)	Maximum space required (including all packages)
Storage Foundation Standard or Enterprise	155MB	275MB
Storage Foundation Standard HA or Enterprise HA	310MB	465MB
Storage Foundation for DB2 Standard or Enterprise	636MB	675MB

Table 1-3 Required disk space

	Minimum space required (without optional packages)	Maximum space required (including all packages)
Storage Foundation for DB2 Standard HA or Enterprise HA	756MB	842MB
Storage Foundation for Oracle Standard or Enterprise	639MB	680MB
Storage Foundation for Oracle Standard HA or Enterprise HA	762MB	848MB

Required memory

A minimum of 1 GB of memory is required.

System disk check

Before installing Veritas Storage Foundation, run the `fdisk -l` command and review the output to verify that all disks installed on the system are visible to the operating system and functioning correctly. Correct any problems before you install the Storage Foundation software.

Prerequisites for remote and cluster installation and uninstallation

Establishing communication between nodes is required to install Veritas software from a remote system, or to install and configure a cluster. The node from which the installation utility is run must have permissions to run `rsh` (remote shell) or `ssh` (secure shell) utilities as `root` on all cluster nodes or remote systems. Remote shell utilities on Linux are disabled by default.

See *Veritas Storage Foundation and High Availability Solutions Getting Started Guide*.

Release Notes

Read the *Release Notes* for all products included with this product. Portable Document Format (.pdf) versions of the *Release Notes* are included on the software disc in the `storage_foundation/release_notes` directory and on the documentation disc that came with your software.

Because product *Release Notes* are not installed by any packages, it is recommended that you copy them from the disc to the `/opt/VRTS/docs` directory on your system so that they are available for future reference.

Persistent network interface names on SUSE clusters

On SUSE systems, network interfaces can change their names following a reboot. To configure persistent network interface names, add a `PERSISTENT_NAME=ethX` entry to the `/etc/sysconfig/network/ifcfg-eth-id-mac_address` network interface configuration file for each interface on each node of the cluster, where `X` and `mac_address` correspond to the interface number and MAC address.

Accessing Storage Foundation commands

Symbolic links to all Storage Foundation command executables are installed in the `/opt/VRTS/bin` directory. Add the `/opt/VRTS/bin` directory to your `PATH` environment variable to access the commands.

Note: Specify `/opt/VRTS/bin` in your `PATH` after the path to the standard Linux commands. To invoke the VxFS-specific `df`, `fsdb`, `ncheck`, or `umount` commands, type the full path name: `/opt/VRTS/bin/command`.

Most of the commands used in the installation are in the `/sbin` or `/usr/sbin` directory. Add these directories to your `PATH` environment variable as shown below. For shells similar to the Bourne Shell (`bash`, `ksh` or `sh`), use the command:

```
# PATH=/sbin:/usr/sbin:$PATH; export PATH
```

For shells similar to the C Shell (`csh` or `tcsh`), use the command:

```
% setenv PATH /sbin:/usr/sbin:${PATH}
```

Accessing manual pages and documentation directories

Volume Manager manual pages are in the `VRTSvmman` package. Veritas File System manual pages are in the `VRTSfsman` package. Veritas Storage Foundation *for DB2* manual pages are in the `VRTSdb2ed` package. Manual pages are installed in the `/opt/VRTS/man` directories. Set the path of your `MANPATH` environment variable to include `/opt/VRTS/man`.

If you are using a shell such as `sh` or `bash`, do the following:

```
$ MANPATH=$MANPATH:/opt/VRTS/man; export MANPATH
```

If you are using a shell such as `csh` or `tcsh`, do the following:

```
% setenv MANPATH ${MANPATH}:/opt/VRTS/man
```

On a Red Hat system, also include the `1m` manual page section in the list defined by your `MANSECT` environment variable.

If you are using a shell such as `sh` or `bash`, do the following:

```
$ MANSECT=$MANSECT:1m; export MANSECT
```

If you are using a shell such as `csh` or `tcsh`, do the following:

```
% setenv MANSECT ${MANSECT}:1m
```

Installation of the documentation packages copies PDF files into the `/opt/VRTS/docs` directory.

Note: If you use the `man(1)` command to access manual pages, set `LC_ALL=C` in your shell to ensure that they display correctly.

Installing the Veritas Storage Foundation software

Topics covered in this chapter include:

- [“Installation requirements”](#) on page 20
- [“Installing the product”](#) on page 20
- [“Verifying the Veritas Storage Foundation installation”](#) on page 29
- [“Veritas Enterprise Administrator \(VEA\)”](#) on page 32
- [“Configuring Veritas Volume Manager”](#) on page 35
- [“Loading and unloading the file system module”](#) on page 35
- [“Creating and configuring the repository database for DB2 and Oracle”](#) on page 36

This chapter provides an overview of the installation tasks for Veritas Storage Foundation, Veritas Storage Foundation for DB2, and Veritas Storage Foundation for Oracle and describes how to install the packages for the first time. If you already have an earlier version of any of the Veritas products installed, see [“Upgrading Veritas Storage Foundation and Linux”](#) on page 57.

Note: Only users with superuser privileges can install and initialize Storage Foundation.

Installation requirements

Review the following Veritas software and operating system requirements before installing the product.

About mapping services and performance statistics for databases

- You must install Veritas Array Integration Layer (VAIL), Generic Array for Mapping Services by Symantec (VRTSgapms), and Veritas Mapping Services (VxMS) if you want to use deep mapping services and performance statistics for supported storage arrays.
- Install the EMC Solutions Enabler (SYMCLI) before you install VAIL. If you install Solutions Enabler after you install VAIL, rescan the EMC Symmetrix arrays so that they can be discovered.
See the *Veritas Storage Foundation DB2 Administrator's Guide*.
See the *Veritas Storage Foundation Oracle Administrator's Guide*.

About the operating system

If patches to the Linux operating system are required, the patches should be applied just prior to installing the Veritas products. Patches may be required to resolve Linux kernel, product performance, or other issues.

The system should be in a quiescent state before adding patches.

Note: See product *Release Notes* for last minute information on patches required for Veritas, Linux, or DB2 (IBM).

Installing the product

The Veritas product installer is the recommended method to license and install the product. The installer also enables you to configure or uninstall the product, verify preinstallation requirements, and view the product's description.

At most points during an installation, you can type "**b**" ("**back**") to return to a previous section of the installation procedure. The **back** feature of the installation scripts is context-sensitive, so it returns to the beginning of a grouped section of questions. If an installation procedure hangs, use Control-c to stop and exit the program. There is a short delay before the script exits.

The following sample procedure is based on the installation of a Storage Foundation for DB2 Enterprise HA cluster with two nodes: "host1" and "host2." The nodes are Intel Xeon EM64T systems running under Red Hat Enterprise

Linux 4 Update 3. If you are installing on standalone systems only, the cluster-configuration steps are unnecessary, and these are indicated. Default responses are enclosed by parentheses. Press Return to accept defaults.

Note: Veritas Storage Foundation Enterprise HA will install similarly, without the database packages.

To install a Storage Foundation product

- 1 Log in as superuser.
- 2 Place the Veritas software disc into a DVD drive connected to your system.
- 3 After inserting the software disc, type the following command:

```
# mount -o ro /dev/cdrom /media/cdrom
```
- 4 Move to the top-level directory on the disc:

```
# cd /mnt/dvdrom
```
- 5 From this directory, type the following command if you are installing on the local system only, or if you are using the secure shell (SSH) utilities to install on remote systems:

```
# ./installer
```

If you are using the remote shell (RSH) utilities to install on remote systems, additionally specify the `-rsh` option:

```
# ./installer -rsh
```

The sample installation assumes that SSH is being used.
- 6 Enter **I** to install a product and press Return to begin.
- 7 When the list of available products is displayed, select the product you want to install and enter the corresponding number and press Return.
The product installation begins automatically.
- 8 You are prompted to enter the systems names (in the following example, “host1” and “host2”) on which the software is to be installed. Enter the system name or names and then press Return.

```
Enter the system names separated by spaces on which to
install product_name: host1 host2
```

- 9 Enter the product license information.

```
Enter a product_name license key for host1: [?] XXXX-XXXX
-XXXX-XXXX-XXXX-XXXX-X
XXXX-XXXX-XXXX-XXXX-XXXX-XXXX-X successfully registered on
host1
Do you want to enter another license key for host1? [y,n,q,?]
(n)
Enter a product_name license key for host2: [?] XXXX-XXXX
-XXXX-XXXX-XXXX-XXXX-X
```

```
XXXX-XXXX-XXXX-XXXX-XXXX-XXXX-X successfully registered on  
host2  
Do you want to enter another license key for host2? [y,n,q,?]  
(n)
```

Enter **n** if you have no further license keys to add for a system. You are then prompted to enter the keys for the next system.

Note: Each system requires a product license before installation. License keys for additional product features should also be added at this time.

- 10** You can choose to either install only required packages or all packages. Each option displays the disk space required for installation. Select which option you want to install and press Return. For example, you should see output similar to the following:

```
SF can be installed without optional filesets to conserve  
diskspace. Additional filesets are typically installed to  
simplify future upgrades.
```

- ```
1) Required Veritas Storage Foundation filesets - 928 MB
 required
2) All Veritas Storage Foundation filesets - 1063 MB
 required
```

```
Select the filesets to be installed on all systems? [1-
2,q,?] (2)
```

---

**Note:** If you are installing Veritas Storage Foundation for Oracle, do not select the “Storage Foundation for Oracle RAC packages” option unless you have the correct license or setup.

---

- 11** Reboot the system.
- 12** If you are installing on a cluster, you must configure the cluster. See [“Configuring Storage Foundation on a cluster”](#) on page 23. If you are not installing on a cluster, you can complete the installation procedure. See [“Completing the installation procedure”](#) on page 27.

## Configuring Storage Foundation on a cluster

---

**Note:** The procedure in this section is only relevant if you are installing an HA version of the Storage Foundation software.

---

As the installation and configuration procedure continues, a message displays notifying you that configuring the Storage Foundation product at this point in the installation procedure is optional.

### To configure Storage Foundation on a cluster

- 1 To invoke the common installer, run the `installer` command on the disc as shown in this example:

```
cd /dvdrom
./installer
```

- 2 At the product status page, enter **C** for the Configure an Installed Product and press Return. The product installer is displayed.

- 3 You are prompted to enter the system names (in the following example, “host1” and “host2”) on which the software is to be installed. Enter the system name or names and then press Return.

```
Enter the system names separated by spaces on which to install
product_name: host1 host2
```

- 4 At the following prompt, enter **y** or press Return to configure the Storage Foundation product.

```
Are you ready to configure product_name? [y,n,q] (y) y
You have a VCS license and you are installing product_name
HA.
```

- 5 When prompted to configure VCS, enter **y** to configure VCS on these systems.

```
Do you want to configure VCS on these systems at this time?
[y,n,q] (y) y
```

- 6 Enter the unique cluster name and Cluster ID number.

```
Enter the unique cluster name: [?] vcs_cluster2
Enter the unique Cluster ID number between 0-65535: [b,?] 76
```

The installer discovers the NICs available on the first system and reports them:

```
Discovering NICs on host1 ...discovered en0 en1 en2
```

- 7 Enter private heartbeat NIC information for each host.

```
Enter the NIC for the first private heartbeat link on host1:
[b,?] eth1
Would you like to configure a second private heartbeat link?
[y,n,q,b,?] (y) y
```

```
Enter the NIC for the second private heartbeat link on host1:
[b,?] ethn2
Would you like to configure a third private heartbeat link?
[y,n,q,b,?] (n) n
Do you want to configure an additional low priority
heartbeat link? [y,n,q,b,?] (n) n
Are you using the same NICs for private heartbeat links on
all systems? [y,n,q,b,?] (y) y
```

---

**Note:** When answering **y**, be sure that the same NICs are available on each system; the installer does not verify this.

---

Notice that in this example, `en0` is not selected for use as a private heartbeat NIC because it already in use as the public network interface. The default responses are chosen.

- 8 A summary of the information you entered is given. When prompted, confirm that the information is correct.

```
Is this information correct? [y,n,q] (y)
```

If the information is correct, press Return. If the information is *not* correct, enter **n**. The installer prompts you to enter the information again.

- 9 When prompted to configure the product to use Veritas Security Services, enter **y** or **n** to configure.

---

**Note:** Before configuring a cluster to operate using Veritas Security Services, another system must already have Veritas Security Services installed and be operating as a Root Broker. Refer to the Veritas Cluster Server Installation Guide for more information on configuring a VxSS Root Broker.

---

```
Would you like to configure product_name to use Veritas
Security
Services? [y,n,q] (n) n
```

- 10 A message displays notifying you of the information required to add users. When prompted, set the user name and/or password for the Administrator.

```
Do you want to set the username and/or password for the Admin
user (default username = 'admin', password='password')?
[y,n,q] (n)
```

- 11 Enter **n** if you want to decline. If you enter **y**, you are prompted to change the password. You are prompted to add another user to the cluster.

```
Do you want to add another user to the cluster? [y,n,q] (y)
```

- 12 Enter **n** if you want to decline, enter **y** if you want to add another user. You are prompted to verify the user.

```
Is this information correct? [y,n,q] (y)
```

Enter **y** or **n** to verify if this information is correct.

- 13 You are prompted to configure the cluster management console. Enter **y** or **n** to configure the cluster management console.

```
Do you want to configure the Cluster Management Console
[y,n,q] (n) y
```

- 14 Enter the NIC for the Cluster Manager (Web Console), then confirm whether the NIC is to be the public NIC used by all systems.

```
Enter the NIC for Cluster Manager (Web Console) to use on
host1: [b,?] (hme0)
Is hme0 to be the public NIC used by all systems [y,n,q,b,?]
(y)
```

- 15 Enter the Virtual IP address for Cluster Manager.

- 16 You are prompted to verify the information.

```
Is this information correct? [y,n,q] (y)
```

Enter **y** or **n** to verify if this information is correct.

- 17 You are prompted to configure the cluster connector. Enter **y** or **n** to configure the cluster connector.

```
Do you want to configure the cluster connector [y,n,q] (n)
```

- 18 When prompted to configure SMTP notification, enter **y** or **n** to configure.

```
Do you want to configure SMTP notification? [y,n,q] (y)
```

- 19 When prompted to configure SNMP notification, enter **y** or **n** to configure.

```
Do you want to configure SNMP notification? [y,n,q] (y)
```

- 20 When prompted to set up the default disk group for each system, enter **y** to set up the disk group for each system.

```
Do you want to set up a default disk group for each system?
[y,n,q,?] (y)
```

- 21 If you are installing Veritas Storage Foundation for DB2 or Veritas Storage Foundation for Oracle, change permissions to allow a database administrator or a group of administrators access to the database tools on each system.

```
Do you want to add single user access on host1? [y,n,q,?] y
Enter login account name for DBA user: account_name
Do you want to add group access on host1? [y,n,q,?] y
Enter groupo name for DBA users: dba
Do you want to add single user access on host2? [y,n,q,?] y
Enter login account name for DBA user: account_name
Do you want to add group access on host2? [y,n,q,?] y
Enter groupo name for DBA users: dba
```

- 22 You are prompted to enter the fully qualified hostname of system host1. Enter **y** for the host1.domain\_name.

```
Is the fully qualified hostname of system "host1" =
"host1.domain_name"? [y,n,q] (y)
```

- 23 You are prompted to enter the fully qualified hostname of system host1. Enter **y** for the host2.domain\_name.

```
Is the fully qualified hostname of system "host2" =
"host2.domain_name"? [y,n,q] (y)
```

- 24 You are prompted to enable Storage Foundation Management Server Management.

```
Enable Storage Foundation Management Server Management?
[y,n,q] (y)
```

- 25 Enter **y** to enable Storage Foundation Management Server Management. You are prompted to start Storage Foundation.

```
Do you want to start Veritas Storage Foundation processes
now? [y,n,q] (y)
```

```
.
.
.
```

```
Startup completed successfully on all systems
```

```
You declined to set up the name of the default disk group for
host1.
```

```
You declined to set up the name of the default disk group
for host2.
```

```
Installation log files, summary file, and response file are
saved at:
```

```
/opt/VRTS/install/logs/installsf-7ai12i
```

```
When installsf installs software, some software may be
applied rather than committed. It is the responsibility of
the system administrator to commit the software, which can
be performed later with the -c option of the installp
command.
```

- 26 Proceed to [“Completing the installation procedure”](#) on page 27

## Completing the installation procedure

At this point in the installation and configuration procedure, the utility begins to install the packages on one node and copy them to any other specified nodes. The following sample output is for a Storage Foundation Enterprise HA installation.

### To complete the installation procedure

- 1 If you are completing the installation procedure in a cluster configuration, skip this step. If you are completing the installation procedure on a stand-alone configuration, invoke the common installer, run the `installer` command on the disc as shown in this example:

```
cd /dvdrom
./installer
```

At the product status page, enter **C** for the Configure an Installed Product and press Return. The product installer is displayed.

- 2 As the utility continues the procedure, you are prompted to choose whether to install on all systems simultaneously. Enter **y** or press Return to accept simultaneous installation.

```
Would you like to install product_name on
all systems simultaneously? [y,n,q,?] (y) y
```

- 3 A message displays notifying you of successful installation. Press Return to continue.
- 4 A message displays describing the VxVM enclosure-based naming scheme and showing which nodes are eligible. When prompted to configure this feature, enter **n** if you want to decline. If required, you can use the `vxdiskadm` command or the Veritas Enterprise Administrator to configure this feature after installation.  
See the `vxdiskadm(1M)` manual page and the “Administering Disks” chapter of the *Veritas Volume Manager Administrator’s Guide* for more information.
- 5 If you are installing an HA version of the product, a message displays indicating the VCS configuration files are being created and copied. Press Return to continue.
- 6 A message displays indicating which systems can be started and on the systems that VxVM selects as targets.
- 7 Press Return to continue. If you are installing an HA version of the product, a message displays notifying you that Cluster Server is starting. This message also contains information about configuring a default disk group.

- 8 You are now given the option of specifying the name of a default disk group that is to be assumed by Veritas Volume Manager commands if a disk group is not otherwise specified.

Do you want to set up the default disk group for each system?  
[y,n,q,?] (y) **n**

Enter **n** if you do not want to specify the name of the default disk group at this time. You can set the name of the default disk group after installation by running the `vxdtl defaultdg diskgroup` command on a system. See the `vxdtl(1M)` manual page and the “Creating and administering disk groups” chapter of the *Veritas Volume Manager Administrator’s Guide* for more information.

---

**Note:** If you specify the name of a default disk group, this step does not create the disk group. After installation, you can use menu item 1 in the `vxdiskadm` utility or the Veritas Enterprise Administrator to create the disk group.

---

- 9 If you have a VVR license installed, the next phase concerns configuration of VVR:

Do you want to change any of the VVR ports ... [y, n, q]

- 10 If you have a VVR license installed, you are now asked questions regarding the frequency of VVR statistics collection.

- 11 The next phase of the configuration procedure consists of setting up a centrally managed host:

Enable Centralized Management? [y,n,q]

If you select to enable centralized management, you are asked a series of questions relating to the names of the systems that are to be managed.

- 12 Finally, you are asked whether you want to start the Storage Foundation processes on the target systems.

Do you want to start Veritas Storage Foundation processes now?  
[y,n,q,?] (y) **y**

Enter **y** to start the processes on each of the systems.

---

**Note:** If you attempt to install the Veritas software on an unsupported kernel, an error such as the following is displayed when an attempt is made to start the modules:

```
ERROR: No appropriate modules found. Error in loading
module "vxdump".
```

This message is also listed in the log file, `/etc/vx/.cpi_vm_rpm_msg`. You must upgrade your system to a supported kernel version.

See [“Supported Linux operating systems”](#) on page 13.

---

- 13 A message displays notifying you of a successful installation and the locations of the `/opt/VRTS/install` files.

Installation log files, summary file, and response file are saved at:

```
/opt/VRTS/install/logs/installsf-xSY2LZ
```

---

**Note:** Do not remove the log files until the Veritas products are working properly on your system. Technical Support will need these log files for debugging purposes.

---

- 14 After you complete the installation procedure, review important details about initializing (where required), setting up, and using the Veritas software shipped with Veritas Storage Foundation.
- 15 If you installed Veritas Storage Foundation for DB2 or Veritas Storage Foundation for Oracle, you must run the `db2ed_update` or `dbed_update` command, respectively.
- See [“Upgrading to the new repository database for DB2 and Oracle”](#) on page 77.

## Verifying the Veritas Storage Foundation installation

After installation is complete, you can perform the following checks to verify that the systems are operating correctly:

- [Checking Volume Manager processes](#)
- [Checking cluster operation](#)

## Checking Volume Manager processes

To confirm that key Volume Manager processes are running

- ◆ Type the following command:

```
ps -e | grep vx
```

Entries for the `vxiod`, `vxconfigd`, `vxnotify`, `vxrelocd`, `vxsmf`, `vxpal`, `vxcached` and `vxconfigbackupd` processes should appear in the output from this command. If you disable hot-relocation, the `vxrelocd` and `vxnotify` processes are not displayed.

## Checking cluster operation

You need to check cluster operation only if you installed and configured an HA version of the Storage Foundation software.

To verify that the cluster is operating

- ◆ Type the following command on any node:

```
hastatus -summary
```

```
-- SYSTEM STATE
-- System State Frozen

A host1 RUNNING 0
A host2 RUNNING 0

-- GROUP STATE
-- Group System Probed AutoDisabled State

B ClusterService host1 Y N ONLINE
B ClusterService host2 Y N OFFLINE
```

Identify the system state of each node in the output of this command. If the value is `RUNNING` for all the nodes, VCS is successfully installed and running.

Refer to the `hastatus(1M)` manual page and the *Veritas Cluster Server User's Guide* for more information on system states and state transitions.

## About Low Latency Transport

The file `llthosts(4)` is a database containing one entry per node that links the Low Latency Transport (LLT) system ID (in the first column) with the LLT host name. This file is identical on each cluster node.

Based on the sample installation, the file `/etc/llthosts` contains the entries:

```
0 host1
1 host2
```

The file `llttab(1M)` contains information derived from the installation and used by the utility `lltconfig(1M)`. After installation, this file lists the network links that correspond to the specific node.

The first line identifies the node. The second line identifies the cluster, based on the cluster ID entered during installation. The next two lines, beginning with the `link` command, identify the two network cards used by the LLT protocol.

See the `llttab(4)` manual page for details on how to modify the LLT configuration. The manual page describes ordering the directives in the `llttab` file.

### Verifying LLT

Use the `lltstat` command to verify that LLT links are active for each system in the cluster.

#### To verify that links are active for LLT

- ◆ Use the `lltstat -n` as follows:

```
lltstat -n
```

With LLT configured correctly, the output of `lltstat -n` shows all of the nodes in the cluster and two links for each node. If the output shows otherwise, type `lltstat -nvv | more` on any node to view additional information about LLT.

#### To obtain LLT port information

- ◆ Use the `lltstat -p` command as follows:

```
lltstat -p
```

## About Group Membership and Atomic Broadcast

After installation, the file `/etc/gabtab` contains a `gabconfig(1M)` command that configures the Group Membership and Atomic Broadcast (GAB) driver.

The file `/etc/gabtab` contains a line that resembles:

```
/sbin/gabconfig -c -nN
```

where the `-c` option configures the driver and `-nN` specifies the cluster will not be formed until at least  $N$  nodes are ready. The variable  $N$  represents the number of cluster nodes.

## Verifying GAB

### To verify that GAB is operating

- ◆ Type the following command on each system:

```
/sbin/gabconfig -a
```

If GAB is operating, the following GAB port membership information is returned:

```
GAB Port Memberships
=====
Port a gen a36e0003 membership 01
Port h gen fd570002 membership 01
```

Port a indicates that GAB is communicating, gen a36e0003 is a randomly generated number, and membership 01 indicates that nodes 0 and 1 are connected.

Port h indicates that VCS is started, gen fd570002 is a randomly generated number, and membership 01 indicates that nodes 0 and 1 are both running VCS.

If GAB is not operating, no GAB port membership information is returned:

```
GAB Port Memberships
=====
```

If only one network is connected, the following GAB port membership information is returned:

```
GAB Port Memberships
=====
Port a gen a36e0003 membership 01
Port a gen a36e0003 jeopardy 1
Port h gen fd570002 membership 01
Port h gen fd570002 jeopardy 1
```

For more information on GAB, including descriptions of ports, refer to the *Veritas Cluster Server User's Guide*.

## Veritas Enterprise Administrator (VEA)

The Veritas Enterprise Administrator (VEA) is the graphical administrative interface for configuring shared storage devices. VEA simplifies administrative tasks, such as mounting and unmounting file systems, creating and removing storage checkpoints, enabling and disabling change log, and many others. For basic information on running the VEA, refer to *Veritas Enterprise Administrator (VEA 500 Series) Getting Started*. For a complete list of administrative tasks and their instructions, see the online help that is available from within the VEA.

The VEA server package, `VRTSob`, is installed by the installation script on all nodes that are to be administered. The `VRTSobgui` package contains the VEA client Graphical User Interface (GUI) program, which may also be installed on one or more of these nodes, or on a separate system that can be used to administer both these and other nodes. A version of the VEA client package is also provided that can be installed and run on a Microsoft Windows® system. See “Installing the VEA client on a Microsoft Windows system” on page 33.

## Installing the VEA client on a Microsoft Windows system

The VEA client package (`\windows\VRTSobgui.msi`) for Windows systems may be used to access servers running Veritas Storage Foundation software and the VEA service on Linux. This package can be installed on Windows NT®, Windows XP, Windows 2003, Windows 2000, Windows ME, Windows 98 and Windows 95 machines.

To install and run the VEA client, your system must conform to the following specifications:

- Windows Installer 2.0 or later must be present. For information about upgrading Windows Installer, visit <http://www.microsoft.com>. For Windows NT 4.0, it is also recommended that you use Windows NT 4.0 Service Pack 6.
- Java Runtime Environment (JRE) version 1.5.0\_01.
- 100MHz Pentium with 256MB memory or higher specification.
- 22MB available disk space.

---

**Note:** Microsoft Installer is required to install the `VRTSobgui.msi` package. You can get this product from the Microsoft website if it is not already installed on your system.

---

Before you install VEA on a Windows system, you must uninstall any existing Veritas Volume Manager Storage Administrator (VMSA) packages and remove the old `setup.exe` from that machine. Only one VEA package can be installed on a Windows machine at a time.

### To install the VEA GUI on a Windows system

- 1 Log in as administrator.
- 2 Insert the disc containing the Veritas software in the DVD-ROM drive
- 3 Using Windows Explorer or a DOS Command window, change directory to `\windows\VRTSobgui.msi` and execute the `VRTSobgui.msi` program with Windows Installer.

- 4 Follow the instructions presented by the `VRTSobgui.msi` program.
- 5 After installation is complete, ensure environment changes made during installation take effect as follows:
  - For Windows NT, Windows 2000, Windows 2003 or Windows XP, log out and then log back in.
  - For Windows ME, Windows 98 or Windows 95, restart the computer.

## Starting and stopping the VEA server

---

**Note:** The VEA server is automatically started when you reboot your system.

---

To check the state of the VEA server, enter:

```
/opt/VRTSob/bin/vxsvcctrl status
```

To start the VEA service, enter:

```
/opt/VRTSob/bin/vxsvcctrl start
```

To stop the VEA server, enter:

```
/opt/VRTSob/bin/vxsvcctrl stop
```

## Using the VEA client to administer local and remote systems

Users with appropriate privileges can use the VEA client to administer a local or remote machine. VERITAS Volume Manager and the VEA server must be installed, and the VxVM configuration daemon, `vxconfigd`, and the VEA server daemon, `vxsvc`, must be running on the machine to be administered.

To use the VEA client GUI provided with this release to administer Veritas software on other platforms, you must upgrade those systems to at least the following releases:

- AIX requires Veritas Storage Foundation 3.2.2 or later
- HP-UX requires Veritas Volume Manager 3.5 Update 2 or later
- Linux requires Veritas Storage Solutions 2.2 or later
- Solaris requires Veritas Storage Foundation 3.5 MP2 or later

To use the VEA client on Linux to administer the *local* system, type:

```
/opt/VRTSob/bin/vea
```

To use the VEA client on Linux to administer a *remote* system, type:

```
/opt/VRTSob/bin/vea -host remote_system -user username \
-password password
```



The first field in the output is the module name. You can unload the modules by entering:

```
rmmmod fdd
rmmmod vxportal
rmmmod vxfs
```

The `rmmmod` command fails if there are any mounted VxFS file systems. To determine if any VxFS file systems are mounted, enter:

```
df -T | grep vxfs
```

## Creating and configuring the repository database for DB2 and Oracle

After installing Veritas Storage Foundation for DB2 or Veritas Storage Foundation for Oracle, you must create and configure the repository database using the `sfua_db_config` script.

The script detects whether your system is running in a stand-alone or HA configuration and then automatically configures the repository database.

Before running the script, review the following requirements:

- In a stand-alone configuration
  - You must have a mount point mounted on a VxVM volume with a VxFS file system. The mount point is used to store the repository database.

In an HA configuration

- Create a separate, non-shared disk group on shared storage. Create a VxVM volume and a VxFS file system and mount the volume.
- It is recommended that you have a separate disk group for the repository volume so that any failovers are independent of other service groups.
- The mount point is used to store the repository database.
- Obtain an unique virtual IP address for public NIC interface.
- Obtain the device names for the public NIC interface (for example: hme0 / eth0 /) for all systems in the cluster.
- Obtain a subnet mask for the public NIC interface.
- Make sure VCS is not in read-write (-rw) mode. To make sure VCS is in read-only mode, use the following command:  

```
haconf -dump -makero
```

Table 2-1 indicates the options available for the `sfua_db_config` script.

**Table 2-1** sfua\_db\_config options

| Option              | Description                                                                                                                                                                                                                                                                              |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| -ssh                | Use this option in a high availability (HA) configuration. The option indicates that ssh and scp are to be used for communication between systems. Either ssh or rsh should be preconfigured so that you can execute the commands without being prompted for passwords or confirmations. |
| -o dropdb           | Drops the repository database.                                                                                                                                                                                                                                                           |
| -o unconfig_cluster | Use this option in a high availability (HA) configuration. Unconfigures the repository database from the VCS cluster.                                                                                                                                                                    |
| -o dbstatus         | Verifies the status of the database and database server.                                                                                                                                                                                                                                 |
| -o stopserver       | Stops the database server.                                                                                                                                                                                                                                                               |
| -o startserver      | Starts the database server.                                                                                                                                                                                                                                                              |

**Table 2-1** sfua\_db\_config options

| Option          | Description                                                |
|-----------------|------------------------------------------------------------|
| -o serverstatus | Reports the database server status.                        |
| -o stopdb       | Detaches the repository database from the database server. |
| -o startdb      | Attaches the repository database to the database server.   |

**To create and configure the repository database**

- 1 Run the `sfua_db_config` script as follows:

```
/opt/VRTSdbcom/bin/sfua_db_config
```

The following is an example of configuring Veritas Storage Foundation for Oracle:

```
Welcome to the SFORA configuration script.
This script creates repository for standalone and HA
configuration.
Please create a Veritas File System on a Veritas Volume
and mount it, before starting configuration using this script.
This mount point will be used to store repository.

The following is required to configure SFORA repository for HA
solution:
* A mount point of already mounted Veritas Volume on a shared
storage, with Veritas File system.
* A public NIC used by each system in the cluster.
* A Virtual IP address and netmask.

Are you ready to configure SFORA repository (y/n/q) [y]?

filesystem mount point for SFORA repository: /sfua_rep

Discovering public NIC on host1eth0

Enter the NIC for system host1 for HA Repository configuration:
[eth0]

Discovering public NIC on host2eth0

Enter the NIC for system host2 for HA Repository configuration:
[eth0]

Enter the Virtual IP address for repository failover:
xx.xxx.xxx.xxx

Enter the netmask for public NIC interface: [xxx.xxx.xxx.x]
```

Following information will be used for SFORA HA configuration:

```
Public IP address: xx.xxx.xxx.xxx
Subnet mask: xxx.xxx.xxx.x
Public interface: host1 -> eth0,host2 -> eth0
Mount point: /sfua_rep
Volume Name for mount point: dbed_rep
Diskgroup for mount point: sfua_rep
```

Is this correct (y/n/q) [y]?

Adding repository information in VCS (HA) configuration...

Added repository information successfully in VCS (HA) configuration.

Repository configuration completed successfully for HA environment.

## 2 Verify that the repository was configured.

If you are installing in a high availability configuration:

```
/opt/VRTS/bin/hagrp -state
#Group Attribute System Value
Sfua_Base State guan |ONLINE|
Sfua_Base State plover |OFFLINE|
```

Note: Sfua\_Base group should be online on one node in the cluster.

If you are installing in a stand-alone configuration:

```
/opt/VRTSdbcom/bin/sfua_db_config -o dbstatus
Database 'dbed_db' is alive and well on server
'VERITAS_DBMS3_host'.
```

# Configuring Veritas Storage Foundation for DB2

After installing Veritas Storage Foundation for DB2, configure the software as described in this section.

## Setting administrative permissions

To allow database administrators to administer a database using Veritas Storage Foundation for DB2, you are required to change some permission settings. You are asked during the installation process if you want to allow database administrators access to various functionality. If you did not make the permission changes during installation, you can do so at a later time.

The default settings at installation time for the `/opt/VRTSdb2ed` directory allow only the `root` login to access the directory.

To allow the user “db2inst1” access to the /opt/VRTSdb2ed directory

Use the `chown` and `chmod` commands as follows:

```
chown db2inst1 /opt/VRTSdb2ed
chmod 500 /opt/VRTSdb2ed
```

To allow users in the group “db2iadm1” access to the /opt/VRTSdb2ed directory

Use the `chgrp` and `chmod` commands as follows:

```
chgrp db2iadm1 /opt/VRTSdb2ed
chmod 550 /opt/VRTSdb2ed
```

## Veritas Enterprise Administrator

You may want to add users to the VEA Authorization Database (AZDB) to allow access to the interface to users other than `root`. You also have the option to give database administrators `root` privileges.

### Adding Users to Veritas Enterprise Administrator for DB2

You may want to add users to the VEA Authorization Database (AZDB) to allow access to the interface to users other than `root`. You also have the option to give database administrators `root` privileges.

To add users other than `root` to the Veritas Enterprise Administrator AZDB

- 1 Make sure that the optional GUI package was installed.

```
rpm -q VRTSd2gui-common
```

The output should look similar to the following:

```
VRTSd2gui-common-5.0.00.A10-SLES9
```

- 2 Stop the VEA server.

```
/opt/VRTS/bin/vxsvcctl stop
```

- 3 To give `root` privileges to the database administrator, use the `vxdb2edusr` command as follows.

```
/opt/VRTS/bin/vxdb2edusr -a {user | group} [-A] [-f] -n \
user_name [-h fully_qualified_host_name -d domain_name \
-t domain_type]
```

where:

-a user adds a user to the registry

-A grants the user root access

-f allows the user to be a user other than the /opt/VRTSdb2ed owner.

-n indicates the name of the user or group.

-h specifies a fully qualified host name on which you want to add a user.

-d specifies the domain to which the user belongs.

`-t` specifies the type of domain to which the user belongs. Valid values are `nis`, `nisplus`, `Idap`, `unixpwd`, and `gssapi`.

For example, to add a database administrator with the name `db2inst1` as a user with `root` privileges, enter the following:

```
/opt/VRTS/bin/vxdb2edusr -a user -A -f -n db2inst1
```

- 4 To add a user without `root` privileges, use the `vxdbe2dusr` command as follows.

```
/opt/VRTS/bin/vxdbe2dusr -a user -n user_name
```

where `-a` adds a user to the registry.

For example, to add “`db2inst1`” as a user, enter the following:

```
/opt/VRTS/bin/vxdb2edusr -a user -n db2inst1
```

- 5 To add a group to the console registry, use the `vxdb2edusr` command as follows:

```
/opt/VRTS/bin/vxdb2edusr -a group [-A] [-f] -n group_name
```

where:

`-a group` adds a group to the registry

`-A` grants the group root access

`-f` allows the group to be other than the `/opt/VRTSdb2ed` owner.

`-n` indicates the name of the user or group.

For example, to add `dba` as a group, enter the following:

```
/opt/VRTS/bin/vxdb2edusr -a group -n dba
```

- 6 Restart the VEA Server.

```
/opt/VRTS/bin/vxsvcctrl start
```

## Removing users from Veritas Enterprise Administrator for DB2

You may need to restrict access to the VEA Authorization Database (AZDB). You can remove users or user groups from the AZDB if they have been previously added.

---

**Note:** You cannot remove `root` from the AZDB.

---

To remove users other than `root` from the VEA service console registry

- 1 Make sure that the optional GUI package was installed.

```
rpm -q VRTSd2gui-common
```

The output should look similar to the following:

```
VRTSd2gui-common-5.0.00.A10-SLES9
```

- 2 Stop the VEA server.

```
/opt/VRTS/bin/vxsvcctrl stop
```

- 3 Use the `vxdb2edusr` command to remove a group or user.  

```
/opt/VRTS/bin/vxdb2edusr -r {user | group} \
-n {user_name | group_name} \
[-h fully_qualified_host_name -d domain_name \
-t domain_type]
```

where `-r` removes a user or user group from the registry.  
For example, to remove the user `db2inst1`, enter the following:  

```
/opt/VRTS/bin/vxdb2edusr -r user -n db2inst1
```
- 4 Restart the VEA Server.  

```
/opt/VRTS/bin/vxsvcctl start
```

## Configuring Veritas Storage Foundation for Oracle

After installing Veritas Storage Foundation for Oracle, configure the software as described in this section.

### Setting administrative permissions

To allow database administrators to administer a database using Veritas Storage Foundation for Oracle, you are required to change some permission settings. You are asked during the installation process if you want to allow database administrators access to various functionality. If you did not make the permission changes during installation, you can do so at a later time.

The default settings at installation time for the `/opt/VRTSdbed` directory allow only the `root` login to access the directory.

#### To allow the user “oracle” access to the `/opt/VRTSdbed` directory

Use the `chown` and `chmod` commands, as follows:

```
chown oracle /opt/VRTSdbed
chmod 500 /opt/VRTSdbed
```

#### To allow users in the group “dba” access to the `/opt/VRTSdbed` directory

Use the `chgrp` and `chmod` commands, as follows:

```
chgrp dba /opt/VRTSdbed
chmod 550 /opt/VRTSdbed
```

## Veritas Enterprise Administrator

You may need to update Veritas Enterprise Administrator so that users other than `root` can access features.

### Adding Users to Veritas Enterprise Administrator for Oracle

You may want to add users to the VEA Authorization Database (AZDB) to allow access to the interface to users other than `root`. You also have the option to give database administrators `root` privileges.

#### To add users other than `root` to the Veritas Enterprise Administrator AZDB

- 1 Make sure that the optional GUI package was installed.

```
rpm -q VRTSorgui
```

The output should look similar to the following:

```
VRTSorgui-common-5.0.00.A10-SLES9
```

- 2 Stop the VEA server.

```
/opt/VRTS/bin/vxsvcctl stop
```

- 3 To give `root` privileges to the database administrator, use the `vxdbedusr` command as follows.

```
/opt/VRTS/bin/vxdbedusr -a {user | group} [-A] [-f] -n \
 user_name [-h fully_qualified_host_name -d domain_name \
 -t domain_type]
```

where:

-a `user` adds a user to the registry

-A grants the user `root` access

-f allows the user to be a user other than the `/opt/VRTSdbed` owner.

-n indicates the name of the user.

-h specifies a fully qualified host name on which you want to add a user.

-d specifies the domain to which the user belongs.

-t specifies the type of domain to which the user belongs. Valid values are `nis`, `nisplus`, `Idap`, `unixpwd`, and `gssapi`.

For example, to add a database administrator with the name “oracle” as a user with `root` privileges, enter the following:

```
/opt/VRTS/bin/vxdbedusr -a user -A -f -n oracle
```

- 4 To add a user without `root` privileges, use the `vxdbedusr` command as follows.

```
/opt/VRTS/bin/vxdbedusr -a user -n user_name
```

where -a adds a user to the registry.

For example, to add “oracle” as a user, enter the following:

```
/opt/VRTS/bin/vxdbedusr -a user -n oracle
```

- 5 To add a group to the console registry, use the `vxdbeusr` command as follows:

```
/opt/VRTS/bin/vxdbeusr -a group -n group_name
```

where `-a` adds the user group to the registry.

For example, to add “dba” as a group, enter the following:

```
/opt/VRTS/bin/vxdbeusr -a group -n dba
```

- 6 Restart the VEA Server.

```
/opt/VRTS/bin/vxsvcctrl start
```

## Removing users from Veritas Enterprise Administrator for Oracle

You may need to restrict access to the VEA Authorization Database (AZDB). You can remove users or user groups from the registry if they have been previously added.

---

**Note:** You cannot remove `root` from the AZDB.

---

### To remove users other than root from the Veritas Enterprise Administrator Service console registry

- 1 Make sure that the optional GUI package was installed.

```
rpm -q VRTSorgui
```

The output should look similar to the following:

```
VRTSorgui-common-5.0.00.A10-SLES9
```

- 2 Stop the VEA server.

```
/opt/VRTS/bin/vxsvcctrl stop
```

- 3 Use the `vxdbeusr` command to remove a group or user.

```
/opt/VRTS/bin/vxdbeusr -r {user | group} \
-n {user_name | group_name}
```

where `-r` removes a user or user group from the registry.

For example, to remove the user “oracle,” enter the following:

```
/opt/VRTS/bin/vxdbeusr -r user -n oracle
```

- 4 Restart the VEA Server.

```
/opt/VRTS/bin/vxsvcctrl start
```

# Installing Veritas Storage Foundation Basic

Topics covered in this chapter include:

- “About Veritas Storage Foundation Basic”
- “Installing Veritas Storage Foundation Basic”
- “Upgrading Veritas Storage Foundation Basic”
- “Uninstalling Veritas Storage Foundation Basic”

This chapter describes how to install, upgrade, and uninstall the Veritas Storage Foundation Basic software.

Storage Foundation Basic is a special offering that is available on a separate Storage Foundation Basic disc or downloadable from the Symantec website. Storage Foundation Basic is not part of the Storage Foundation and High Availability Solutions product suite. For complete information on ordering this product, licensing, and technical support, visit:

<http://www.symantec.com/sfbasic>

## About Veritas Storage Foundation Basic

The Storage Foundation Basic software contains the same features as Storage Foundation Standard software, but you will receive messages on the system console if you exceed the following soft limitations of the license:

- Maximum of 4 VxVM volumes
- Maximum of 4 VxFS file systems
- Maximum server capacity of 2 CPU sockets

For a product overview on Storage Foundation Basic, see the *Veritas Storage Foundation and High Availability Solutions Getting Started Guide*.

## Storage Foundation Basic technical support

Technical support is self-service only, available from the Veritas Support website. You can purchase additional support corresponding to the terms of the Storage Foundation Basic license. To access the self-service knowledge base, go to:

<http://support.veritas.com>

When contacting Support with questions relating to Storage Foundation Basic, be prepared to provide your product license key. You can determine your currently installed license by running the Veritas license report utility as shown in the following example:

```
/opt/VRTS/bin/vxlicrep
....
License Key = XXXX-XXXX-XXXX-XXXX-XXXX-XXXX-XXX
Product Name = Veritas Storage Foundation Basic
```

The Storage Foundation Basic license key is installed automatically by the Veritas product installer.

## Storage Foundation Basic system requirements

### Dependencies

Veritas Storage Foundation Basic can only be installed on a system running Red Hat Enterprise Linux 4 (RHEL 4) with Update 3 or SUSE Linux Enterprise Server 9 (SLES 9) with SP3 on AMD Opteron or Intel Xeon EM64T (x86\_64). Installing this product on any other Linux release will fail. If necessary, upgrade Linux before you install the Veritas products.

See “[Supported Linux operating systems](#)” on page 13.

### Disk space

The product installation script automatically checks that sufficient disk space is available. However, before installing the Veritas Storage Foundation Basic software, you may wish to confirm that there is sufficient disk space in the file systems on the target systems.

The following table shows the approximate disk space used by all the Storage Foundation Basic software packages:

| / (excluding /opt, /usr and /var) | /opt  | /usr | /var  | Total disk space required |
|-----------------------------------|-------|------|-------|---------------------------|
| 82MB                              | 281MB | 78MB | 101MB | 542MB                     |

The following table describes each package:

| Package                        | Contents                                                         |
|--------------------------------|------------------------------------------------------------------|
| <b>Volume Manager packages</b> |                                                                  |
| VRTSalloc                      | Veritas Volume Manager: Veritas Intelligent Storage Provisioning |
| VRTSddlpr                      | Veritas Device Discovery Layer Services Provider                 |
| VRTSvdiid                      | Veritas Device Identification API                                |
| VRTSvmddoc                     | Veritas Volume Manager Documentation (optional)                  |
| VRTSvmmann                     | Veritas Volume Manager -Manual Pages (optional)                  |
| VRTSvmpro                      | Veritas Volume Manager Management Services Provider              |

| Package                                               | Contents                                                           |
|-------------------------------------------------------|--------------------------------------------------------------------|
| VRTSvxvm-common                                       | Veritas Volume Manager, Common Binaries                            |
| VRTSvxvm-platform                                     | Veritas Volume Manager, Platform-Specific Binaries                 |
| <b>File System packages</b>                           |                                                                    |
| VRTSfdoc                                              | Veritas File System Documentation (optional)                       |
| VRTSfsmn                                              | Veritas File System - Manual Pages (optional)                      |
| VRTSfsmnd                                             | Veritas File System Software Developer Kit Manual Pages (optional) |
| VRTSfspro                                             | Veritas File System Management Services Provider                   |
| VRTSfssdk                                             | Veritas File System Software Developer Kit                         |
| VRTSvxfs-common                                       | Veritas File System, Common Binaries                               |
| VRTSvxfs-platform                                     | Veritas File System, Platform-Specific Binaries                    |
| <b>Veritas Enterprise Administrator packages</b>      |                                                                    |
| VRTSaa                                                | Veritas Enterprise Administrator Action Agent                      |
| VRTScg                                                | Veritas Enterprise Administrator Central Control Grid              |
| VRTSob                                                | Veritas Enterprise Administrator Service                           |
| VRTSobc33                                             | Veritas Enterprise Administrator Core Service                      |
| VRTSobgui                                             | Veritas Enterprise Administrator                                   |
| <b>Veritas FlashSnap Agent for Symmetrix packages</b> |                                                                    |
| VRTSfas                                               | Veritas FlashSnap Agent for Symmetrix                              |
| VRTSfasdc                                             | Veritas FlashSnap Agent for Symmetrix Documentation                |
| <b>Miscellaneous packages</b>                         |                                                                    |
| SYMClma                                               | Symantec License Inventory Agent                                   |
| VRTSat                                                | Symantec Product Authentication Service                            |
| VRTSdcli                                              | Veritas Distributed Command Line Agent                             |
| VRTSdsa                                               | Veritas Datacenter Storage Agent                                   |

| Package               | Contents                                                           |
|-----------------------|--------------------------------------------------------------------|
| VRTSgapms             | Veritas Generic Array Plugin                                       |
| VRTSicsco             | Symantec Common Infrastructure                                     |
| VRTSmappro            | Veritas Storage Foundation GUI for Mapping                         |
| VRTSmh                | Veritas Centralized Management for Storage Foundation Managed Host |
| VRTSspb               | Symantec Private Branch Exchange                                   |
| VRTSperl              | Perl 5.8.0 for Veritas                                             |
| VRTSsmf               | Symantec Service Management Framework                              |
| VRTSspt               | Veritas Software Support Tools                                     |
| VRTSvail              | Veritas Array Integration Layer                                    |
| VRTSvlic              | Veritas License Utilities                                          |
| VRTSvsvc              | Veritas Volume Server and Client Provider                          |
| VRTSvxmsa             | Veritas Mapping Service, Application Libraries                     |
| windows/vrtsobgui.msi | Veritas Enterprise Administrator for Windows                       |

## Installing Veritas Storage Foundation Basic

This section describes how to install Veritas Storage Foundation Basic.

---

**Note:** The Storage Foundation Basic license key is automatically installed by the Veritas product installer.

SF Basic systems can be administered with the Storage Foundation Management Server.

See [“Preinstallation instructions”](#) on page 9.

---

### To install Veritas Storage Foundation Basic

- 1 If you are installing from the Veritas Storage Foundation Basic disc, insert the disc into your system's DVD-ROM drive, and mount the disc on a suitable mount point, for example:

```
mount -o ro /dev/cdrom /mnt/cdrom
```

- 2 Move to the top-level directory on the mounted disc, or in the extracted download, for example:

```
cd /mnt/cdrom
```

- 3 From this directory, type the following command if you are installing on the local system only, or if you are using the secure shell (SSH) utilities to install on remote systems:

```
./installer
```

If you are using the remote shell (RSH) utilities to install on remote systems, additionally specify the `-rsh` option:

```
./installer -rsh
```

The sample installation assumes that SSH is being used.

- 4 At the product status page, enter **1** for the product installer and press **Return**. The product installation begins.

```
Enter the system names separated by spaces on which
to install SF: host1 host2
```

- 5 Enter the system names on which the software is to be installed. The script performs an initial check on each system, installs the licensing packages, and displays the packages that will be installed. You are prompted to press **Return** to page through the list of packages.

```
It is optional to configure SF Basic now. If you choose to
configure SF Basic later, you can either do so manually or
run the installsf -configure command.
```

```
Are you ready to configure SF Basic? [y,n,q,?] (y)
```

- 6 Press **Return** to continue installing the packages and to configure the software.

```
Installation completed successfully on all systems
```

```
The enclosure-based naming scheme is a feature of Volume
Manager. It allows one to reference disks using a symbolic
name that is more meaningful than the operating system's
normal device access name. This symbolic name is typically
derived from the array name.
```

```
Do you want to set up the enclosure-based naming scheme?
[y,n,q,?] (n)
```

- 7 Enter **y** or enclosure-based naming scheme, or **n** to use.

```
Volume Manager default disk group configuration:
```

```
Many Volume Manager commands affect the contents or
configuration of a disk group. Such commands require that
the user specify a disk group. This is accomplished by using
the -g option of a command or setting the VXVM_DEFAULTDG
environment variable. An alternative to these two methods is
to configure the default disk group of a system.
```

Do you want to set up a default disk group for each system?  
[y,n,q,?] (y)

- 8 Press **Return** to set up the default disk group for each system. You are prompted to specify one disk group name for all eligible systems.

Will you specify one disk group name for all eligible systems? [y,n,q,?] (y)

- 9 Press **Return** to specify a disk group name for all eligible systems.

Specify a default disk group name for system host1. [?] **sfbdg**

- 10 Enter the name of the default disk group for each system.

Is this correct? [y,n,q] (y)

- 11 Press **Return** to confirm the name of the default disk group.

- 12 If you are prompted to configure Veritas FlashSnap™ Agent for Symmetrix (VxFAS), follow the instructions to configure or unconfigure VxFAS, or skip this step.

Verify the install systems Fully Qualified Hostnames.

Querying fully qualified domain name of host "host1" ... ok

Is the fully qualified hostname of system "host1" =  
"host1.your.domain.name"? [y,n,q] (y)

- 13 Press **Return** to confirm the fully qualified host name of each system.

- 14 The next phase of the configuration procedure consists of setting up a centrally managed host:

Enable Centralized Management? [y,n,q]

If you select to enable centralized management, you are asked a series of questions relating to the configuration of the Storage Foundation Management Server.

- 15 Finally, you are asked whether you want to start the Storage Foundation processes on the target systems.

```
Do you want to start Storage Foundation Basic processes now?
[y,n,q] (y)
```

Press **Return** to start the Storage Foundation Basic processes.

---

**Note:** If you attempt to install the Veritas software on an unsupported kernel, an error such as the following is displayed when an attempt is made to start the modules:

```
ERROR: No appropriate modules found. Error in loading
module "vxdmp".
```

This message is also listed in the log file, `/etc/vx/.cpi_vm_rpm_msg`. You must upgrade your system to a supported kernel version.

---

- 16 A message displays notifying you of a successful installation and the locations of the `/opt/VRTS/install` files.

```
Installation log files, summary file, and response file are
saved at:
```

```
/opt/VRTS/install/logs/installsf-xSY2LZ
```

---

**Note:** Do not remove the log files until the Veritas products are working properly on your system. Technical Support will need these log files for debugging purposes. See “[Storage Foundation Basic technical support](#)” on page 46.

---

# Upgrading Veritas Storage Foundation Basic

This section describes how to upgrade Veritas Storage Foundation Basic to a full version of Veritas Storage Foundation.

---

**Note:** If you upgrade Storage Foundation Basic to any other product, contact Veritas Sales for product information.

---

## Planning the upgrade

Complete the following tasks in advance of upgrading:

- Ensure that you have created a valid backup.
- Review the *Veritas Storage Foundation Release Notes* for any late-breaking information on upgrading your system.
- Be sure that the administrator doing the upgrade has root access and a working knowledge of Linux operating system administration.
- Schedule sufficient outage time for the upgrade.

To determine which version of Storage Foundation is installed on your system, run the `vxlicrep` command.

## Upgrade paths

The upgrade paths for Veritas Storage Foundation Basic are:

| From                     | Upgrade to                    | Tasks                                                                                                                                                                                                                       |
|--------------------------|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Storage Foundation Basic | Storage Foundation Standard   | <ul style="list-style-type: none"><li>■ Install the license key by running <code>vxlicinst</code> command.</li><li>■ Run <code>vxdtl license init</code> to reread the Storage Foundation Standard license key.</li></ul>   |
| Storage Foundation Basic | Storage Foundation Enterprise | <ul style="list-style-type: none"><li>■ Install the licence key by running <code>vxlicinst</code> command.</li><li>■ Run <code>vxdtl license init</code> to reread the Storage Foundation Enterprise license key.</li></ul> |

| From                     | Upgrade to                                                                         | Tasks                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|--------------------------|------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Storage Foundation Basic | Storage Foundation Enterprise with licensed features:<br>Veritas Volume Replicator | <ul style="list-style-type: none"> <li>■ Run the Storage Foundation product installer to install the Storage Foundation Enterprise and Veritas Volume Replicator key. See <a href="#">“Installing Veritas Storage Foundation”</a> on page 19. See <a href="#">“Installing the Veritas Storage Foundation software”</a> on page 19.</li> <li>■ Run <code>vxddt1 license init</code> to reread the Veritas Volume Replicator license key.</li> </ul> |
| Storage Foundation Basic | Any Storage Foundation product                                                     | <ul style="list-style-type: none"> <li>■ Uninstall Storage Foundation Basic. See <a href="#">“Uninstalling Veritas Storage Foundation Basic”</a> on page 54.</li> <li>■ Install any Storage Foundation product, see the <i>Veritas Storage Foundation and High Availability Getting Started Guide</i>.</li> </ul>                                                                                                                                  |

## Uninstalling Veritas Storage Foundation Basic

This section describes how to uninstall Veritas Storage Foundation Basic.

### To uninstall Veritas Storage Foundation Basic

- 1 Move all of your data off any VxVM volumes or VxFS file systems that you have created. Unmount all VxFS file systems, and stop any applications that may be accessing VxVM volumes.
- 2 Change directory to `/opt/VRTS/install`, and run the `uninstallsf` program.

```
cd /opt/VRTS/install
./uninstallsf
```

Enter the system names separated by spaces on which to uninstall SF: **host1 host2**

- 3 Enter the system names on which the software is installed. You are prompted to press **Return** to continue.

Press [Return] to continue:

- 4 Press **Return** to continue. You are prompted to uninstall the Storage Foundation Basic packages.

uninstallsf is now ready to uninstall SF.

All SF processes that are currently running must be stopped.

Are you sure you want to uninstall SF packages? [y,n,q] (y)

- 5 Enter **y** to uninstall the Storage Foundation Basic packages. You are prompted to press **Return** to continue.

Storage Foundation Basic package uninstall completed successfully.

Press [Return] to continue:

**Press Return to continue after the Storage Foundation Basic package uninstall completed successfully.**

Uninstall completed successfully on all systems

Uninstallation log files, summary file, and response file are saved at:

/opt/VRTS/install/logs/uninstallsf-7TdmtZ

NOTICE: As part of the uninstallation process on Linux, the current configuration of VxVM was saved in the directory /VXVM-CFG-BAK. This configuration may be used in a future installation of VxVM. If you do not plan to reuse it, you may manually remove this subdirectory.

**It is suggested that you archive the saved files for review in the event that they are needed at a future date.**



# Upgrading Veritas Storage Foundation and Linux

If you are running an earlier release of Veritas Storage Foundation, you can upgrade to the latest version of Veritas Storage Foundation, Veritas Storage Foundation for Oracle, or Veritas Storage Foundation for DB2 using the procedures described in this chapter.

The information in “[Upgrading the Veritas software on a cluster](#)” on page 60 pertains to Veritas Storage Foundation, Veritas Storage Foundation for Oracle, and Veritas Storage Foundation for DB2.

Topics include:

- “[Previously supported installations on Red Hat Linux](#)” on page 58
- “[Previously supported installations on SUSE Linux](#)” on page 58
- “[Preparing to upgrade the Veritas Storage Foundation software](#)” on page 59
- “[Upgrading the Veritas software on a cluster](#)” on page 60
- “[Upgrading the Veritas software on a standalone system](#)” on page 68
- “[Upgrading the Linux kernel](#)” on page 74
- “[Upgrading VxFS disk layout versions](#)” on page 75
- “[Upgrading VxVM disk group versions](#)” on page 76
- “[Upgrading to the new repository database for DB2 and Oracle](#)” on page 77
- “[Migrating from /etc/vx/vxdba to /var/vx/vxdba for DB2 and Oracle](#)” on page 78
- “[Upgrading the VEA client on a Windows system](#)” on page 79

---

**Note:** If you need to upgrade your kernel with Veritas Storage Foundation 5.0 already installed, follow the procedure given in [“Upgrading the Linux kernel”](#) on page 74.

Only users with superuser privileges can upgrade and initialize Veritas Storage Foundation and Linux.

---

## Previously supported installations on Red Hat Linux

The following table shows the supported kernels for previous releases of Veritas Storage Foundation on the Red Hat Linux 64-bit platform:

| Veritas Product            | Red Hat Enterprise Linux 4 (RHEL4)                                |
|----------------------------|-------------------------------------------------------------------|
| Storage Foundation 4.1     | Update 1 (2.6.9-11)                                               |
| Storage Foundation 4.1 MP1 | Update 1 (2.6.9-11)<br>Update 2 (2.6.9-22)                        |
| Storage Foundation 4.1 MP2 | Update 1 (2.6.9-11)<br>Update 2 (2.6.9-22)<br>Update 3 (2.6.9-34) |

See [“Supported Linux operating systems”](#) on page 13 for details of the Red Hat Enterprise Linux 4 systems that are supported by the Veritas Storage Foundation 5.0 software.

## Previously supported installations on SUSE Linux

The following table shows the supported previous releases of Veritas software on the SUSE Linux 64-bit platform:

| Veritas product            | SUSE Linux Enterprise Server 9 (SLES9)      |
|----------------------------|---------------------------------------------|
| Storage Foundation 4.1     | SP1 (2.6.5-7.139 and 2.6.5-7.145, 147, 151) |
| Storage Foundation 4.1 RP1 | SP2 (2.6.5-7.195, 201, 202) only            |

| Veritas product            | SUSE Linux Enterprise Server 9 (SLES9)      |
|----------------------------|---------------------------------------------|
| Storage Foundation 4.1 MP1 | SP1 (2.6.5-7.139 and 2.6.5-7.145, 147, 151) |
|                            | SP2 (2.6.5-7.195, 201, 202)                 |
|                            | SP3 (2.6.5-7.244, 252)                      |
| Storage Foundation 4.1 MP2 | SP1 (2.6.5-7.139 and 2.6.5-7.145, 147, 151) |
|                            | SP2 (2.6.5-7.195, 201, 202)                 |
|                            | SP3 (2.6.5-7.244, 252)                      |

See “[Supported Linux operating systems](#)” on page 13 for details of the SUSE Linux Enterprise Server 9 systems that are supported by the Veritas Storage Foundation 5.0 software.

## Upgrade paths

The only supported upgrade paths to Storage Foundation 5.0 are from Storage Foundation 4.1, including all release packs and maintenance packs for that release.

See “[Preparing to upgrade the Veritas Storage Foundation software](#)” on page 59.

## Preparing to upgrade the Veritas Storage Foundation software

If you are upgrading an installed Veritas Storage Foundation system, you should take the following steps to preserve the existing configuration information:

- Verify that `/opt/VRTS/bin` is in your `PATH` so you can execute all product commands.
- Use the `vxlicrep` command to make a record of the currently installed Veritas licenses.
- Make a record of the mount points for VxFS file systems and VxVM volumes that are defined in the `/etc/fstab` file. You will need to recreate these entries in the `/etc/fstab` file on the freshly installed system.
- Ensure that you have made backups of all data that you want to preserve. In particular, you will need the information in files such as `/boot/grub/menu.lst`, `/etc/grub.conf`, `/etc/elilo.conf`, or `/etc/lilo.conf` (as appropriate), and `/etc/fstab`. You should also run the `vxlicrep`, `vxdisk list`, and `vxprint -ht` commands, and record the

output from these. You may need this information to reconfigure your system after the upgrade.

- If you are upgrading an HA cluster, follow the guidelines given in the *Veritas Cluster Server Installation Guide* for information on preserving your VCS configuration across the upgrade procedure. In particular, you should make backups of configuration files, such as `main.cf` and `types.cf`, in the `/etc/VRTSvcs/conf/config` directory. Additional configuration files, such as `Oracletypes.cf`, may also be present in this directory if you have installed any VCS agents. You should also back up these files.

---

**Caution:** Existing data could be destroyed on any disks that are touched by upgrading the operating system. While upgrading, do not reconfigure any disks other than the root disk. To ensure the integrity of your data, it is recommended that you back it up before starting the upgrade.

---

You should also review the *Veritas Storage Foundation Release Notes* or *Veritas Storage Foundation Cluster File System Release Notes*, and all documents in the `release_notes` directory for important release information.

The following sections describe how to upgrade a cluster and a standalone system:

- [“Upgrading the Veritas software on a cluster”](#) on page 60.
- [“Upgrading the Veritas software on a standalone system”](#) on page 68.

## Upgrading the Veritas software on a cluster

A cluster upgrade requires stopping the failover functionality during the entire procedure, while CFS and CVM services remain available. The upgrade is performed in several stages:

- Freeze service group operations and stop VCS on the cluster.
- Select a group of one or more cluster nodes to upgrade, and leave a group of one or more nodes running.
- Take the first group offline and install the software patches.
- Bring the first group (with the newly installed patches) online to restart cluster failover services.
- Upgrade the nodes in the second group, and bring them online. The cluster is fully restored.

### To upgrade a Veritas Storage Foundation product on a cluster

- 1 Log in as superuser.
- 2 If you are upgrading Veritas Storage Foundation for DB2, resynchronize all existing snapshots before upgrading.

```
/opt/VRTS/bin/db2ed_vmsnap -D DB2DATABASE -f SNAPPLAN \
-o resync
```

- 3 From any node in the cluster, make the VCS configuration writable:

```
haconf -makerw
```

- 4 Take all service groups offline.

List all service groups:

```
/opt/VRTSvcs/bin/hagrp -list
```

For each service group listed, take it offline:

```
/opt/VRTSvcs/bin/hagrp -offline service_group \
-sys system_name
```

- 5 Make the configuration read-only:

```
haconf -dump -makero
```

- 6 Select the group of nodes that are to be upgraded first, and follow [step 7](#) through [step 30](#) for these nodes.

- 7 Stop VCS by entering the following command on each node in the group being upgraded:

```
hstop -local
```

- 8 Stop cluster fencing, GAB and LLT:

```
/etc/init.d/vxfen stop
/etc/init.d/gab stop
/etc/init.d/llt stop
```

- 9 Check if each node's root disk is under VxVM control by running this command:

```
df -v /
```

The root disk is under VxVM control if `/dev/vx/dsk/bootdg/rootvol` is listed as being mounted as the root (`/`) file system. If so, unmirror and unencapsulate the root disk as described in the following steps:

- a Use the `vxplex` command to remove all the plexes of the volumes `rootvol`, `swapvol`, `usr`, `var`, `opt` and `home` that are on disks other than the root disk.

For example, the following command removes the plexes `mirrootvol-01`, and `mirswapvol-01` that are configured on a disk other than the root disk:

```
vxplex -o rm dis mirrootvol-01 mirswapvol-01
```

---

**Note:** Do not remove the plexes on the root disk that correspond to the original disk partitions.

---

- b** Enter the following command to convert all the encapsulated volumes in the root disk back to being accessible directly through disk partitions instead of through volume devices. There must be at least one other disk in the `rootdg` disk group in addition to the root disk for `vxunroot` to succeed.

```
/etc/vx/bin/vxunroot
```

Following the removal of encapsulation, the system is rebooted from the unencapsulated root disk.

If your system is running VxVM 4.1 MP2, the following remnants of encapsulation will still be present:

- Partition table entries for the private and public regions
- GRUB or LILO configuration entries for VxVM

If you are upgrading from 4.1 MP2, also perform [step c](#) through [step g](#) to correct these entries. Otherwise, proceed to [step 10](#) on page 65.

- c** Run the `fdisk` command on the root disk, as shown in this example:

```
fdisk -l /dev/sda
Disk /dev/sda: 36.3 GB, 36398825472 bytes
255 heads, 63 sectors/track, 4425 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes

 Device Boot Start End Blocks Id System
/dev/sda1 1 13 104391 83 Linux
/dev/sda2 14 2001 15968610 83 Linux
/dev/sda3 1 4425 35543781 7e Unknown
/dev/sda4 2002 4425 19470780 5 Extended
/dev/sda5 2002 3001 8032468+ 83 Linux
/dev/sda6 3002 3003 16033+ 82 Linux swap
/dev/sda7 4425 4425 1024 7f Unknown
```

Partitions `/dev/sda3` and `/dev/sda7` with identifiers `7e` and `7f` correspond to the private and public regions respectively.

- d** Run the `fdisk` command again to remove the private and public partitions, `/dev/sda3` and `/dev/sda7`.

```
fdisk /dev/sda
```

```
The number of cylinders for this disk is set to 4425.
There is nothing wrong with that, but this is larger than
1024, and could in certain setups cause problems with:
 1) software that runs at boot time (e.g., old versions of
LILO)
 2) booting and partitioning software from other OSs
(e.g., DOS FDISK, OS/2 FDISK)
```

```

Command (m for help): d
Partition number (1-7): 3

Command (m for help): d
Partition number (1-7): 7

Command (m for help): w
The partition table has been altered!

Calling ioctl() to re-read partition table.

WARNING: Re-reading the partition table failed with
error 16: Device or resource busy.
The kernel still uses the old table.
The new table will be used at the next reboot.
Syncing disks.

```

- e** Edit the `/etc/fstab` file, and ensure that the entries for the root file system (`/`) and for other file systems on the root disk correspond to the correct disk partitions. If they do not, make any necessary changes to allow the system to boot correctly. For the example layout, no update is necessary. However, if the VxVM private region had been `/dev/sda6`, and other logical partitions followed it in the listing, the numbers of these partitions would decrease by 1. For example, `/dev/sda7` would become `/dev/sda6`, `/dev/sda8` would become `/dev/sda7`, and so on. Alternatively, you can copy `/etc/fstab.b4vxvm` back to `/etc/fstab` if you are certain that the entries are still valid.
- f** Correct the configuration of the boot loader that is used on your system.
- For the GRUB boot loader, edit the `/boot/grub/menu.lst` file.

Remove all entries between *and including* the `vxvm_root_default_START` and `vxvm_root_default_END` comment markers, as shown in this example:

```

#vxvm_root_default_START (do not remove)
Default menu entry number has been set to vxvm_root.
- the vxvm_root default entry number is: 3
- the original default entry number is: 0
- the selected default entry number is: 0
- the original grub configuration is in: \
/boot/grub/menu.lst.b4vxvm
default=3
#vxvm_root_default_END (do not remove)

```

Remove all entries between *and including* the `vxvm_root_START` and `vxvm_root_END` comment markers, as shown in this example:

```

#vxvm_root_START (do not remove)
title vxvm_root
root (hd0,0)
kernel /vmlinuz root=/dev/sda2 vga=0x314 console=tty0 \
console=ttyS0 selinux=0 resume=/dev/sda6 elevator=cfq \
showopts initrd /VxVM_initrd.img

```

```
#vxvm_root_END (do not remove)
```

Change to the original boot kernel that was used before the root disk was encapsulated by uncommenting the line that starts `#default`, as shown in this example:

```
color white/blue black/light-gray
#default 0
timeout 8
```

which would become:

```
color white/blue black/light-gray
default 0
timeout 8
```

Save the changes to the `/boot/grub/menu.lst` file.

Alternatively, you can copy `/boot/grub/menu.lst.b4vxvm` back to `/boot/grub/menu.lst` if you are certain that the entries are still valid.

- For the LILO boot loader, edit the `/etc/lilo.conf` file.

Remove all entries between *and including* the `vxvm_rootgeom_START` and `vxvm_rootgeom_END` comment markers, as shown in this example:

```
#vxvm_rootgeom_START (do not remove)
#NOTE: Only vxvm_root entry will be able to boot the
system, while your root disk is under Volume Manager.
Also, running -R/lock/fallback options of LILO may
render your system unbootable.
disk=/dev/vx/dsk/bootdg/rootvol
bios=0x80
sectors=63
heads=255
cylinders=4425
partition=/dev/vx/dsk/bootdg/bootvol
start=63
#vxvm_rootgeom_END (do not remove)
```

Remove all entries between *and including* the `vxvm_root_START` and `vxvm_root_END` comment markers, as shown in this example:

```
#vxvm_root_START (do not remove)
image=/boot/vmlinuz
label=vxvm_root
initrd=/boot/VxVM_initrd.img
read-only
append="root=/dev/sda2 vga=0x314 console=tty0 \
console=ttyS0 selinux=0 resume=/dev/sda6 elevator=cfg \
showopts"
#vxvm_root_END (do not remove)
```

Change to the argument to the `default=` attribute from `vxvm_root` to `Linux`, as shown in this example:

```
boot=/dev/sda
default=Linux
timeout=50
```

Save the changes to the `/etc/lilo.conf` file.

Alternatively, you can copy `/etc/lilo.conf.b4vxxvm` back to `/etc/lilo.conf` if you are certain that the entries are still valid.

Run the following command after updating the `/etc/lilo.conf` file:

```
/sbin/lilo
```

**g** Reboot the system.

**10** Use the following command to check if any VxFS file systems or Storage Checkpoints are mounted:

```
df -T | grep vxfs
```

**11** Unmount all Storage Checkpoints and file systems:

```
umount /checkpoint_name
umount /filesystem
```

**12** Verify that all file systems have been cleanly unmounted:

```
echo "8192B.p S" | fsdb -t vxfs filesystem | grep clean
flags 0 mod 0 clean clean_value
```

A *clean\_value* value of `0x5a` indicates the file system is clean, `0x3c` indicates the file system is dirty, and `0x69` indicates the file system is dusty. A dusty file system has pending extended operations.

**a** If a file system is not clean, enter the following commands for that file system:

```
fsck -t vxfs filesystem
mount -t vxfs filesystem mountpoint
umount mountpoint
```

This should complete any extended operations that were outstanding on the file system and unmount the file system cleanly.

There may be a pending large fileset clone removal extended operation if the `umount` command fails with the following error:

```
file system device busy
```

You know for certain that an extended operation is pending if the following message is generated on the console:

```
Storage Checkpoint asynchronous operation on file_system
file system still in progress.
```

**b** If an extended operation is pending, you must leave the file system mounted for a longer time to allow the operation to complete. Removing a very large fileset clone can take several hours.

**c** Repeat [step 12](#) to verify that the unclean file system is now clean.

- 13 Stop activity to all VxVM volumes. For example, stop any applications such as databases that access the volumes, and unmount any file systems that have been created on the volumes.
- 14 Stop all the volumes by entering the following command for each disk group:

```
vxvol -g diskgroup stopall
```

To verify that no volumes remain open, use the following command:

```
vxprint -Aht -e v_open
```
- 15 Make a record of the mount points for VxFS file systems and VxVM volumes that are defined in the `/etc/fstab` file. You will need to recreate these entries in the `/etc/fstab` file on the freshly installed system.
- 16 Shut down the nodes that are being upgraded.
- 17 Install Red Hat Enterprise Linux 4 Update 3 or SUSE Linux Enterprise Server 9 SP3 on each of the nodes.

---

**Caution:** This is likely to destroy any existing data on any disks that are touched by the installation procedure. During installation, do not reconfigure any disks other than the root disk or those disks that were previously in the `rootdg` disk group. To ensure the integrity of your data, it is recommended that you back it up before starting the upgrade.

---

- 18 Perform any necessary preinstallation checks. See “[Preinstallation instructions](#)” on page 9 for more information.
- 19 Upgrade Veritas Storage Foundation 5.0 or Veritas Storage Foundation 5.0 for DB2 and any additional required packages on the nodes by running the `installer` script as described in “[Installing the Veritas Storage Foundation software](#)” on page 19.
- 20 Shut down and reboot each of the upgraded nodes. After the nodes come back up, application failover capability is available for that group.
- 21 If you need to re-encapsulate and mirror the root disk on each of the nodes, follow the procedures in the “Administering Disks” chapter of the *Veritas Volume Manager Administrator’s Guide*.
- 22 If necessary, reinstate any missing mount points in the `/etc/fstab` file on each node that you recorded in [step 15](#).
- 23 If any VCS configuration files need to be restored, stop the cluster, restore the files to the `/etc/VRTSvcs/conf/config` directory, and restart the cluster.

- 24 Make the VCS configuration writable again from any node in the upgraded group:

```
haconf -makerw
```
- 25 Enter the following command on each node in the upgraded group to unfreeze HA service group operations:

```
hasys -unfreeze -persistent nodename
```
- 26 Make the configuration read-only:

```
haconf -dump -makero
```
- 27 Bring the CVM service group online on each node in the upgraded group:

```
hagrps -online cvm -sys nodename
```
- 28 Restart all the volumes by entering the following command for each disk group:

```
vxvol -g diskgroup startall
```
- 29 Remount all VxFS file systems and Storage Checkpoints on all nodes:

```
mount /filesystem
mount /checkpoint_name
```
- 30 Check if the VEA service was restarted:

```
/opt/VRTS/bin/vxsvcctrl status
```

If the VEA service is not running, restart it:

```
/opt/VRTS/bin/vxsvcctrl start
```
- 31 Repeat [step 7](#) through [step 30](#) for the second group of nodes. There are several optional configuration steps that you may want to perform:
  - If you want to use features of Veritas Storage Foundation 5.0 for which you do not currently have an appropriate license installed, obtain the license and run the `vxlicinst` command to add it to your system.
  - To upgrade VxFS Disk Layout versions and VxVM Disk Group versions, follow the instructions given in “[Upgrading VxFS disk layout versions](#)” on page 75 and “[Upgrading VxVM disk group versions](#)” on page 76.
  - If you upgraded to the current version of Veritas Storage Foundation for DB2, see “[Creating and configuring the repository database for DB2 and Oracle](#)” on page 36.

## Upgrading the Veritas software on a standalone system

### To upgrade a Veritas Storage Foundation product on a standalone system

- 1 Log in as superuser.
- 2 If you are upgrading Veritas Storage Foundation for DB2, resynchronize all existing snapshots before upgrading.

```
/opt/VRTS/bin/db2ed_vmsnap -D DB2DATABASE -f SNAPPLAN \
-o resync
```

- 3 Check if the system's root disk is under VxVM control by running this command:

```
df -v /
```

The root disk is under VxVM control if `/dev/vx/dsk/bootdg/rootvol` is listed as being mounted as the root (`/`) file system. If so, unmirror and unencapsulate the root disk as described in the following steps:

- a Use the `vxplex` command to remove all the plexes of the volumes `rootvol`, `swapvol`, `usr`, `var`, `opt` and `home` that are on disks other than the root disk.

For example, the following command removes the plexes `mirrootvol-01`, and `mirswapvol-01` that are configured on a disk other than the root disk:

```
vxplex -o rm dis mirrootvol-01 mirswapvol-01
```

---

**Note:** Do not remove the plexes on the root disk that correspond to the original disk partitions.

---

- b Enter the following command to convert all the encapsulated volumes in the root disk back to being accessible directly through disk partitions instead of through volume devices. There must be at least one other disk in the `rootdg` disk group in addition to the root disk for `vxunroot` to succeed.

```
/etc/vx/bin/vxunroot
```

Following the removal of encapsulation, the system is rebooted from the unencapsulated root disk.

If your system is running VxVM 4.1 MP2, the following remnants of encapsulation will still be present:

- Partition table entries for the private and public regions
- GRUB or LILO configuration entries for VxVM

If you are upgrading from 4.1 MP2, also perform [step c](#) through [step g](#) to correct these entries. Otherwise, proceed to [step 4](#) on page 71.

- c** Run the `fdisk` command on the root disk, as shown in this example:

```
fdisk -l /dev/sda
Disk /dev/sda: 36.3 GB, 36398825472 bytes
255 heads, 63 sectors/track, 4425 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes

 Device Boot Start End Blocks Id System
/dev/sda1 1 13 104391 83 Linux
/dev/sda2 14 2001 15968610 83 Linux
/dev/sda3 1 4425 35543781 7e Unknown
/dev/sda4 2002 4425 19470780 5 Extended
/dev/sda5 2002 3001 8032468+ 83 Linux
/dev/sda6 3002 3003 16033+ 82 Linux swap
/dev/sda7 4425 4425 1024 7f Unknown
```

Partitions `/dev/sda3` and `/dev/sda7` with identifiers `7f` and `7e` correspond to the private and public regions respectively.

- d** Run the `fdisk` command again to remove the private and public partitions, `/dev/sda3` and `/dev/sda7`.

```
fdisk /dev/sda
The number of cylinders for this disk is set to 4425.
There is nothing wrong with that, but this is larger than
1024, and could in certain setups cause problems with:
 1) software that runs at boot time (e.g., old versions of
LILO)
 2) booting and partitioning software from other OSs
(e.g., DOS FDISK, OS/2 FDISK)

Command (m for help): d
Partition number (1-7): 3

Command (m for help): d
Partition number (1-7): 7

Command (m for help): w
The partition table has been altered!

Calling ioctl() to re-read partition table.

WARNING: Re-reading the partition table failed with
error 16: Device or resource busy.
The kernel still uses the old table.
The new table will be used at the next reboot.
Syncing disks.
```

- e** Edit the `/etc/fstab` file, and ensure that the entries for the root file system (`/`) and for other file systems on the root disk correspond to the correct disk partitions. If they do not, make any necessary changes to allow the system to boot correctly. For the example layout, no update is necessary. However, if the VxVM private region had been `/dev/sda6`, and other logical partitions followed it in the listing, the numbers of

these partitions would decrease by 1. For example, `/dev/sda7` would become `/dev/sda6`, `/dev/sda8` would become `/dev/sda7`, and so on. Alternatively, you can copy `/etc/fstab.b4vxvm` back to `/etc/fstab` if you are certain that the entries are still valid.

- f Correct the configuration of the boot loader that is used on your system.
- For the GRUB boot loader, edit the `/boot/grub/menu.lst` file.

Remove all entries between *and including* the `vxvm_root_default_START` and `vxvm_root_default_END` comment markers, as shown in this example:

```
#vxvm_root_default_START (do not remove)
Default menu entry number has been set to vxvm_root.
- the vxvm_root default entry number is: 3
- the original default entry number is: 0
- the selected default entry number is: 0
- the original grub configuration is in: \
/boot/grub/menu.lst.b4vxvm
default=3
#vxvm_root_default_END (do not remove)
```

Remove all entries between *and including* the `vxvm_root_START` and `vxvm_root_END` comment markers, as shown in this example:

```
#vxvm_root_START (do not remove)
title vxvm_root
root (hd0,0)
kernel /vmlinuz root=/dev/sda2 vga=0x314 console=tty0 \
console=ttyS0 selinux=0 resume=/dev/sda6 elevator=cfq \
showopts initrd /VxVM_initrd.img
#vxvm_root_END (do not remove)
```

Change to the original boot kernel that was used before the root disk was encapsulated by uncommenting the line that starts `#default`, as shown in this example:

```
color white/blue black/light-gray
#default 0
timeout 8
```

which would become:

```
color white/blue black/light-gray
default 0
timeout 8
```

Save the changes to the `/boot/grub/menu.lst` file.

Alternatively, you can copy `/boot/grub/menu.lst.b4vxvm` back to `/boot/grub/menu.lst` if you are certain that the entries are still valid.

- For the LILO boot loader, edit the `/etc/lilo.conf` file.

Remove all entries between *and including* the `vxvm_rootgeom_START` and `vxvm_rootgeom_END` comment markers, as shown in this example:

```
#vxvm_rootgeom_START (do not remove)
#NOTE: Only vxvm_root entry will be able to boot the
system, while your root disk is under Volume Manager.
Also, running -R/lock/fallback options of LILO may
render your system unbootable.
disk=/dev/vx/dsk/bootdg/rootvol
bios=0x80
sectors=63
heads=255
cylinders=4425
partition=/dev/vx/dsk/bootdg/bootvol
start=63
#vxvm_rootgeom_END (do not remove)
```

Remove all entries between *and including* the `vxvm_root_START` and `vxvm_root_END` comment markers, as shown in this example:

```
#vxvm_root_START (do not remove)
image=/boot/vmlinuz
label=vxvm_root
initrd=/boot/VxVM_initrd.img
read-only
append="root=/dev/sda2 vga=0x314 console=tty0 \
console=ttyS0 selinux=0 resume=/dev/sda6 elevator=cfq \
showopts"
#vxvm_root_END (do not remove)
```

Change to the argument to the `default=` attribute from `vxvm_root` to `Linux`, as shown in this example:

```
boot=/dev/sda
default=Linux
timeout=50
```

Save the changes to the `/etc/lilo.conf` file.

Alternatively, you can copy `/etc/lilo.conf.b4vxvm` back to `/etc/lilo.conf` if you are certain that the entries are still valid.

Run the following command after updating the `/etc/lilo.conf` file:

```
/sbin/lilo
```

**g** Reboot the system.

- 4 Use the following command to check if any VxFS file systems or Storage Checkpoints are mounted:

```
df -T | grep vxfs
```

- 5 Unmount all Storage Checkpoints and file systems:

```
umount /checkpoint_name
umount /filesystem
```

- 6 Verify that all file systems have been cleanly unmounted:

```
echo "8192B.p S" | fsdb -t vxfs filesystem | grep clean
flags 0 mod 0 clean clean_value
```

A *clean\_value* value of 0x5a indicates the file system is clean, 0x3c indicates the file system is dirty, and 0x69 indicates the file system is dusty. A dusty file system has pending extended operations.

- a If a file system is not clean, enter the following commands for that file system:

```
fsck -t vxfs filesystem
mount -t vxfs filesystem mountpoint
umount mountpoint
```

This should complete any extended operations that were outstanding on the file system and unmount the file system cleanly.

There may be a pending large fileset clone removal extended operation if the `umount` command fails with the following error:

```
file system device busy
```

You know for certain that an extended operation is pending if the following message is generated on the console:

```
Storage Checkpoint asynchronous operation on file_system
file system still in progress.
```

- b If an extended operation is pending, you must leave the file system mounted for a longer time to allow the operation to complete. Removing a very large fileset clone can take several hours.
  - c Repeat [step 12](#) to verify that the unclean file system is now clean.
- 7 Stop activity to all VxVM volumes. For example, stop any applications such as databases that access the volumes, and unmount any file systems that have been created on the volumes.
  - 8 Stop all the volumes by entering the following command for each disk group:

```
vxvol -g diskgroup stopall
```

To verify that no volumes remain open, use the following command:

```
vxprint -Aht -e v_open
```
  - 9 Make a record of the mount points for VxFS file systems and VxVM volumes that are defined in the `/etc/fstab` file. You will need to recreate these entries in the `/etc/fstab` file on the freshly installed system.
  - 10 Shut down the system.
  - 11 Install Red Hat Enterprise Linux 4 Update 3 or SUSE Linux Enterprise Server 9 SP3 on your system.

---

**Caution:** This is likely to destroy any existing data on any disks that are touched by the installation procedure. During installation, do not reconfigure any disks other than the root disk or those disks that were previously in the `rootdg` disk group. To ensure the integrity of your data, it is recommended that you back it up before starting the upgrade.

---

- 12 Perform any necessary preinstallation checks. See “[Preinstallation instructions](#)” on page 9 for more information.
- 13 Upgrade Veritas Storage Foundation 5.0 or Veritas Storage Foundation 5.0 for DB2 and any additional required packages by running the `installer` script as described in “[Installing the Veritas Storage Foundation software](#)” on page 19.
- 14 Reinstate the mount points in the `/etc/fstab` file that you recorded in [step 9](#).
- 15 Reboot the upgraded systems.
- 16 Restart all the volumes by entering the following command for each disk group:

```
vxvol -g diskgroup startall
```

There are several optional configuration steps that you may want to perform:

- To encapsulate and mirror the boot disk, follow the procedures in the “Administering Disks” chapter of the *Veritas Volume Manager Administrator’s Guide*.
- If you want to use features of Veritas Storage Foundation 5.0 for which you do not currently have an appropriate license installed, obtain the license and run the `vxlicinst` command to add it to your system.
- To upgrade VxFS Disk Layout versions and VxVM Disk Group versions, follow the instructions given in “[Upgrading VxFS disk layout versions](#)” on page 75 and “[Upgrading VxVM disk group versions](#)” on page 76.
- If you upgraded to the current version of Veritas Storage Foundation for DB2, see “[Creating and configuring the repository database for DB2 and Oracle](#)” on page 36.

## Upgrading the Linux kernel

---

**Note:** This procedure is only required if your root disk is encapsulated, or if the systems to be upgraded are in an HA cluster.

---

### To upgrade the Linux kernel after the Veritas Storage Foundation 5.0 software has been installed

- 1 Log in as superuser.
- 2 If you are upgrading a node in an HA cluster, perform the following steps:
  - a From any node in the cluster, make the VCS configuration writable:

```
haconf -makerw
```
  - b Enter the following command to freeze HA service group operations on the node that is to be upgraded:

```
hasys -freeze -persistent nodename
```
  - c Make the VCS configuration read-only:

```
haconf -dump -makero
```
- 3 Check if the system's root disk is under VxVM control by running this command:

```
df -v /
```

The root disk is under VxVM control if `/dev/vx/dsk/rootvol` is listed as being mounted as the root (`/`) file system. If so, unmirror and unencapsulate the root disk as described in the following steps:
  - a Use the `vxplex` command to remove all the plexes of the volumes `rootvol`, `swapvol`, `usr`, `var`, `opt` and `home` that are on disks other than the root disk.  
For example, the following command removes the plexes `mirrootvol-01`, and `mirswapvol-01` that are configured on a disk other than the root disk:

```
vxplex -o rm dis mirrootvol-01 mirswapvol-01
```

Do *not* remove the plexes on the root disk that correspond to the original disk partitions.
  - b Enter the following command to convert all the encapsulated volumes in the root disk back to being accessible directly through disk partitions instead of through volume devices. There must be at least one other disk in the `rootdg` disk group in addition to the root disk for `vxunroot` to succeed.

```
/etc/vx/bin/vxunroot
```

Following the removal of encapsulation, the system is rebooted from the unencapsulated root disk.

- 4 Upgrade Linux on the node, and then reboot the system to load the new kernel.
- 5 If you removed rootability in [step 3](#), re-encapsulate and remirror the root disk as described in the “Administering Disks” chapter of the *Veritas Volume Manager Administrator’s Guide*.
- 6 If you are upgrading a node in an HA cluster, perform the following steps:
  - a Make the VCS configuration writable again from any other node in the cluster:

```
haconf -makerw
```
  - b Enter the following command on the upgraded node to unfreeze HA service group operations:

```
hasys -unfreeze -persistent nodename
```
  - c Make the configuration read-only:

```
haconf -dump -makero
```
  - d Bring each service group online on the upgraded node:

```
hagrps -online service_group -sys nodename
```

Repeat this entire procedure for each node in an HA cluster.

## Upgrading VxFS disk layout versions

Veritas File System 5.0 allows Version 4, 6 and 7 file system disk layouts to be mounted. Disk layout Versions 1, 2, and 5 are not supported by VxFS 5.0 on the Linux platform. All file systems created on VxFS 5.0 use disk layout Version 7 by default.

To determine the disk layout version of a VxFS file system, run the `fstyp_vxfs` command on the file system physical device, for example:

```
/opt/VRTS/bin/fstyp -v /dev/vx/dsk/rootdg/volname | grep \
version
magic a501fcf5 version 7 ctime Thu Jul 31 11:29:31 2004
```

## When to upgrade disk layout versions

To make use of the extended features available in the VxFS 5.0 release, use the `vxfsconvert` or `vxupgrade` utilities to upgrade older disk layout versions to disk layout Version 7 as described in the following sections.

See the *Veritas Storage Foundation Release Notes*.

## When to use vxfscnvert

You can use the `vxfscnvert` command to convert an unmounted ext2 or ext3 file system to a Veritas file system with disk layout Version 7.

```
vxfscnvert /device_name
```

See the `vxfscnvert(1M)` manual pages.

See the `fsadm_vxfs(1M)` manual pages.

## When to use vxupgrde

You can use the `vxupgrde` command to upgrade older VxFS disk layouts to disk layout Version 7 while the file system remains mounted.

```
vxupgrde -n 7 /mount_point
```

See the `vxupgrde(1M)` manual pages.

See the `fsadm_vxfs(1M)` manual pages.

---

**Note:** The contents of intent logs created on a previous disk layout version cannot be used after the disk layout version is upgraded.

---

## Requirements for upgrading to disk layout version 7

Converting a Version 4 or 6 disk layout to Version 7 disk layout requires adequate free space. The space and time required to complete the upgrade increases with the number of files, extended attributes, and hard links in the file system. Typical maximum space is at least two additional inodes with one block for every inode. Allow at least ten minutes to upgrade for every million inodes in the file system.

## Upgrading VxVM disk group versions

All Veritas Volume Manager disk groups have an associated version number. Each VxVM release supports a specific set of disk group versions and can import and perform tasks on disk groups with those versions. Some new features and tasks work only on disk groups with the current disk group version, so you need to upgrade existing disk groups before you can perform the tasks. The following

table summarizes the disk group versions that correspond to each VxVM release on Linux from 3.2 to the present.

| VERITAS Volume Manager release | Disk group version | Supported disk group versions |
|--------------------------------|--------------------|-------------------------------|
| 3.2                            | 90                 | 90                            |
| 4.0                            | 110                | 90, 110                       |
| 4.1                            | 120                | 90, 110, 120                  |
| 5.0                            | 140                | 90, 110, 120, 140             |

Use the following command to find the version of a disk group:

```
vxdg list diskgroup
```

To upgrade a disk group to version 140, use the following command:

```
vxdg upgrade diskgroup
```

## Upgrading to the new repository database for DB2 and Oracle

If you are installing or upgrading Veritas Storage Foundation for DB2 or installing Veritas Storage Foundation for Oracle, you need to migrate your old repository database to the new one or you need to create a new repository database. To use the `db2ed_update` or `dbed_update` command, you must be the instance owner or database administrator.

### To upgrade your repository database

- 1 Create and configure the new repository database with the `sfua_db_config` command.

```
/opt/VRTSdbcom/bin/sfua_db_config
```

- 2 Migrate your old repository information into the new repository database. If you are upgrading Veritas Storage Foundation for DB2 in a single-host environment, run the `db2ed_update` command.

```
/opt/VRTS/bin/db2ed_update -D DB2DATABASE
```

If you are upgrading Veritas Storage Foundation for DB2 in a high availability (HA) environment, run the `db2ed_update` command with the `-G` option.

```
/opt/VRTS/bin/db2ed_update -D DB2DATABASE -G service_group
```

If you are upgrading Veritas Storage Foundation for Oracle in a single-host environment, run the `dbed_update` command.

```
/opt/VRTS/bin/dbed_update -S $ORACLE_SID -H $ORACLE_HOME
```

If you are upgrading Veritas Storage Foundation for Oracle in a high availability (HA) environment, run the `dbed_update` command with the `-G` option.

```
/opt/VRTS/bin/dbed_update -S $ORACLE_SID -H $ORACLE_HOME \
-G service_group
```

After the upgrade, the old repository database will be marked with a hidden file name, such as `/etc/vx/vxdba/.upgrade_to_5.0`, to prevent further updates. If you need to perform an additional upgrade, the file must be removed.

## Migrating from `/etc/vx/vxdba` to `/var/vx/vxdba` for DB2 and Oracle

If you are upgrading Veritas Storage Foundation for DB2 or Veritas Storage Foundation for Oracle, you can migrate to `/var/vx/vxdba` to save space under the root partition. Migrating to `/var/vx/vxdba` is optional. However, if you do not perform this migration, you cannot remove any file or directory from `/etc/vx/vxdba` to ensure proper operation. This procedure can be done at any time.

### To migrate from `/etc/vx/vxdba` to `/var/vx/vxdba`

- 1 Copy the `/etc/vx/vxdba` directory and contents to `/var/vx/vxdba`

```
cp -rp /etc/vx/vxdba /var/vx/vxdba
```

- 2 Remove `/etc/vx/vxdba`.

```
rm -rf /etc/vx/vxdba
```

- 3 Link the two directories.

```
ln -s /var/vx/vxdba /etc/vx/vxdba
```

## Upgrading the VEA client on a Windows system

To upgrade the VEA client on a Microsoft Windows system, first uninstall the existing VEA client package.

### To upgrade the VEA client package

- 1 Log in as administrator.
- 2 Select **Start > Settings > Control Panel**.
- 3 Double-click **Add/Remove Programs** to display a list of installed products.
- 4 Select **Veritas Enterprise Administrator** from the list, and click the **Remove** button.
- 5 Click **Yes** when a dialog box appears asking you to confirm the removal.
- 6 After removing the existing package, install the new VEA client package by following the instructions given in [“Installing the VEA client on a Microsoft Windows system”](#) on page 33.



# Uninstalling the Veritas Storage Foundation software

This chapter covers steps to uninstall Veritas Storage Foundation, Veritas Storage Foundation for DB2, and Veritas Storage Foundation for Oracle.

Topics include:

- [“Dropping the repository database for DB2 and Oracle”](#) on page 82
- [“Shutting down cluster operations”](#) on page 83
- [“Removing rootability”](#) on page 83
- [“Removing VxFS file systems”](#) on page 84
- [“Moving volumes to disk partitions”](#) on page 84
- [“Uninstalling Veritas Storage Foundation packages”](#) on page 86
- [“Removing license files \(Optional\)”](#) on page 87
- [“Removing license files \(Optional\)”](#) on page 87
- [“Removing the VEA client from a Windows system”](#) on page 88

---

**Note:** Only users with superuser privileges can uninstall Veritas Storage Foundation, Veritas Storage Foundation for DB2, or Veritas Storage Foundation for Oracle.

---

---

**Caution:** Failure to follow the instructions in the following sections may result in unexpected behavior.

---

## Dropping the repository database for DB2 and Oracle

When uninstalling Veritas Storage Foundation for DB2 or Veritas Storage Foundation for Oracle, drop the repository database. If you want to recreate the repository database, you can drop the existing repository database using these steps.

### To drop the repository database in a stand-alone configuration

- 1 Make sure the repository database volume is mounted using the `df` command.  
If the repository database volume is not mounted, run the `sfua_rep_mount` command to mount the volume:  

```
/opt/VRTSdbcom/config/sfua_rep_mount start
```
- 2 Use the `sfua_db_config` command with the `-o dropdb` option to remove the database.  

```
/opt/VRTS/bin/sfua_db_config -o dropdb
```

### To drop the repository database in a DB2 or Oracle cluster or Oracle RAC configuration

- 1 Drop the repository database from the VCS configuration and deport the repository disk group.  

```
/opt/VRTS/bin/sfua_db_config -o unconfig_cluster
```
- 2 Import the repository database disk group.  

```
/opt/VRTS/bin/vxdg import repository_diskgroup_name
```
- 3 Run the `sfua_rep_mount` command to mount the repository database volume.  

```
/opt/VRTSdbcom/config/sfua_rep_mount start
```
- 4 Use the `sfua_db_config` command with the `-o dropdb` option to remove the database.  

```
/opt/VRTS/bin/sfua_db_config -o dropdb
```

## Shutting down cluster operations

If the systems are running as an HA cluster, you have to take all service groups offline and shutdown VCS.

### To take all service groups offline and shutdown VCS

- ◆ Use the `hastop` command as follows:

```
/opt/VRTSvcs/bin/hastop -all
```

---

**Note:** Do not use the `-force` option when executing `hastop`. This will leave all service groups online and shut down VCS, causing undesired results during uninstallation of the packages.

---

## Removing rootability

---

**Note:** Perform this procedure if you configured rootability by encapsulating the root disk.

---

### To remove rootability

- 1 Check if the system's root disk is under VxVM control by running this command:

```
df -v /
```

The root disk is under VxVM control if `/dev/vx/dsk/rootvol` is listed as being mounted as the root (`/`) file system. If so, unmirror and unencapsulate the root disk as described in the following steps:

- 2 Use the `vxplex` command to remove all the plexes of the volumes `rootvol`, `swapvol`, `usr`, `var`, `opt` and `home` that are on disks other than the root disk. For example, the following command removes the plexes `mirrootvol-01`, and `mirswapvol-01` that are configured on a disk other than the root disk:

```
vxplex -o rm dis mirrootvol-01 mirswapvol-01
```

---

**Caution:** Do not remove the plexes that correspond to the original root disk partitions.

---

- 3 Enter the following command to convert all the encapsulated volumes in the root disk back to being accessible directly through disk partitions instead of through volume devices:

```
/etc/vx/bin/vxunroot
```

Following the removal of encapsulation, the system is rebooted from the unencapsulated root disk.

## Removing VxFS file systems

The VxFS package cannot be removed if there are any mounted VxFS file systems. Unmount all VxFS file systems before removing the package. After you remove the VxFS package, VxFS file systems are not mountable or accessible until another VxFS package is installed. It is advisable to back up VxFS file systems before installing a new VxFS package. If VxFS will not be installed again, all VxFS file systems must be converted to a new file system type.

### To remove VxFS file systems

- 1 Check if any VxFS file systems or Storage Checkpoints are mounted:
 

```
df -T | grep vxfs
```
- 2 Make backups of all data on the file systems that you wish to preserve, or recreate them as non-VxFS file systems on non-VxVM volumes or partitions.
- 3 Unmount all Storage Checkpoints and file systems:
 

```
umount /checkpoint_name
umount /filesystem
```
- 4 Comment out or remove any VxFS file system entries from the `/etc/fstab` file.

## Moving volumes to disk partitions

All volumes must be moved to disk partitions. This can be done using one of these procedures:

- Back up the system fully onto tape and then recover from it.
- Back up each file system individually and then recover them all after creating new file systems on disk partitions.
- Use VxVM to move volumes incrementally onto disk partitions as described in the following section.

## Moving volumes onto disk partitions using VxVM

### To move volumes onto disk partitions

- 1 Evacuate disks using the `vxdiskadm` program, VEA, or the `vxevac` script. You should consider the amount of target disk space required for this before you begin.

Evacuation moves subdisks from the specified disks to target disks. The evacuated disks provide the initial free disk space for volumes to be moved to disk partitions.

- 2 Remove the evacuated disks from VERITAS Volume Manager control using the following commands:

```
vxdg -g diskgroup rmdisk disk _media_name
vxdisk rm disk_access_name
```

- 3 Decide which volume to move first. If the volume to be moved is mounted, unmount it.
- 4 If the volume is being used as a raw partition for database applications, make sure that the application is not updating the volume and that data on the volume is synced.
- 5 Create a partition on free disk space of the same size as the volume. If there is not enough free space for the partition, a new disk must be added to the system for the first volume removed. Subsequent volumes can use the free space generated by the removal of this volume.
- 6 Copy the data on the volume onto the newly created disk partition using a command similar to the following:

```
dd if=/dev/vx/dsk/diskgroup/lhome of=/dev/sdb2
```

where `sdb` is the disk outside of VERITAS Volume Manager and `2` is the newly created partition on that disk.

- 7 Replace the entry for that volume (if present) in `/etc/fstab` with an entry for the newly created partition.
- 8 Mount the disk partition if the corresponding volume was previously mounted.
- 9 Stop the volume and remove it from VERITAS Volume Manager using the following commands:

```
vxvol -g diskgroup -f stop volume_name
vxedit -g diskgroup -rf rm volume_name
```

- 10 Remove any disks that have become free (have no subdisks defined on them) by removing volumes from VERITAS Volume Manager control. To check if there are still some subdisks remaining on a particular disk, use the following command:

```
vxprint -F "%snum" disk_media_name
```

- 11 If the output is not 0, there are still some subdisks on this disk that must be subsequently removed. If the output is 0, remove the disk from VERITAS Volume Manager control using the following commands:

```
vxdg -g diskgroup rmdisk disk_media_name
vxdisk rm disk_access_name
```

- 12 The free space now created can be used for adding the data in the next volume to be removed.
- 13 After all volumes have been converted into disk partitions successfully, reboot the system. After the reboot, none of the volumes should be open. To verify that none of the volumes are open, use the following command:  

```
vxprint -Aht -e v_open
```
- 14 If any volumes remain open, repeat the steps listed above.

## Uninstalling Veritas Storage Foundation packages

---

**Note:** To remove packages from remote systems, configure `ssh` or `rsh`.

Not all packages may be installed on your system depending on the choices that you made when you installed the software.

See [“Prerequisites for remote and cluster installation and uninstallation”](#) on page 16.

---

### To shut down and remove the installed Veritas Storage Foundation packages

- 1 If you are uninstalling Veritas Storage Foundation for DB2 or Veritas Storage Foundation for Oracle, stop the repository database and unmount the repository volume.

In a stand-alone configuration:

Stop the database repository:

```
/opt/VRTSdbcom/bin/sfua_db_config -o stopdb
```

Unmount the database repository:

```
/opt/VRTSdbcom/config/sfua_rep_mount stop
```

In an HA configuration: Stop VCS processes on either the local system or all systems.

To stop VCS processes on the local system:

```
hastop -local
```

To stop VCS processes on all systems:

```
hastop -all
```

- 2 Move to the `/opt/VRTS/install` directory and run the uninstall script.

```
cd /opt/VRTS/install
```

For Veritas Storage Foundation

```
./uninstallsf
```

For Veritas Storage Foundation for DB2

```
./uninstallsfdb2
```

For Veritas Storage Foundation for Oracle

```
./uninstallsfora
```

## Removing license files (Optional)

To remove the VERITAS license files

- 1 To see what license key files you have installed on a system, enter:

```
/sbin/vxlicrep
```

The output lists the license keys and information about their respective products.

- 2 Go to the directory containing the license key files and list them:

```
cd /etc/vx/licenses/lic
```

```
ls -a
```

- 3 Using the output from step 1, identify and delete unwanted key files listed in step 2. Unwanted keys may be deleted by removing the license key file.

## Removing the VEA client from a Windows system

To uninstall the VEA client from a Windows system

- 1 Log in as administrator.
- 2 Select **Start > Settings > Control Panel**.
- 3 Double-click **Add/Remove Programs** to display a list of installed products.
- 4 Select **Veritas Enterprise Administrator** from the list, and click the **Remove** button.
- 5 Click **Yes** when a dialog box appears asking you to confirm the removal.

# Installation script options

If you choose to install using the product installation script or if you obtained a Veritas product from an electronic download site, which does not include the product installer, you have several script options.

Use the table to determine which installation script to use:

| If you are installing                 | Use          |
|---------------------------------------|--------------|
| Veritas Storage Foundation            | installsf    |
| Veritas Storage Foundation for DB2    | installsfdb2 |
| Veritas Storage Foundation for Oracle | installsfora |

To use the installation script, enter the script name at the prompt. For example, to install Veritas Storage Foundation, type `./installsf` at the prompt.

The following options apply to all Veritas Storage Foundation products.

## Installation Script Options

The following options are available when using the product installation script. For an initial install or upgrade, options are not usually required.

**Table A-1** Available command line options

| Command Line Option             | Function                                                                                                                                                            |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>system1 system2...</code> | Specifies the systems on which to run the installation options. A system name is required for all options. If not specified, the command prompts for a system name. |

**Table A-1** Available command line options

| Command Line Option                    | Function                                                                                                                                                                                                                                                  |
|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| -configure                             | Configures the product after installing using the <code>-installonly</code> option.                                                                                                                                                                       |
| -enckeyfile <i>encryption_key_file</i> | See the <code>-responsefile</code> and the <code>-encrypt</code> options.                                                                                                                                                                                 |
| -encrypt <i>password</i>               | Encrypts <i>password</i> using the encryption key provided with the <code>-enckeyfile</code> option so that the encrypted password can be stored in response files.                                                                                       |
| -installpkgs                           | Displays all product packages in correct installation order. Output can be used to create scripts for command line installs, or for installations over a network. See the <code>requiredpkgs</code> option.                                               |
| -installonly                           | Installs packages, but does not configure the product.                                                                                                                                                                                                    |
| -keyfile <i>ssh_key_file</i>           | Specifies a key file for secure shell (SSH) installs. This option passes <code>-i ssh_key_file</code> to every SSH invocation.                                                                                                                            |
| -license                               | Registers or updates product licenses on the specified systems.                                                                                                                                                                                           |
| -logpath <i>log_path</i>               | Specifies a directory other than <code>/opt/VRTS/install/logs</code> as the location where installer log files, summary files, and response files are saved.                                                                                              |
| -noextrapkgs                           | Additional packages can be installed so that you can upgrade to another Symantec product simply by installing a new license. The <code>-noextrapkgs</code> option bypasses installation of extra product packages to simplify future maintenance updates. |
| -nolic                                 | Allows installation of product packages without entering a license key. Licensed features cannot be configured, started, or used when this option is specified.                                                                                           |
| -nooptionalpkgs                        | Bypasses installation of optional product packages such as user documentation and manual pages.                                                                                                                                                           |
| -nostart                               | Bypasses startup of the product following installation and configuration.                                                                                                                                                                                 |

**Table A-1** Available command line options

| Command Line Option                                                                                      | Function                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>-patchpath <i>patch_path</i></code>                                                                | Designates the path of a directory that contains all patches to install. The directory is typically an NFS-mounted location and must be accessible all specified installation systems.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <code>-pkgpath <i>package_path</i></code>                                                                | Designates the path of a directory that contains all packages to install. The directory is typically an NFS-mounted location and must be accessible all specified installation systems.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <code>-precheck</code>                                                                                   | Performs a preinstallation check to determine if systems meet all installation requirements. Symantec recommends doing a precheck before installing a product.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <code>-requiredpkgs</code>                                                                               | Displays all required product packages in correct installation order. Optional packages are not listed. Output can be used to create scripts for command line installs, or for installations over a network. See <code>installpkgs</code> option.                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <code>-responsefile <i>response_file</i></code><br><code>[-enckeyfile <i>encryption_key_file</i>]</code> | <p>Automates installation and configuration by using system and configuration information stored in a specified file instead of prompting for information. The <i>response_file</i> must be a full path name. If not specified, the response file is automatically generated as <code>installerernumber.response.number</code> is random. You must edit the response file to use it for subsequent installations. Variable field definitions are defined within the file.</p> <p>The <code>-enckeyfile</code> option and <i>encryption_key_file</i> name are required with the <code>-responsefile</code> option when the response file contains encrypted passwords.</p> |
| <code>-rootpath <i>root_path</i></code>                                                                  | <p>Specifies an alternative root directory on which to install packages.</p> <p>On Solaris operating systems, <code>-rootpath</code> passes <code>-R path</code> to <code>pkgadd</code>.</p> <p>On HP-UX operating systems, <code>-rootpath</code> passes <code>-I path</code> to <code>swinstall</code>.</p> <p>The <code>-rootpath</code> option is not supported on AIX or Linux operating systems.</p>                                                                                                                                                                                                                                                                |

**Table A-1** Available command line options

| Command Line Option      | Function                                                                                                                                                                                                                                                                                  |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| -rsh                     | Specify this option when you want to use RSH and RCP for communication between systems instead of the default SSH and SCP. The <code>-rsh</code> option requires that systems be preconfigured so that commands between systems execute without prompting for passwords or confirmations. |
| -tmppath <i>tmp_path</i> | Specifies a directory other than <code>/var/tmp</code> as the working directory for the installation scripts. This destination is where initial logging is performed and where packages are copied on remote systems before installation.                                                 |

# Veritas Storage Foundation install packages

This appendix contains the following topics:

- [“Veritas Storage Foundation install packages”](#) on page 93

## Veritas Storage Foundation install packages

[Table B-1](#) shows the package name and contents for each English language package for

- Veritas Storage Foundation
- Veritas Storage Foundation for DB2
- Veritas Storage Foundation for Oracle

**Table B-1** Storage Foundation packages

| Package                        | Contents                                                        | Required/Optional |
|--------------------------------|-----------------------------------------------------------------|-------------------|
| <b>Volume Manager packages</b> |                                                                 |                   |
| VRTSalloc                      | Veritas Volume Manager Veritas Intelligent Storage Provisioning | Required          |
| VRTSdcli                       | Veritas Distributed Command Line Interface                      | Required          |
| VRTSddlpr                      | Veritas Device Discovery Layer Services Provider                | Required          |

**Table B-1** Storage Foundation packages

| <b>Package</b>              | <b>Contents</b>                                                  | <b>Required/Optional</b>                  |
|-----------------------------|------------------------------------------------------------------|-------------------------------------------|
| VRTSsvmconv                 | Veritas Linux LVM to VxVM Converter                              | Optional                                  |
| VRTSvdid                    | Veritas Device Identification API                                | Required                                  |
| VRTSvm doc                  | VERITAS Volume Manager(Documentation)                            | Optional                                  |
| VRTSvmman                   | VERITAS Volume Manager Manual Pages                              | Optional                                  |
| VRTSvmpro                   | Veritas Volume Manager Management Services Provider              | Required                                  |
| VRTSsvsvc                   | Veritas Volume Server and Client Provider                        | Required                                  |
| VRTSvxvm-common             | VERITAS Volume Manager common files                              | Required                                  |
| VRTSvxvm-platform           | Veritas Volume Manager platform-specific files                   | Required                                  |
| VRTSvmweb                   | Veritas Volume Manager Management Services Web Client Extensions | Required                                  |
| <b>File System packages</b> |                                                                  |                                           |
| VRTSfsdoc                   | Veritas File System Documentation                                | Optional                                  |
| VRTSfsman                   | Veritas File System Manual Pages                                 | Optional                                  |
| VRTSfsmnd                   | Veritas File System Software Developer Kit Manual Pages          | Optional                                  |
| VRTSfspro                   | Veritas File System Management Services Provider                 | Required                                  |
| VRTSfssdk                   | Veritas File System Software Developer Kit                       | Required                                  |
| VRTSvxfs-common             | Veritas File System common files                                 | Required                                  |
| VRTSfsweb                   | Veritas File System Provider Web Client Extension                | Required                                  |
| VRTSvxfs-platform           | Veritas File System platform-specific files                      | Required                                  |
| <b>Database packages</b>    |                                                                  |                                           |
| VRTSd2gui-common            | Veritas Storage Foundation for DB2 Graphical User Interface      | Required (for Storage Foundation for DB2) |

**Table B-1** Storage Foundation packages

| <b>Package</b>                                   | <b>Contents</b>                                                | <b>Required/Optional</b>                     |
|--------------------------------------------------|----------------------------------------------------------------|----------------------------------------------|
| VRTSdb2ed-common                                 | Veritas Storage Foundation for DB2                             | Required (for Storage Foundation for DB2)    |
| VRTSdbcom-common                                 | Veritas Storage Foundation Common Utilities for Databases      | Required (for all database products)         |
| VRTSdbdoc                                        | Veritas Storage Foundation Documentation for Databases         | Optional                                     |
| VRTSdbed-common                                  | Veritas Storage Foundation for Oracle                          | Required (for Storage Foundation for Oracle) |
| VRTSodm-common                                   | ODM Driver for VxFS                                            | Required (for Storage Foundation for Oracle) |
| VRTSodm-platform                                 | ODM Driver for VxFS                                            | Required (for Storage Foundation for Oracle) |
| VRTSorgui-common                                 | Veritas Storage Foundation for Oracle Graphical User Interface | Required (for Storage Foundation for Oracle) |
| VRTSvxmsa                                        | Veritas Mapping Service, Application Libraries                 | Required (for DB2 and Oracle products)       |
| <b>Veritas Enterprise Administrator packages</b> |                                                                |                                              |
| VRTSaa                                           | Veritas Enterprise Administrator Action Agent                  | Required                                     |
| VRTSccg                                          | Veritas Enterprise Administrator Central Control Grid          | Required                                     |
| VRTSob                                           | Veritas Enterprise Administrator                               | Required                                     |
| VRTSobc33                                        | Veritas Enterprise Administrator Core                          | Required                                     |
| VRTSobweb                                        | Veritas Enterprise Administrator Web Console                   | Required                                     |
| VRTSobgui                                        | Veritas Enterprise Administrator                               | Optional                                     |
| <b>Infrastructure packages</b>                   |                                                                |                                              |
| VRTSat                                           | Symantec Product Authentication Service                        | Required                                     |
| VRTSgapms                                        | Veritas Generic Array Plugin                                   | Required                                     |
| VRTSicsco                                        | Symantec Infrastructure Core Services Common                   | Required                                     |

**Table B-1** Storage Foundation packages

| <b>Package</b>                                             | <b>Contents</b>                                                    | <b>Required/Optional</b> |
|------------------------------------------------------------|--------------------------------------------------------------------|--------------------------|
| VRTSvail                                                   | Veritas Array Integration Layer                                    | Required                 |
| <b>High Availability (Veritas Cluster Server) packages</b> |                                                                    |                          |
| VRTSacclib                                                 | Veritas ACC Library                                                | Required                 |
| VRTScmccc                                                  | Veritas Cluster Management Console Cluster Connector               | Required                 |
| VRTScmcs                                                   | Veritas Cluster Management Console for single cluster environments | Required                 |
| VRTScscm                                                   | Veritas Cluster Server Cluster Manager                             | Required                 |
| VRTScscw                                                   | Veritas Cluster Server Configuration Wizards                       | Required                 |
| VRTScssim                                                  | Veritas Cluster Server Simulator                                   | Required                 |
| VRTScutil                                                  | Veritas Cluster Utilities                                          | Required                 |
| VRTSgab                                                    | Veritas Group Membership and Atomic Broadcast                      | Required                 |
| VRTSjre                                                    | Veritas Java Runtime Environment Redistribution                    | Required                 |
| VRTSjre15                                                  | Veritas Java Runtime Environment Redistribution                    | Required                 |
| VRTSllt                                                    | Veritas Low Latency Transport                                      | Required                 |
| VRTSvcsc                                                   | Veritas Cluster Server                                             | Required                 |
| VRTSvcscag                                                 | Veritas Cluster Server Bundled Agents                              | Required                 |
| VRTSvcscdc                                                 | Veritas Cluster Server Documentation                               | Optional                 |
| VRTSvcscdr                                                 | Veritas Cluster Server Documentation                               | Optional                 |
| VRTSvcscmg                                                 | Veritas Cluster Server Message Catalogs                            | Required                 |
| VRTSvcscmn                                                 | Manual Pages for Veritas Cluster Server                            | Optional                 |
| VRTSvcxfen                                                 | Veritas I/O Fencing                                                | Required                 |
| VRTSweb                                                    | Symantec Web Server                                                | Required                 |
| VRTSvcscdb                                                 | Veritas High Availability Agent for DB2                            | Required                 |
| VRTSvcscor                                                 | Veritas High Availability Agent for Oracle                         | Required                 |

**Table B-1** Storage Foundation packages

| Package                          | Contents                                                                                     | Required/Optional |
|----------------------------------|----------------------------------------------------------------------------------------------|-------------------|
| VRTScsow                         | Veritas Cluster Server Oracle and RAC Configuration Wizards                                  | Required          |
| <b>Veritas Volume Replicator</b> |                                                                                              |                   |
| VRTSvcsvr                        | Veritas Cluster Server Agents for VVR                                                        | Required          |
| VRTSvrdoc                        | Veritas Volume Replicator Documentation                                                      | Optional          |
| VRTSvrpro                        | Veritas Volume Replicator Client Extension and Provider for Veritas Enterprise Administrator | Required          |
| VRTSvrw                          | Veritas Volume Replicator Web Console                                                        | Required          |
| <b>Other Packages</b>            |                                                                                              |                   |
| SYMClma                          | Symantec License Inventory Agent                                                             | Required          |
| VRTSdcli                         | Veritas Distributed Command Line Agent                                                       | Required          |
| VRTSdsa                          | Veritas Datacenter Storage Agent                                                             | Required          |
| VRTSgapms                        | Veritas Generic Array Plugin                                                                 | Required          |
| VRTSicsco                        | Symantec Common Infrastructure                                                               | Required          |
| VRTSmapro                        | Veritas Storage Foundation GUI for Mapping                                                   | Required          |
| VRTSmh                           | Veritas Centralized Management for Storage Foundation Managed Host                           | Required          |
| VRTScs                           | Veritas Storage Foundation Management Server                                                 | Required          |
| VRTScsdoc                        | Veritas Storage Foundation Management Serve                                                  | Required          |
| VRTSpx                           | Symantec Private Branch Exchange                                                             | Required          |
| VRTSperl                         | Perl 5.8.8 for Veritas                                                                       | Required          |
| VRTSsmf                          | Symantec Service Management Framework                                                        | Required          |
| VRTSspt                          | Veritas Software Support Tools                                                               | Required          |
| VRTSvail                         | Veritas Array Integration Layer                                                              | Required          |
| VRTSvlic                         | Veritas License Utilities                                                                    | Required          |
| VRTSsvvc                         | Veritas Volume Server and Client Provider                                                    | Required          |

**Table B-1** Storage Foundation packages

| <b>Package</b>            | <b>Contents</b>                                             | <b>Required/Optional</b> |
|---------------------------|-------------------------------------------------------------|--------------------------|
| VRTSvxmsa                 | Veritas Mapping Service, Application Libraries              | Required                 |
| VRTSaa                    | Veritas Storage Foundation Action Agent                     | Required                 |
| VRTScweb                  | Symantec Web Server                                         | Required                 |
| VRTSdbms3                 | Symantec Shared DBMS                                        | Required                 |
| VRTSdcp                   | Veritas Disk Correlator Provider                            | Required                 |
| VRTSdsm                   | Veritas Datacenter Storage Manager                          | Required                 |
| VRTSgcscha                | Veritas GCS High Availability Agents                        | Required                 |
| VRTSgcspr                 | Veritas SAN Global Configuration Server Object Bus provider | Required                 |
| windows/<br>vrtsobgui.msi | Veritas Enterprise Administrator for Windows                | Optional                 |

# Configuring the Symantec License Inventory Agent

This appendix includes the following topics:

- [“About the Symantec License Inventory Manager”](#) on page 100
- [“When the Symantec License Inventory Agent is installed”](#) on page 101
- [“When the server and access points are installed”](#) on page 101
- [“What you can do with the agent after it is installed”](#) on page 101
- [“How to remove the agent”](#) on page 102
- [“How to order the Symantec License Inventory Manager license and media kit”](#) on page 103

The Symantec License Inventory Manager installation disc is available separately. For information on how to order the full product, see [“How to order the Symantec License Inventory Manager license and media kit”](#) on page 103. The installation media provides online documentation with details on all topics discussed in this appendix.

Read the following Technical Support TechNote for the latest information on updates, patches, and software issues regarding this product:

<http://support.veritas.com/docs/282183>

You can also download the *Symantec License Inventory Agent 4.1 Release Notes*, from this website.

## About the Symantec License Inventory Manager

The Symantec License Inventory Manager (license inventory manager) is an enterprise asset management tracking tool that inventories Symantec Information Availability products in your network and consolidates critical information on the deployment of these products to facilitate license management and compliance tracking. Using the information provided by the license inventory manager, you can:

- Determine all the Symantec software products and licenses being used in your enterprise
- Achieve easier license self-compliance management
- Know your Enterprise License Agreement deployment status
- Reduce administrative overhead for managing license compliance
- Renew support and maintenance based on the licenses you have deployed
- Gain more control over your Symantec software usage
- Manage department chargebacks based on actual software usage
- Use more flexible licensing and pricing models
- Exploit detailed deployment data to perform return on investment analyses for purchased software

The license inventory manager is a three-tiered system that consists of a server tier, access point tier, and an agent tier. The server tier is the Symantec License Inventory Server, which consolidates and stores information that it gathers from the agents and access points.

The optional access point tier includes Symantec License Inventory Access Points and serves as a consolidation layer between the agents and server.

The agent tier includes Symantec License Inventory Agents, which are deployed on individual hosts in a network. Each agent gathers product information on the supported Symantec products that are installed on the agent's host, then sends the information to an access point or the server.

## When the Symantec License Inventory Agent is installed

The Symantec product installer installs or upgrades the agent on the host with the Symantec product. The agent is installed in the following directory:

`/opt/SYMC1ma`

The agent is installed with a default configuration that minimizes its impact on a running system. The minimum configuration prevents remote communication with the agent to keep its data and interfaces secure.

## When the server and access points are installed

The server and access points are not installed automatically. If you want to use the Symantec License Inventory Manager, you must manually install the server and, optionally, the access points. After you install the server and access points, the agents can gather information and you can create inventory reports.

You can install the server and access points from the Symantec License Inventory Manager installation disc.

## What you can do with the agent after it is installed

If you are already participating in a Symantec sales program that requires the use of the agent, or if you want to order and deploy the Symantec License Inventory Manager, you can use the agent to track Symantec products on the systems on which it was installed. To use the agent, however, you must manually configure it to enable remote communication between the agent and its server or access point.

Complete instructions for reconfiguring the agent are provided in the *Symantec License Inventory Manager 4.1 Release Notes*. You can download this document from the following website:

<http://support.veritas.com/docs/282183>

## How to remove the agent

If you do not want to use the Symantec License Inventory Manager, you can remove the agent using the operating system package removal commands to remove the agent packages, which include SYMClma and VRTSsmf.

The server and access point also use the VRTSsmf package. If the server or access point is installed on this host with the agent, you can remove the SYMClma package, but not the VRTSsmf package. If neither the server nor the access point is installed on this host, you can remove both the SYMClma and VRTSsmf packages.

If you remove both packages, remove the SYMClma package first.

[Table C-1](#) lists the commands required to remove these packages on the supported platforms.

**Table C-1** Package removal commands required to remove the agent

| Platform | Package removal command                                              |
|----------|----------------------------------------------------------------------|
| AIX      | <code>installp -u VRTSlma</code><br><code>installp -u VRTSsmf</code> |
| HP-UX    | <code>swremove SYMClma</code><br><code>swremove VRTSsmf</code>       |
| Linux    | <code>rpm evv SYMClma</code><br><code>rpm evv VRTSsmf</code>         |
| Solaris  | <code>pkgrm VRTSlma</code><br><code>pkgrm VRTSsmf</code>             |

Later, you can reinstall the agent with the Symantec License Inventory Manager installation disc. This disc is available in the Symantec License Inventory Manager kit.

## How to order the Symantec License Inventory Manager license and media kit

To order a Symantec License Inventory Manager license and media kit, contact your Symantec sales representative.

The installation media provides online documentation for the Symantec License Inventory Manager. You can contact your sales representative to order printed copies of the documentation. The documents you can order include:

- *Symantec License Inventory Manager Installation and Configuration Guide*
- *Symantec License Inventory Manager Administrator's Guide*
- *Symantec License Inventory Manager User's Guide*

