

VERITAS Storage Foundation™ 4.1

Installation Guide

Solaris

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Preface

VERITAS Storage Foundation is an integrated set of system software enhancements and configuration guidelines. This guide provides information on installing, upgrading, configuring, and uninstalling the components of VERITAS Storage Foundation products.

Follow the instructions in this guide if you are installing one of the following products:

- ◆ VERITAS Storage Foundation (QuickStart, 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)
- ◆ VERITAS Storage Foundation *for Sybase* (Standard, Enterprise, Enterprise HA Editions)
- ◆ VERITAS Volume Manager
- ◆ VERITAS File System

Previously, VERITAS Storage Foundation *for DB2*, VERITAS Storage Foundation *for Oracle*, and VERITAS Storage Foundation *for Sybase* had separate installation guides. All Storage Foundation product installation information has been combined in this document in this release. For more information, see [“Preinstallation Instructions”](#) on page 1.

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.



What's In This Guide?

This guide is organized as follows:

Chapters in This Guide

Chapter	Description
Chapter 1. "Preinstallation Instructions" on page 1	Describes the licensing, product, and system requirements for installing and using VERITAS Storage Foundation.
Chapter 2. "Installing the VERITAS Software" on page 27	Provides the installation procedures for VERITAS Storage Foundation, VERITAS Volume Manager, and VERITAS File System.
Chapter 3. "Upgrading the VERITAS Software" on page 65	Provides the upgrade procedures for VERITAS Storage Foundation, VERITAS Volume Manager, and VERITAS File System.
Chapter 4. "Configuring the VERITAS Software" on page 131	Describes how to configure the VERITAS Storage Foundation software.
Chapter 5. "Uninstalling the VERITAS Software" on page 157	Provides the uninstallation procedures for VERITAS Storage Foundation, VERITAS Volume Manager, and VERITAS File System.
Appendix A. "Installation Script Options" on page 173	Describes the options available if you choose to install using the installation script instead of the product installer.
Appendix B. "Sample Output" on page 179	Shows an example of the installation output.

How to Use This Guide

This guide describes how to install, upgrade, configure, and remove VERITAS Storage Foundation, VERITAS Volume Manager, and VERITAS File System.

This guide assumes that the user has a:

- ◆ basic understanding of system and database administration
- ◆ working knowledge of the operating system
- ◆ general understanding of file systems



Getting Help

VERITAS offers you a variety of support options.

Accessing the VERITAS Support Web Site

The VERITAS Support Web site allows you to:

- ◆ contact the VERITAS Support staff and post questions to them
- ◆ get the latest patches, upgrades, and utilities
- ◆ view the Frequently Asked Questions (FAQ) pages
- ◆ search the knowledge base for answers to technical support questions
- ◆ receive automatic notice of product updates
- ◆ find out about VERITAS training
- ◆ read current white papers

The address for the VERITAS Support Web site is:

- ◆ <http://support.veritas.com>

Subscribing to VERITAS Email Notification Service

Subscribe to the VERITAS Email notification service to be informed of software alerts, newly published documentation, Beta programs, and other services.

Go to <http://support.veritas.com>. Select a product and click “E-mail Notifications” on the right side of the page. Your customer profile ensures you receive the latest VERITAS technical information pertaining to your specific interests.

Accessing VERITAS Telephone and Fax Support

Telephone support for VERITAS Storage Foundation is only available with a valid support contract. To contact VERITAS for technical support, dial the appropriate phone number listed on the Support Guide included in the product box and have your product license information ready for quick navigation to the proper support group.

The address for the VERITAS telephone support directory is:

- ◆ <http://support.veritas.com>



Contacting VERITAS Licensing

For license information (U.S. and Canadian customers) call 1-800-634-4747 option 3, fax 1-650-527-0952, or e-mail amercustomercafe@veritas.com.

Unique Message Number

If you encounter a product error message, record the unique message number preceding the text of the message. When contacting VERITAS Technical Support, either by telephone or by visiting the VERITAS Technical Support website, be sure to provide the relevant message number. VERITAS Technical Support will use this message number to quickly determine if there are Tech Notes or other information available for you.

A unique message number is an alpha-numeric string beginning with the letter “V”. For example, in the message number:

V-5-732-8018 At least one disk must be specified

the “V” indicates that this is a VERITAS product error message. The text of the error message follows the unique message number.

VRTSexplorer Diagnostic Program for Troubleshooting

The VRTSexplorer program is available to assist VERITAS Customer Support engineers in diagnosing technical problems associated with VERITAS products. You can download this program from the VERITAS FTP site or install it from the VERITAS product disc. For instructions on downloading VRTSexplorer from the Web or installing it from the disc, see the *VERITAS Storage Foundation Release Notes* and the README file in the top-level support directory on the product disc.

Conventions

Typographical and Symbolic

Here are the typographical and symbolic conventions used throughout the guides:

Typographical Conventions

Typeface	Usage	Examples
monospace	Computer output, files, directories, software elements such as command options, function names, and parameters	Read tunables from the <code>/etc/vx/tunefstab</code> file. See the <code>ls(1)</code> manual page for more information.
monospace (bold)	User input	# mount -F vxfs /h/filesys
<i>italic</i>	New terms, book titles, emphasis, variables replaced with a name or value	See the <i>User's Guide</i> for details. The variable <i>ncsize</i> determines the value of...

Symbolic Conventions

Symbol	Usage	Examples
%	C shell prompt	
\$	Bourne/Korn shell prompt	
#	Superuser prompt (all shells)	
db2 =>	DB2 command processor prompt	db2 => list database directory
SQL>	Oracle SQL prompt for Oracle9i.	SQL> alter tablespace ts1 \ begin backup;
>	Sybase isql prompt	> quiesce database tag-1 release
\	Continued input on the following line; you do not type this character	# mkfs -F vxfs -o largefiles \ /dev/vx/rdsk/PRODDg/db01



Symbolic Conventions

Symbol	Usage	Examples
[]	In a command synopsis, brackets indicates an optional argument	ls [-a]
	In a command synopsis, a vertical bar separates mutually exclusive arguments	mount [suid nosuid]
blue text	In PDF and HTML files, click on these active hyperlinks to move to the specified location	See “ Using Snapshots for Database Backup ” on page 97 for more information.

Notes and Cautions

Note	Used for important information that you should know, but that shouldn’t cause any damage to your data or your system if you choose to ignore it.
Caution	Used for information that will prevent a problem. Ignore a caution at your own risk.



Comment on the Documentation

Let us know what you like and dislike about the documentation. Were you able to find the information you needed quickly? Was the information clearly presented? Report errors and omissions, or tell us what you would find useful in future versions of our manuals and online help.

Please include the following information with your comment:

- ◆ The title and product version of the manual you are commenting on
- ◆ The topic (if relevant) you are commenting on
- ◆ Your comment
- ◆ Your name

Email your comment to the following addresses:

- ◆ foundation_docs@veritas.com (for general product topics)
- ◆ sfuadocs@veritas.com (for database-related topics)

Please only use this address to comment on product documentation. See “[Getting Help](#)” on page xiii for how to contact Technical Support about our software.

We appreciate your feedback.





Preinstallation Instructions

1

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

- ◆ VERITAS Storage Foundation (QuickStart, 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)
- ◆ VERITAS Storage Foundation *for Sybase* (Standard, Enterprise, Enterprise HA Editions)
- ◆ VERITAS Volume Manager
- ◆ VERITAS File System

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.

After reviewing the information in this chapter, see [“Installing the VERITAS Software”](#) on page 27 for information on installing the software for the first time. See [“Upgrading the VERITAS Software”](#) on page 65 if you are upgrading an existing product.

Topics covered in this chapter include:

- ◆ [“VERITAS Storage Foundation Product Suites”](#) on page 2
- ◆ [“General Installation Requirements”](#) on page 5
- ◆ [“VERITAS Volume Manager Requirements”](#) on page 19



VERITAS Storage Foundation Product Suites

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

Storage Foundation Version	Products and Features
Storage Foundation QuickStart	VERITAS File System (Base feature set) VERITAS Volume Manager (Base feature set)
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 VERITAS FlashSnap Option Optionally licensed features: VERITAS Volume Replicator
Storage Foundation Enterprise HA	VERITAS File System VERITAS Volume Manager VERITAS Cluster Server VERITAS FlashSnap Option Optionally licensed features: VERITAS Volume Replicator

Storage Foundation Version	Products and Features
Storage Foundation <i>for DB2 Standard</i>	VERITAS File System VERITAS Volume Manager VERITAS Quick I/O option Optionally licensed features: VERITAS Volume Replicator
Storage Foundation <i>for DB2 Enterprise</i>	VERITAS File System VERITAS Volume Manager VERITAS FlashSnap Option VERITAS Quick I/O option VERITAS Storage Checkpoint option VERITAS Storage Mapping option Optionally licensed features: VERITAS Volume Replicator
Storage Foundation <i>for DB2 Enterprise HA</i>	VERITAS File System VERITAS Volume Manager VERITAS Cluster Server VERITAS FlashSnap Option VERITAS Quick I/O option VERITAS Storage Checkpoint option VERITAS Storage Mapping option Optionally licensed features: VERITAS Volume Replicator
Storage Foundation <i>for Oracle Standard</i>	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 Version	Products and Features
Storage Foundation <i>for Oracle</i> Enterprise	<p> VERITAS File System VERITAS Volume Manager VERITAS FlashSnap Option VERITAS Quick I/O option VERITAS Extension for Oracle Disk Manager option VERITAS Storage Checkpoint option VERITAS Storage Mapping option </p> <p>Optionally licensed features:</p> <p>VERITAS Volume Replicator</p>
Storage Foundation <i>for Oracle</i> Enterprise HA	<p> VERITAS File System VERITAS Volume Manager VERITAS Cluster Server VERITAS FlashSnap Option VERITAS Quick I/O option VERITAS Extension for Oracle Disk Manager option VERITAS Storage Checkpoint option VERITAS Storage Mapping option </p> <p>Optionally licensed features:</p> <p>VERITAS Volume Replicator</p>
Storage Foundation <i>for Sybase</i> Standard	<p> VERITAS File System VERITAS Volume Manager VERITAS Quick I/O option </p> <p>Optionally licensed features:</p> <p>VERITAS Volume Replicator</p>
Storage Foundation <i>for Sybase</i> Enterprise	<p> VERITAS File System VERITAS Volume Manager VERITAS Quick I/O option VERITAS FastResync option </p> <p>Optionally licensed features:</p> <p>VERITAS Volume Replicator</p>

Storage Foundation Version	Products and Features
Storage Foundation <i>for Sybase</i> Enterprise HA	VERITAS File System VERITAS Volume Manager VERITAS Cluster Server VERITAS Quick I/O option VERITAS FastResync option Optionally licensed features: VERITAS Volume Replicator
Note If you are installing VERITAS Volume Replicator, see the <i>VERITAS Volume Replicator Installation Guide</i> on the product disc. The <i>VERITAS Volume Replicator Installation Guide</i> 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.

VERITAS Product Licensing

Product keys are available on the License Key certificate. The certificate also includes the number of product licenses purchased. A single key enables product installation on the number and the type of systems for which you purchased the license. A key may enable the operation of more products than specified on the certificate, but you are legally limited to the number of product licenses purchased.

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

`vxlicinst` - installs a license key for a VERITAS product

`vxlicrep` - displays currently installed licenses

`vxlictest` - retrieves features and their descriptions encoded in a license key

If you encounter problems while licensing your product, visit the VERITAS licensing support website at <http://www.veritas.com/buy/vLicense/vLicenseHome.jhtml>.



System Requirements

The following sections provide requirements that your system must meet before installing the VERITAS software.

Dependencies

VERITAS Storage Foundation can only be installed on a system running Solaris 8 (32- or 64-bit), 9 (32- or 64-bit), or 10 (64-bit). Installing this product on any other Solaris release will fail. If necessary, upgrade Solaris before you install the VERITAS products. See [“Upgrading VERITAS Storage Foundation and Earlier Solaris Releases”](#) on page 86.

Software and Hardware Requirements

For information on hardware requirements, see the *VERITAS Volume Manager Hardware Notes*, which can be found on the documentation disc.

DB2 Requirements

The following table identifies the supported DB2 EE (Enterprise Edition), DB2 EEE (Extended Enterprise Edition), DB2 ESE (Enterprise Server Edition), and Solaris combinations if you plan to use VERITAS Storage Foundation with a DB2 database:

Supported DB2 and Solaris Combinations

DB2 UDB Release	Solaris 8 (64-bit)	Solaris 8 (32-bit)	Solaris 9 (64-bit)	Solaris 9 (32-bit)	Solaris 10 (64-bit)
7.2 EE/EEE with FixPak 7 or higher	Yes	Yes	Yes	Yes	No
8.1 ESE with FixPak 6 or lower	Yes	Yes	Yes	Yes	No
8.2 (or 8.1 ESE with FixPak 7 or higher)	Yes	Yes	Yes	Yes	See TechNote listed below.

For the latest support matrix information, see TechNote 274784 on the VERITAS Technical Support website:

<http://support.veritas.com/docs/274784>

Note With DB2 7.2 EEE, only Symmetric Multiprocessing (SMP) is supported.

Note With DB2 8.1 ESE, the Database Partitioning feature is only supported in an SMP configuration.

Note At this time, only Quick I/O and Cached Quick I/O are supported in a Massively Parallel Processor (MPP) configuration. No other VERITAS Storage Foundation *for* DB2 tools are supported in an MPP environment.

Refer to the appropriate DB2 installation guide that accompanied your DB2 software for additional information. IBM maintains DB2 UDB FixPaks for download at the following location:

<http://www.ibm.com/software/data/db2/udb/support/>

Oracle Requirements

The following list identifies the supported Oracle and Solaris combinations if you plan to use VERITAS Storage Foundation with an Oracle database:

Oracle Release	Solaris 8 (64-bit)	Solaris 8 (32-bit)	Solaris 9 (64-bit)	Solaris 9 (32-bit)	Solaris 10 (64-bit)
9.2 (64-bit)	Yes	Yes	Yes	Yes	See TechNote listed below.
9.2 (32-bit)	Yes	No	Yes	No	See TechNote listed below.
10.1	See TechNote listed below.	See TechNote listed below.	See TechNote listed below.	See TechNote listed below.	See TechNote listed below.

For the latest support matrix information, see TechNote 274784 on the VERITAS Technical Support website:

<http://support.veritas.com/docs/274784>

Refer to the appropriate Oracle installation guide that accompanied your Oracle software for additional preinstallation information.



In order to use VERITAS Extension for Oracle Disk Manager, you must use Oracle9i release 9.2 or later. Refer to Oracle bug number 1824061 for more details.

To use the Storage Mapping functionality, you must install Oracle 9.2.0.3 or higher.

Sybase Requirements

The following table identifies the supported Sybase and Solaris combinations if you plan to use VERITAS Storage Foundation with a Sybase database:

Sybase Release	Solaris 8 (64-bit)	Solaris 8 (32-bit)	Solaris 9 (64-bit)	Solaris 9 (32-bit)	Solaris 10 (64-bit)
11.9.3	No	No	No	No	See TechNote listed below.
12.0	Yes	Yes	Yes	Yes	See TechNote listed below.
12.5	Yes	Yes	Yes	Yes	See TechNote listed below.

For the latest support matrix information, see TechNote 274784 on the VERITAS Technical Support website:

<http://support.veritas.com/docs/274784>

Refer to the appropriate Sybase installation guide that accompanied your Sybase software for additional information.



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:

Product Name	/ root	/opt	/usr	/var
Storage Foundation Standard	52 MB	550 MB	92 MB	24 MB
Storage Foundation Enterprise	52 MB	550 MB	92 MB	24 MB
Storage Foundation Enterprise HA	57 MB	962 MB	106 MB	53 MB
Storage Foundation for DB2 Standard	52 MB	597 MB	92 MB	24 MB
Storage Foundation for DB2 Enterprise	52 MB	597 MB	92 MB	24 MB
Storage Foundation for DB2 Enterprise HA	57 MB	1011 MB	106 MB	55 MB
Storage Foundation for Oracle Standard	52 MB	608 MB	92 MB	24 MB
Storage Foundation for Oracle Enterprise	52 MB	608 MB	92 MB	24 MB
Storage Foundation for Oracle Enterprise HA	57 MB	1025 MB	106 MB	56 MB
Storage Foundation for Sybase Standard	52 MB	565 MB	92 MB	24 MB
Storage Foundation for Sybase Enterprise	52 MB	565 MB	92 MB	24 MB
Storage Foundation for Sybase Enterprise HA	57 MB	980 MB	106 MB	53 MB



Product Name	/ root	/opt	/usr	/var
Volume Manager	51 MB	320 MB	71 MB	13 MB
File System	8 MB	204 MB	4 MB	11 MB

Note Use the “Perform a Preinstallation Check” (P) option (the option used to get the space requirements for the English packages) of the product installer to determine whether there is sufficient space for installing the language packages.

Package Information

The following section contains package information for all supported languages.

English Language Packages

The following table shows the package name and contents for each English language package:

English Language Packages

Package	Contents
Volume Manager Packages	
VRTSvxvm	VERITAS Volume Manager, Binaries
VRTSvmpro	VERITAS Volume Manager Management Services Provider
VRTSalloc	VERITAS Volume Manager: VERITAS Intelligent Storage Provisioning
VRTsvmdoc	VERITAS Volume Manager (user documentation) (optional)
VRTsvmman	VERITAS Volume Manager, Manual Pages (optional)
File System Packages	
VRTSvxfs	VERITAS File System



English Language Packages

Package	Contents
VRTSfspro	VERITAS File System Management Services Provider
VRTSfssdk	VERITAS File System Software Developer Kit
VRTSfsdoc	VERITAS File System Documentation (optional)
VRTSfsman	VERITAS File System - Manual Pages (optional)
VRTSfsmnd	VERITAS File System Software Developer Kit Manual Pages (optional)

Database Packages

VRTSdb2ed	VERITAS Storage Foundation <i>for DB2</i>
VRTSd2gui	VERITAS Storage Foundation <i>for DB2</i> Graphical User Interface
VRTSdbed	VERITAS Storage Foundation <i>for Oracle</i>
VRTSorgui	VERITAS Storage Foundation <i>for Oracle</i> Graphical User Interface
VRTSodm	VERITAS Extension for Oracle Disk Manager
VRTSsybed	VERITAS Storage Foundation <i>for Sybase</i>
VRTSvxmsa	VERITAS Mapping Service, Application Libraries
VRTSdbdoc	VERITAS Storage Foundation Database Documentation (optional)

VERITAS Enterprise Administrator Packages

VRTSob	VERITAS Enterprise Administrator Service
VRTSobgui	VERITAS Enterprise Administrator (optional)

Infrastructure Packages

VRTSddlpr	VERITAS Device Discovery Layer Services Provider
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English Language Packages

Package	Contents
VRTSvail	VERITAS Array Providers
VRTSap	VERITAS Action Provider (optional) Note VRTSap is the rules engine add-on for the VERITAS Enterprise Administrator GUI. Installing VRTSap enables SNMP trap and email
VRTStep	VERITAS Task Execution Provider (optional) Note VRTStep provides the command execution add-on for the VERITAS Enterprise Administrator GUI. Installing VRTStep and VRTSap enables command execution in response to an alert.

High Availability (VERITAS Cluster Server) Packages

VRTSat	VERITAS Authentication Service
VRTScscm	VERITAS Cluster Server Cluster Manager
VRTScscw	VERITAS Cluster Server Configuration Wizards
VRTScssim	VERITAS Cluster Server Simulator
VRTScutil	VERITAS Cluster Utility
VRTSgab	VERITAS Group Membership and Atomic Broadcast
VRTSjre	VERITAS JRE Redistribution (v1.4.2 from Sun)
VRTSllt	VERITAS Low Latency Transport
VRTSvcS	VERITAS Cluster Server
VRTSvcSag	VERITAS Cluster Server Bundled Agents
VRTSvcsmg	VERITAS Cluster Server Message Catalogs
VRTSvcsw	VERITAS Cluster Manager (Web Console)
VRTSvxfen	VERITAS I/O Fencing

English Language Packages

Package	Contents
VRTSweb	VERITAS Web Server
VRTSvcscdc	VERITAS Cluster Server Documentation (optional)
VRTSvcsmn	VERITAS Cluster Server Manual Pages (optional)

FlashSnap Agent for Symmetrix Packages

VRTSfas	VERITAS FlashSnap Agent for Symmetrix
VRTSfasag	VERITAS Cluster Server Agents for VERITAS FlashSnap Agent for Symmetrix
VRTSfasdc	VERITAS FlashSnap Agent for Symmetrix Documentation (optional)

Other Packages

VRTSvlic	VERITAS License Utilities
VRTSperl	Perl 5.8.0 for VERITAS
VRTScpi	VERITAS Cross Product Installation Framework
windows/vrtsobgui.msi	VERITAS Enterprise Administrator for Windows

Note VERITAS Storage Foundation for Sybase (VRTSsybed) has not been localized.

Japanese Language Packages

The following table shows the package name and contents for each Japanese language package:

Japanese Language Packages

Package	Contents
Volume Manager Japanese Packages	
VRTSjavmc	VERITAS Volume Manager (VRTSvxvm) Multi-language Package



Japanese Language Packages

Package	Contents
VRTSmuvmp	Multi Language VERITAS Volume Manager Management Services Provider
VRTSmualc	VERITAS Intelligent Storage Provisioning (VRTSa11oc) Multi-language Package
VRTSjavmd	VERITAS Volume Manager Japanese Document Package
VRTSjavmm	VERITAS Volume Manager Japanese Online Manual Document Package

File System Japanese Packages

VRTSjafsc	VERITAS File System (VRTSvxfs) Japanese Language Package
VRTSmufsp	VERITAS File System Provider (VRTSfspro) Multi-language Package
VRTSjafsd	VERITAS File System Japanese Document Package
VRTSjafsm	VERITAS File System Japanese Online Manual Document Package

Database Japanese Packages

VRTSjadb2	VERITAS Storage Foundation <i>for DB2</i> (VRTSdb2ed) Japanese Package
VRTSjad2g	VERITAS Storage Foundation <i>for DB2</i> Graphical User Interface (VRTSd2gui) Japanese Package
VRTSjadbe	VERITAS Storage Foundation <i>for Oracle</i> (VRTSdbed) Japanese Package
VRTSjaorg	VERITAS Storage Foundation <i>for Oracle</i> Graphical User Interface (VRTSorgui) Japanese Package
VRTSjaodm	VERITAS Oracle Disk Manager (VRTSodm), Japanese Package

Japanese Language Packages

Package	Contents
VRTSjamsa	VERITAS VxMS Mapping Service (VRTSvxmsa) Japanese Package
VRTSjadbd	Japanese VERITAS Storage Foundation Documentation for Databases

VERITAS Enterprise Administrator Japanese Packages

VRTSmuob	VERITAS Enterprise Administrator Service Localized Package
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Infrastructure Japanese Packages

VRTSmuddl	VERITAS Device Discovery Layer Provider (VRTSddlpr) Multi-language Package
VRTSjaap	VERITAS Array Providers - Japanese Support
VRTSmuap	VERITAS Action Provider Language Package
VRTSmutep	VERITAS Task Exec Provider Language Package

High Availability (VERITAS Cluster Server) Japanese Packages

VRTSjacs	Japanese VERITAS Cluster Server Message Catalogs
VRTSjacsu	Japanese VERITAS Cluster Utility Language Pack
VRTSjacsj	Japanese VERITAS Cluster Server Cluster Manager
VRTSjacsm	Japanese VERITAS Cluster Server Simulator
VRTSjacsw	Japanese VERITAS Cluster Manager (Web Console)
VRTSjaweb	Japanese VERITAS Web Server Language Pack
VRTSjacsd	Japanese VERITAS Cluster Server Documentation

FlashSnap Agent for Symmetrix Japanese Packages

VRTSjafag	Japanese VERITAS Cluster Server Agents for VERITAS Flashsnap Agent for Symmetrix
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Japanese Language Packages

Package	Contents
VRTSjafas	Japanese VERITAS Flashsnap Agent for Symmetrix

Other Japanese Packages

VRTSmulic	Multi-language VERITAS License Utilities
VRTSmuobg (Windows client only)	VERITAS Enterprise Administrator Localized GUI Package

Chinese Language Packages

The following table shows the package name and contents for each Chinese language package:

Chinese Language Packages

Package	Contents
Volume Manager Chinese Packages	
VRTSmuvmp	Multi Language VERITAS Volume Manager Management Services Provider
VRTSmualc	VERITAS Intelligent Storage Provisioning (VRTSalloc) Multi-language Package
VRTSmuob	VERITAS Enterprise Administrator Service Localized Package
VRTSzhvmm	Chinese VERITAS Volume Manager, Manual Pages
VRTSzhvmd	Chinese VERITAS Volume Manager (User Documentation)
VRTSzhvmc	Chinese VERITAS Volume Manager - Message Catalogs
VRTSmufsp	Multi-language VERITAS File System Management Services Provider
VRTSmuddl	VERITAS Device Discovery Layer Provider (VRTSddlpr) Multi-language Package

Chinese Language Packages

Package	Contents
VRTSmulic	Multi-language VERITAS License Utilities
VRTSmuobg (Windows client only)	VERITAS Enterprise Administrator Localized GUI Package

French Language Packages

The following table shows the package name and contents for each French language package:

French Language Packages

Package	Contents
Volume Manager French Packages	
VRTSmuvmp	Multi Language VERITAS Volume Manager Management Services Provider
VRTSmualc	VERITAS Intelligent Storage Provisioning (VRTSalloc) Multi-language Package
VRTSmuob	VERITAS Enterprise Administrator Service Localized Package
VRTSfrvmm	French VERITAS Volume Manager, Manual Pages
VRTSfrvmd	French VERITAS Volume Manager (User Documentation)
VRTSfrvmc	French VERITAS Volume Manager - Message Catalogs
VRTSmufsp	Multi-language VERITAS File System Management Services Provider
VRTSmuddl	VERITAS Device Discovery Layer Provider (VRTSddlpr) Multi-language Package
VRTSmulic	Multi-language VERITAS License Utilities
VRTSmuobg (Windows client only)	VERITAS Enterprise Administrator Localized GUI Package



/opt Directory

The directory `/opt` must exist, be writable and must not be a symbolic link. When upgrading, volumes not temporarily converted by the `upgrade_start` script will be unavailable during the upgrade process. If you have a symbolic link from `/opt` to one of the unconverted volumes, the symbolic link will not function during the upgrade and items in `/opt` will not be installed.

Environment Variables

Most of the commands used in the installation are in the `/sbin` or `/usr/sbin` directory. However, there are additional variables needed to use the VERITAS Storage Foundation product after installation. Add the following directories to your `PATH` environment variable:

- ◆ If you are using Bourne or Korn shell (`sh` or `ksh`), use the commands:

```
$ PATH=$PATH:/usr/sbin:/opt/VRTS/bin:/opt/VRTSvxfs/sbin:\
/opt/VRTSdbed/bin:/opt/VRTSdb2ed/bin:/opt/VRTSsybed/bin\
/opt/VRTSob/bin
$ MANPATH=/usr/share/man:/opt/VRTS/man:$MANPATH
$ export PATH MANPATH
```

- ◆ If you are using a C shell (`csh` or `tcsh`), use the commands:

```
% set path = ( $path /usr/sbin /opt/VRTSvxfs/sbin \
/opt/VRTSdbed/bin /opt/VRTSdb2ed/bin /opt/ VRTSsybed/bin \
/opt/VRTSob/bin:/opt/VRTS/bin )
% setenv MANPATH /usr/share/man:/opt/VRTS/man:$MANPATH
```

Note If you are not installing on a database, you can omit `/opt/VRTSdbed/bin`, `/opt/VRTSdb2ed/bin`, and `/opt/VRTSsybed/bin`. If you are installing on a database, make sure you include the appropriate path.

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, VERITAS recommends that you copy them from the disc to the `/opt/VRTS/docs` directory on your system so that they are available for future reference.

VERITAS Volume Manager Requirements

Review the following Volume Manager-related items before installing or upgrading VERITAS Storage Foundation or VERITAS Volume Manager.

Taking a Disk Inventory

Selecting Disks

Decide which disks you want to place under VxVM control. The other disks in your configuration are not affected. Disks may be brought under VxVM control in two ways:

- ◆ Encapsulated disks—Data in all existing file systems and partitions on the disk are preserved.
- ◆ Initialized disks—Data on the disks is removed.

Verifying Disk Contents

Verify the disk contents. Answer the following questions and list the data for your convenience.

1. Make sure you are aware of the contents of each disk. Determine which disks can be encapsulated (data is preserved) or initialized (data is removed).
2. Do you want to place the system root disk under VxVM control?

3. Do you want to either encapsulate or initialize *all* disks on a controller together? Identify the controllers (for example c0t0d0).



4. Identify the disks to be encapsulated, initialized, or excluded, in a table similar to the following.

Disk ID	Encapsulate, Initialize, Exclude

5. If you are encapsulating disks, verify that the disks to be encapsulated by VxVM have two free partitions and a small amount of free space (2048 sectors).

The free space must be at the beginning or end of the disk and must not belong to a partition. This space is used for storing disk group configurations and a disk label that ensures VxVM can identify the disk, even if it is moved to a different address or controller. It is also used to keep track of disk configuration and to ensure correct recovery. VxVM allocates approximately 2048 sectors from each disk for the disk group configurations and the disk label. This space is sufficient to handle normal disk group configurations for up to approximately 100 disks.

The boot disk is a special case. If no other space is available, VxVM attempts to allocate space usually reserved for swap by shrinking the swap partition. This process is known as *swap relocation* and, if necessary, happens automatically during root disk encapsulation.

Note Although it is possible to put disks with no free space under VxVM control, this is only used as a migration strategy. Many VxVM capabilities based on disk identity are available only for disks with the required free space. See the `vxdisk(1M)` manual page for information on the `nopriv` disk type.

6. If you are encapsulating the boot (root) disk:
 - a. Before encapsulating your boot disk, set the EEPROM variable `use-nvramrc?` to **true**. This will enable VxVM to take advantage of boot disk aliases to identify the mirror of the boot disk if a replacement is needed. If this variable is set to **false**, you must determine which disks are bootable yourself. Set this variable to **true** as follows:

```
eeeprom "use-nvramrc?=true"
```

If your root disk is connected over fabric, you should check the Hardware Compatibility List to see if your device type is supported for boot encapsulation.

- b. Use the `prtvtoc(1M)` command to record the layout of the partitions on the unencapsulated boot disk (`/dev/rdisk/c0t0d0s2` in this example):

```
# prtvtoc /dev/rdisk/c0t0d0s2
```

Record the output from this command for future reference.

- c. To encapsulate the boot disk, tag the swap partition as swap so that it is possible to dump to that partition later. See `format (1M)` for information on tagging the swap partition.

Note If the path to an aliased boot device is different from the path in the `/devices` directory, aliases may not function correctly. This might happen if the pathname is incorrectly entered at the command line, or if the device's pathname changes at a later date.

7. A DMP consideration is that if your system uses Sun's AP software, this release of VxVM requires an AP upgrade and a Solaris Operating System patch. See "[DMP and Alternate Pathing](#)" on page 22.

Note Because Sun Microsystems only supports AP software on Solaris 8 or lower, this step does not apply if you are running Solaris 9 or Solaris 10.

Including and Excluding Disks

▼ Define which disks will be managed by VxVM

1. Log in as superuser (`root`).
2. Identify controllers, disks and enclosures that are to be excluded from being configured as VxVM devices by the `vxdiskadm` utility.
3. To exclude devices from VxVM control, create the `/etc/vx/cntrl.exclude`, `/etc/vx/disks.exclude` and `/etc/vx/enclr.exclude` files. You can:
 - ◆ exclude one or more disks from VxVM control.
 - ◆ exclude all disks on certain controllers from VxVM control.
 - ◆ exclude all disks in specific enclosures from VxVM control.



Note The `vxinstall` uses the `exclude` files to avoid configuring the specified disks as VxVM devices. These files do not exclude disks from use by any other VxVM commands.

Here are examples of each `exclude` file.

- ❖ To exclude one or more disks from VxVM control, create the `/etc/vx/disks.exclude` file, and add disk names to the file. The file contents would be similar to the following:

```
c0t1d0
c0t1d1
```
- ❖ To exclude all disks on certain controllers from VxVM control, create or edit the `/etc/vx/cntrlr.exclude` file, and add the names of the controllers to the file. The file contents would be similar to the following:

```
c0
c1
```
- ❖ To exclude all disks in specific enclosures from VxVM control, create or edit the `/etc/vx/enclr.exclude` file, and add the names of the enclosures to the file. The file contents would be similar to the following:

```
sena0
emc1
```

Partitioning Disks on Sun StorEdge 6120/6320 Arrays

If you are planning to install VxVM with Sun StorEdge 6120/6320 arrays, see the section in the *VERITAS Volume Manager Hardware Notes* called “Partitioning Disks on Sun StorEdge 6120/6320 Arrays.”

DMP and Alternate Pathing

This note only applies if you are running Solaris 8. VxVM 4.1 allows Dynamic Multipathing (DMP) to co-exist with Sun’s Alternate Pathing (AP) software. For VxVM to co-exist with AP successfully, you must upgrade AP before installing VxVM 4.1. This release of VxVM requires AP version 2.3.1 and Solaris OS patch 110722 (latest version).

If you do not know which version of AP is installed, run the following command:

```
#pkginfo -l SUNWapdv | grep VERSION
```

Upgrade AP to 2.3.1, and then install the patch before installing this release of VxVM.

DMP is described in more detail in the *VERITAS Volume Manager Administrator's Guide*.

Use the new interfaces provided through `vxdiskadm` to prevent DMP from multipathing certain or all devices connected to the system. These interfaces can also suppress devices from VxVM.

Note Sun Microsystems does not support AP software on Solaris 9 or Solaris 10.

Array Support Libraries (ASL)

VxVM provides support for new disk arrays in the form of Array Support Library (ASL) software packages. You can obtain ASL packages from:

- ◆ The VxVM release package in the `veritas_enabled` directory
- ◆ The disk array provided by the vendor
- ◆ The VERITAS Technical Support site, <http://support.veritas.com>

For further information on supported ASLs and installing ASLs, see the *VERITAS Volume Manager Hardware Notes*.

Disabling Hot-Relocation

The hot-relocation feature detects disk failure automatically, notifies you of the nature of the failure, attempts to relocate any affected subdisks that are redundant, and initiates recovery procedures.

The hot-relocation feature is enabled by default and it is recommended that you leave it on. However, if you need to disable it for some reason (for example, you do not want the free space on some of your disks used for relocation), you can do so by preventing the `vxrelocd` daemon from starting during system startup. Disable hot-relocation only after you install the VERITAS Volume Manager packages.

▼ To disable hot-relocation

1. Comment out the `vxrelocd` line in the startup file `/etc/rc2.d/S95vxvm-recover`, as follows:

```
# vxrelocd root &
```



2. After editing the file, you can kill the `vxrelocd` process or reboot the system.

Note If you disable hot-relocation, you are not notified by electronic mail of any failures that occur. This is because `vxrelocd` is responsible for notifying the system administrator of failures.

For more information on hot-relocation and `vxrelocd`, refer to the `vxrelocd (1M)` manual page.

VERITAS Enterprise Administrator

VERITAS Storage Foundation must be installed and run on a UNIX (Solaris) machine. The VERITAS Enterprise Administrator (VEA) client can be installed and run on any Solaris, Windows XP, Windows NT, Windows ME, Windows 2000, or Windows 98 machine that supports the Java Runtime Environment.

VERITAS Enterprise Administrator (VEA) is required to access the graphical user interface (GUI) for VERITAS Storage Foundation. You can use the GUI to administer disks, volumes, file systems, and database functionality on local or remote machines.

One of the following packages needs to be installed and running on the client:

- ◆ VERITAS Enterprise Administrator (VRTSobgui)
This is the client package for Solaris.
- ◆ VERITAS Enterprise Administrator for Windows (windows/VRTSobgui.msi)
This is the client package for Windows.

See the *VERITAS Storage Foundation Release Notes* for patch information before you install VEA.

Requirements

The following are minimum system recommendations for the GUI:

Solaris	SPARCstation 5 with 64M memory
Windows XP, NT, Me, 2000, or 98	300MHz Pentium with 256M memory

To install the VEA client on Solaris 8, you must install the appropriate java 1.4.1 patches for Solaris 8. See <http://support.veritas.com/docs/264714> for more information.

VMSA and VEA Co-existence

If you do not plan to use VMSA to administer other (pre-VxVM 3.5) machines, then you should uninstall VMSA before installing VEA. You can later do a client-only install if you want to run the VMSA client on your machine.

Note The release of VEA that ships with VxVM 4.1 is not compatible with VMSA, the previous VERITAS Volume Manager GUI. You cannot run VMSA with VxVM version 4.1.

If you do not remove VMSA, the following warning appears during a reboot:

```
VERITAS VM Storage Administrator Server terminated.
Stopping VERITAS VM Storage Administrator Server
### Terminated
```

The message informs you that the `vmsa_server` is unable to start. You can safely ignore this message.

You can avoid the message by removing the boot-time start up of the `vmsa_server`. Use the following command:

```
# /opt/VRTSvmsa/bin/autostart on
```

Alternatively, you can remove the files `/etc/init.d/vmsa-server` and `/etc/rc2.d/S96vmsa-server`.

Cluster Environment Requirements

Use these steps if the configuration contains a cluster, which is a set of hosts that share a set of disks.

▼ To configure a cluster

1. Obtain a license for the *optional* VxVM cluster feature from your Customer Support channel.
2. If you plan to encapsulate the root disk group, decide where you want to place it for each node in the cluster. The root disk group, usually aliased as `bootdg`, contains the volumes that are used to boot the system. VxVM sets `bootdg` to the appropriate disk group if it takes control of the root disk. Otherwise `bootdg` is set to `nodg`. To check the name of the disk group, enter the command:

```
# vxdg bootdg
```

3. Decide the layout of shared disk groups. There may be one or more shared disk groups. Determine how many you wish to use.



4. If you plan to use Dirty Region Logging (DRL) with VxVM in a cluster, leave a small amount of space on the disk for these logs. The log size is proportional to the volume size and the number of nodes. Refer to the *VERITAS Volume Manager Administrator's Guide* and the *VERITAS Storage Foundation Cross-Platform Data Sharing Administrator's Guide* for more information on DRL.
5. Install the license on every node in the cluster. For more information on enabling clustering, see ["Enabling Cluster Support in VxVM \(Optional\)"](#) on page 149.

Setting up a SAN Configuration

If you have a SAN configuration and if some disks in your SAN will not be under VxVM control, create a file called `/etc/vx/cntrls.exclude` or `/etc/vx/disks.exclude`. See ["Including and Excluding Disks"](#) on page 21 for more information.

Installing the VERITAS Software

This chapter provides an overview of the installation tasks for VERITAS Storage Foundation products 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 the VERITAS Software”](#) on page 65.

Topics covered in this chapter include:

- ◆ [“Installation Requirements”](#) on page 28
- ◆ [“Summary of VERITAS Storage Foundation Installation Tasks”](#) on page 29
- ◆ [“Installing VERITAS Storage Foundation”](#) on page 30
- ◆ [“Verifying the VERITAS Storage Foundation Installation”](#) on page 42
- ◆ [“Loading and Unloading the File System Module”](#) on page 46
- ◆ [“Installing the VERITAS Software with JumpStart”](#) on page 47
- ◆ [“Installing Language Packages”](#) on page 52
- ◆ [“Installing VERITAS Volume Manager”](#) on page 54
- ◆ [“Installing VERITAS File System”](#) on page 60

Note Only users with superuser (root) privileges can install VERITAS products.



Installation Requirements

VERITAS software and operating system installation requirements are described in the following sections.

Mapping Services and Performance Statistics for Databases

- ◆ You must install VERITAS Array Integration Layer (VAIL) and VERITAS Mapping Services (VxMS) if you want to use deep mapping services and performance statistics for supported storage arrays. VERITAS Storage Foundation *for Sybase* does not support this option.
- ◆ 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. For more information, see the *VERITAS Storage Foundation Oracle Administrator's Guide* or *VERITAS Storage Foundation DB2 Administrator's Guide*.

Remote Installation

For information on configuring your system for remote installations, refer to the “Configuring SSH or RSH Before Installing VERITAS Products” section of the *VERITAS Storage Foundation and High Availability Solutions Getting Started Guide* that came with your software discs.

Operating System

If patches to the Solaris operating system are required, the patches should be applied just prior to installing the VERITAS products. Patches may be required to resolve Solaris 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, Solaris (Sun), IBM (DB2), Oracle, or Sybase software.

Summary of VERITAS Storage Foundation Installation Tasks

Installation of VERITAS Storage Foundation products consists of the following tasks:

- ◆ Reviewing *Release Notes* for the most current product information.
- ◆ Reviewing preinstallation requirements (see “[Preinstallation Instructions](#)” on page 1) and making any necessary modifications.
- ◆ Adding Solaris operating system patches, if needed. Refer to the *Release Notes* for specific software patch information.
- ◆ Obtaining a license key.
- ◆ Installing or upgrading the VERITAS Storage Foundation software packages. For new installations, use the instructions in this chapter. For upgrades, see “[Upgrading the VERITAS Software](#)” on page 65.

After you complete the installation procedure, read “[Configuring the VERITAS Software](#)” on page 131 for important details about initializing, setting up, and using the VERITAS software shipped with the VERITAS Storage Foundation products.

Note Installing VERITAS Storage Foundation using the product installer will automatically configure the software. If you install using an alternative method, you will have to run the product installer to configure the software.

Installation and Upgrade Paths

Follow the installation or upgrade instructions based on your site’s needs.

Installation and Upgrade Instructions for VERITAS Storage Foundation Products

To install or upgrade...	Go to...
Storage Foundation and Storage Foundation HA	“ Installing VERITAS Storage Foundation ” on page 30 or “ Upgrading VERITAS Storage Foundation ” on page 82
Storage Foundation <i>for DB2</i> and Storage Foundation <i>for DB2</i> HA	“ Installing VERITAS Storage Foundation ” on page 30 or “ Upgrading VERITAS Storage Foundation ” on page 82
Storage Foundation <i>for Oracle</i> and Storage Foundation <i>for Oracle</i> HA	“ Installing VERITAS Storage Foundation ” on page 30 or “ Upgrading VERITAS Storage Foundation ” on page 82
Storage Foundation <i>for Sybase</i> and Storage Foundation <i>for Sybase</i> HA	“ Installing VERITAS Storage Foundation ” on page 30 or “ Upgrading VERITAS Storage Foundation ” on page 82
Solaris Operating System	“ Upgrading the Solaris OS Only ” on page 116



Installation and Upgrade Instructions for VERITAS Storage Foundation Products

To install or upgrade...	Go to...
Volume Manager	“Installing VERITAS Volume Manager” on page 54 or “Upgrading VERITAS Volume Manager (VxVM)” on page 98
File System	“Installing VERITAS File System” on page 60 or “Upgrading VERITAS File System” on page 129

Installing VERITAS Storage Foundation

This section describes how to install the VERITAS Storage Foundation products for the first time. These instructions apply to VERITAS Storage Foundation, VERITAS Storage Foundation *for DB2*, VERITAS Storage Foundation *for Oracle*, and VERITAS Storage Foundation *for Sybase*.

The product installer simplifies the process of installing VERITAS software and VERITAS strongly recommends this method of installation.

After you complete the installation procedure, read [“Configuring the VERITAS Software”](#) on page 131 for important details about initializing (where required), setting up, and using the VERITAS software shipped with VERITAS Storage Foundation.

Mounting the Software Disc

You must have superuser (root) privileges to load the VERITAS software.

▼ To mount the software disc

1. Log in as superuser (root).
2. Insert the media disc into your system’s CD-ROM drive connected to your system.
3. If Solaris volume management software is running on your system, the software disc is automatically mounted as `/cdrom/cdrom0`.

If Solaris volume management software is not available to mount the disc, mount it manually. To mount the disc, enter the following:

```
# mount -F hsfs -o ro /dev/dsk/c0t6d0s2 /mount_point
```

where `c0t6d0s2` is the default address for the CD-ROM drive.



To install, use one of the following procedures:

To install	See
<ul style="list-style-type: none">♦ VERITAS Storage Foundation♦ VERITAS Storage Foundation <i>for DB2</i>♦ VERITAS Storage Foundation <i>for Oracle</i>♦ VERITAS Storage Foundation <i>for Sybase</i>	“Installing Using the Product Installer” on page 31
VERITAS Volume Manager	“Installing VERITAS Volume Manager” on page 54
VERITAS File System	“Installing VERITAS File System” on page 60

Installing Using the Product Installer

The product installer simplifies the process of installing VERITAS software and VERITAS strongly recommends this method of installation. The installer enables you to configure the product, verify preinstallation requirements, and view the product’s description.

Select a product to install from the product installer menu to invoke the product installation script.

Note If you have obtained a VERITAS product from an electronic download site, the single product download files do not contain the installer installation script, so you must use the product installation script to install the product. For example, if you download VERITAS Storage Foundation, use the `installsf` script instead of the installer script.

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 VERITAS Storage Foundation Enterprise HA cluster with two nodes: “host1” and “host2.” If you are installing on stand-alone systems only, some steps are unnecessary, and these are indicated. Default responses are enclosed by parentheses. Press Return to accept defaults.



▼ To install a VERITAS Storage Foundation product

1. Insert the product software disc into a CD-ROM drive attached to your system and mount it (see [“Mounting the Software Disc”](#) on page 30).

2. Move to the CD-ROM directory:

```
# cd /cdrom/cdrom0
```

Note If you are using the VERITAS Enterprise Administrator (VEA) GUI on your system, stop the VEA service before performing a new installation, an uninstall, or an upgrade. To stop the VEA service, on each system type:

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

3. From the /cdrom/cdrom0 directory, invoke the installer script:

```
# ./installer (to install using rsh)
```

or:

```
# ./installer -ussssh (to install using ssh)
```

For information on installing on multiple hosts, see [“Completing the Installation Procedure on an HA Environment”](#) on page 37.

4. If the VRTSvlic licensing package is installed, the Product Status page displays the following:

- ◆ Products available for installation
- ◆ Products currently installed
- ◆ Products that are licensed
- ◆ Options for operations you can initiate

Note You can use the /opt/VRTS/bin/vxlicrep command to view a report of the license type for each product.

5. At the Product Status page, enter **I** for the product installer and press Return. The product installer is displayed.
6. At the VERITAS product installer page, enter the number of the product you want to install and press Return.
The product installation begins.
7. Enter the system names on which the software is to be installed when prompted and press Enter to continue.

8. After the script checks the system configuration, press Enter. The utility begins installing the infrastructure packages.
9. During license verification, you are prompted to enter a license key. Select **y** to add a license key. Then, enter the license key and press Enter.

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

SF Licensing Verification:

```

Checking SF license key on host1 ..... not licensed
Enter a SF license key for host1: [?]
XXXX-XXXX-XXXX-XXXX-XXXX-XXXX-X
Registering VERITAS Storage Foundation Enterprise HA key on host1

Do you want to enter another license key for host1? [y,n,q,?] (n) n

Registering XXXX-XXXX-XXXX-XXXX-XXXX-XXXX-X on host1
Checking SF license key on host1 .....Storage Foundation
Enterprise HA

Do you want to enter another license key for host1? [y,n,q,?] (n) 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. The following prompt is displayed when you
have added licenses to all the systems. Press Enter to continue.
```

10. A list of optional packages is now displayed. Enter **1** or press Enter to install the standard and all optional packages.

```

1) Install all of the optional filesets
2) Install none of the optional filesets
3) View fileset descriptions and select optional filesets
Select the optional filesets to be installed on all systems?
[1-3,q,?] (1) 1
```

Note The list of optional filesets may differ depending on the license keys that you entered in step 9.

The utility lists the packages to be installed. Press Enter to continue listing the packages.

11. When prompted, press Enter. The utility begins checking the installation requirements for each of the nodes.



12. If you are installing on a cluster, proceed to “[Configuring VERITAS Storage Foundation on a Cluster](#)” on page 34 to configure Storage Foundation Enterprise HA. Otherwise, read “[Configuring the VERITAS Software](#)” on page 131 for important details about initializing (where required), setting up, and using the VERITAS software shipped with VERITAS Storage Foundation.

Configuring VERITAS Storage Foundation on a Cluster

Note Use the procedure in this section 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 Storage Foundation at this point in the installation procedure is optional.

▼ To configure Storage Foundation on a cluster

1. At the following prompt, enter **y** or press Enter to configure Storage Foundation.

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

A message is displayed describing how to configure Storage Foundation using the product installer.
2. Press Enter to continue. A message is displayed describing the VERITAS Cluster Server (VCS) configuration requirements.
3. You are then prompted to enter information about the cluster. Sample entries and output are based on the two-node cluster comprising “host1” and “host2.” The redundant private network is configured over the network interfaces en1 and en0, and the public network connected via “eth0” is not used as a low priority heartbeat link.

```
Enter the unique Cluster name: [?] clustertest  
Enter the unique Cluster ID number between 0-255: 5
```

Discovering NICs on host1..... discovered en0 en1 en2 en3

```
Enter the NIC for the first private heartbeat NIC on host1: [b,?]  
en1  
Would you like to configure a second private heartbeat link?  
[y,n,q,b,?] (y) y  
Enter the NIC for the second private heartbeat NIC on host1: [b,?]  
en0
```

```

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) n

```

```

Discovering NICs on host2..... discovered en2 en3

```

```

Enter the NIC for the first private heartbeat NIC on host2: [b,?]
en3
Would you like to configure a second private heartbeat link?
[y,n,q,b,?] (y) y
Enter the NIC for the second private heartbeat NIC on host2: [b,?]
en2
Would you like to configure a third private heartbeat link?
[y,n,q,b,?] (n) n

```

4. The utility summarizes the cluster information. When prompted, enter **y** to confirm the information is correct. If the information displayed is not correct, enter **n** to re-enter the information.

```

Cluster information verification:

```

```

Cluster Name: clustertest
Cluster ID Number: 5
Private Heartbeat NICs for host1: link1=en1 link2=en0
Private Heartbeat NICs for host2: link1=en3 link2=en2

```

```

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

```

5. A message displays notifying you of the information required to add VCS users. When prompted to add a password for the Administrator, enter **y** to set the password for the administrator. Enter **n** if you want to decline.
6. At the prompt, enter the password and press Enter. You are then asked to re-enter the password for verification.
7. When prompted to add a user, enter **y** to proceed. Enter **n** if you want to decline.



8. For each user, enter the following:
 - ◆ user name
 - ◆ password
 - ◆ password again (for verification)
 - ◆ privilege
9. When you have finished adding users, enter **n** when prompted to add another user. A summary of the newly added users displays. Press **y** to confirm the information. Press **n** to enter the information again.
10. A message displays notifying you of the configuration requirements for Cluster Manager (the VCS graphical user interface). When prompted to configure this feature, enter **y** to continue. Enter **n** if you want to decline.
11. When prompted for Cluster Manager information, enter details of the public NIC, virtual IP address, and network mask to be used by Cluster Manager.
12. A message displays notifying you of the configuration requirements for SMTP email notification. When prompted to configure this feature, enter **y** to proceed. Enter **n** if you want to decline.
13. When prompted, enter the following information for SMTP email notification:
 - ◆ SMTP server's host name
 - ◆ email address of each recipient
 - ◆ minimum security level of messages to be sent to each recipient
14. A message displays notifying you of the configuration requirements for SNMP trap notification. When prompted to configure this feature, enter **y** to proceed. Enter **n** if you want to decline.
15. When prompted, enter the following information for SNMP trap notification:
 - ◆ SNMP trap daemon port
 - ◆ SNMP console system name
 - ◆ minimum security level of messages to be sent to each console
16. Proceed to [“Completing the Installation Procedure on an HA Environment”](#) on page 37.



Completing the Installation Procedure on an HA Environment

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

```
Would you like to install Storage Foundation Enterprise HA on all
systems simultaneously? [y,n,q,?] (y) y
```

```
Installing Storage Foundation Enterprise HA 4.1 on all systems
simultaneously:
```

```
Copying VRTSperl.rte.tar.gz to host2 ..... Done 1 of 102 steps
Installing VRTSperl 4.1 on host2 ..... Done 2 of 102 steps
Copying VRTSob.tar.gz to host2..... Done 3 of 102 steps
Installing VRTSperl 4.1 on host1 ..... Done 4 of 102 steps
Installing VRTSob 3.2.514.1 on host2 ..... Done 5 of 102 steps
Installing VRTSob 3.2.514.1 on host1 ..... Done 6 of 102 steps
.
.
```

2. A message displays notifying you of successful installation. Press Enter to continue.

```
Storage Foundation Enterprise HA installation completed
successfully.
```

```
Press [Return] to continue:
```

3. 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.



4. A message displays indicating the VCS configuration files are being created and copied. Press Enter to continue.

A message displays indicating which systems can be started and on the systems that VxVM selects as targets.

```
Evaluating which systems can now be started...
```

```
System host1 is eligible -- can be started.
```

```
System host2 is eligible -- can be started.
```

```
Preparing to start VxVM on target systems...
```

```
Begin initial start of VxVM on system host1
```

```
Starting vxconfigd for VxVM
```

```
Done with initial start of VxVM on system host1
```

```
Begin initial start of VxVM on system host2
```

```
Starting vxconfigd for VxVM .....Succeeded
```

```
Done with initial start of VxVM on system host2
```

```
Done with starting VxVM on target systems...
```

5. Press Enter to continue. A message displays notifying you that Cluster Server is starting. This message also contains information about configuring a default disk group.

```
Starting Cluster Server:
```

```
Starting LLT on host1 ..... Started
```

```
Starting LLT on host2 ..... Started
```

```
Starting GAB on host1 ..... Started
```

```
Starting GAB on host2 ..... Started
```

```
Starting Cluster Server on host1 ..... Started
```

```
Starting Cluster Server on host2 ..... Started
```

```
Confirming Cluster Server startup ..... 2 systems RUNNING
```

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

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.

Evaluating which systems can now have their default disk group configured...

System host1 is eligible -- can configure the default diskgroup.
System host2 is eligible -- can configure the default diskgroup.

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 `vxctl defaultdg diskgroup` command on a system. See the `vxctl(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.

7. Finally, a message displays indicating the utility is preparing to start the daemons on the target systems.

```
Preparing to start daemons on target system(s)...
Starting vxrelocd on host1 ..... Success
Starting vxcached on host1 ..... Success
Starting vxconfigbackupd on host1 ..... Success
```

```
Starting vxrelocd on host2 ..... Success
Starting vxcached on host2 ..... Success
Starting vxconfigbackupd on host2 ..... Success
Storage Foundation Enterprise HA was started successfully.
```

Press [Return] to continue:

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

The installation summary is saved at:

```
/opt/VRTS/install/logs/installer610192714.summary
```

The installer log is saved at:

```
/opt/VRTS/install/logs/installer610192714.log
```

The installation response file is saved at:

```
/opt/VRTS/install/logs/installer610192714.response
```



8. Reboot the system.
9. After you complete the installation procedure, read “[Configuring the VERITAS Software](#)” on page 131 for important details about initializing (where required), setting up, and using the VERITAS software shipped with VERITAS Storage Foundation.

Installing the VERITAS Enterprise Administrator Client

If you plan to run the VEA client, you must install the `VRTSobgui` package on the machine you are planning to use.

By default, the `VRTSobgui` package is installed when you install a VERITAS Storage Foundation product. You only need to install the package manually if you are installing on a machine other than the server.

Installing on Solaris

▼ To install the VEA client on a Solaris machine using `pkgadd`

1. Log in as superuser (`root`).
2. First, check to determine whether the VEA client package is already installed.

```
# pkginfo | grep VRTSobgui
```

This command will return `VRTSobgui` if `VRTSobgui` is already installed. It will return nothing if the package has not been installed.
3. To install the VEA client package for Solaris, insert the appropriate media disc into your system’s CD-ROM drive.

4. Copy the `VRTSobgui.tar.gz` package to the current working directory on your system.

```
# cp /cdrom/cdrom0/storage_foundation/pkgs/VRTSobgui.tar.gz .
```

5. Decompress the package and then extract the contents.

```
# /cdrom/cdrom0/storage_foundation/scripts/install\  
/gunzip VRTSobgui.tar.gz  
# tar xvf VRTSobgui.tar
```

6. Use the `pkgadd` command to install the package.

```
pkgadd -d . VRTSobgui
```

7. Press Return.

The VEA client package for Solaris is installed.

Installing on Windows

The VEA client runs on Windows NT, Windows XP, Windows 2000, Windows ME, Windows 98, and Windows 95 machines. If you plan to run VEA from a Windows machine, install the optional Windows package after you have installed the VEA server on a Solaris machine.

Before you install VEA on a Windows machine, 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 any given time.

Note If you plan to install the GUI client on Windows NT 4.0, Windows Installer must be upgraded to version 2.0. For more information about upgrading Windows Installer, visit <http://www.microsoft.com>. If you are using Windows NT 4.0, it is also recommended that you use Windows NT 4.0 Service Pack 6.

▼ To install the VEA client on a Windows machine

1. Insert the appropriate media disc into your system's CD-ROM drive.
2. Using Windows Explorer or a DOS Command window, go to the `/windows` directory and execute the `vrtsobgui.msi` program with Windows Installer.
3. Follow the instructions presented by the `vrtsobgui.msi` program.
4. After installation is complete, ensure environment changes made during installation take effect by performing one of the following procedures:
 - ◆ For Windows NT, Windows 2000 or Windows XP, log out and then log back in.
 - ◆ For Windows ME, Windows 98 or Windows 95, restart the computer.



Verifying the VERITAS Storage Foundation Installation

Use the following sections to verify the product installation.

Checking Volume Manager Processes

After a VERITAS Storage Foundation product has been successfully installed, you can confirm that key Volume Manager processes (`vxconfigd`, `vxnotify`, and `vxrelocd`) are running by using the following command:

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

Entries for these processes are similar to the following:

```
142 ?    00:00:00vxiod
143 ?    00:00:00vxiod
.
.
.
150 ?    00:00:00vxiod
151 ?    00:00:00vxiod
159 ?    00:01:12vxconfigd
405 ?    00:00:00vxrelocd
410 ?    00:00:00vxnotify
411 ?    00:00:00vxrelocd
```

Note If you have disabled hot-relocation, the `vxrelocd` and `vxnotify` processes are not displayed.

Verifying VxFS Installation

The VERITAS File System package consists of a kernel component and administrative commands.

Kernel Installation Verification

To ensure that the file system driver is loaded, enter:

```
# modinfo | grep vxfs
```

The `modinfo` command displays information about all modules loaded on the system. If the `vxfs` module is loaded, you will see an entry corresponding to `vxfs`. If not, follow the instructions in [“Loading and Unloading the File System Module”](#) on page 46 to complete the process.

Command Installation Verification

The VERITAS File System commands are installed in four directories:

<code>/etc/fs/vxfs</code>	Contains the VERITAS <code>mount</code> command and QuickLog commands required to mount file systems.
<code>/usr/lib/fs/vxfs/bin</code>	Contains the VxFS type-specific switch-out commands.
<code>/opt/VRTSvxfs/sbin</code>	Contains the VERITAS-specific commands.
<code>/opt/VRTS/bin</code>	Contains symbolic links to all VERITAS-specific commands installed in the directories listed above.

Determine whether these subdirectories are present:

```
# ls /etc/fs/vxfs
# ls /usr/lib/fs/vxfs/bin
# ls /opt/VRTSvxfs/sbin
# ls /opt/VRTS/bin
```

Make sure you have adjusted your environment variables accordingly. See “[Environment Variables](#)” on page 18 for details.

Checking Cluster Operation

Note This section is only relevant 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
```

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.



To display the VCS attribute values for each node in the cluster, enter the following command on any node:

```
# hasys -display
```

For more information on interpreting the output from this command, see the `hasys(1M)` manual page and the *VERITAS Cluster Server User's Guide*.

LLT (Low Latency Transport)

The `/etc/llthosts` File

The file `llthosts(4)` is a database containing one entry per node that links the 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 `/etc/llttab` File

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.

LLT Operation

Use the `lltstat` command to verify that links are active for LLT. This command returns information about the links for LLT for the node on which it is typed.

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.

For information on ports open for LLT, type `lltstat -p` on any node.

GAB Files, GAB and Cluster Operation

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

The `/etc/gabtab` File

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.

GAB Operation

To verify that GAB is operating, type the following command on each node:

```
# /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 random generation number, and `membership 01` indicates that nodes 0 and 1 are connected.

Port `h` indicates that VCS is started, `gen fd570002` is a random generation 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*.



Loading and Unloading the File System Module

On Solaris 8, 9, and 10, the `vxfs` file system module automatically loads on the first reference to a VxFS file system. This occurs when a user tries to mount a VxFS disk layout. In some instances, you may want to load the file system module manually. To do this, first load `vxfs`, then `vxportal`. `vxportal` is a pseudo device driver that enables VxFS commands to issue ioctls to the VxFS modules even when there are no file systems mounted on the system.

```
# modload /kernel/fs/vxfs
# modload /kernel/drv/vxportal
```

If you have a license for the VERITAS Quick I/O feature, you can load its kernel modules:

```
# modload /usr/kernel/drv/sparcv9/fdd
```

To determine if the modules successfully loaded, enter:

```
# modinfo | grep vxportal
# modinfo | grep vxfs
```

The above commands provide information about the modules. The first field in the output is the module ID.

You can unload the module by entering:

```
# modunload -i portal_module_id
# modunload -i vxfs_module_id
```

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

```
# df -F vxfs
```

Installing the VERITAS Software with JumpStart

If you plan to install VERITAS Storage Foundation, VERITAS Storage Foundation *for DB2*, VERITAS Storage Foundation *for Oracle*, or VERITAS Storage Foundation *for Sybase* using JumpStart, unzip the packages and then follow the documentation that came with your OS.

Unzipping the Packages

Before you can install the packages, you must unzip them.

▼ To unzip the packages

1. Log in as superuser (root).
2. Create a directory for installation.

```
# mkdir /tmp/install
```
3. Insert the software disc with the VERITAS Storage Foundation software into a drive connected to the system. The Solaris volume-management software automatically mounts the CD as /cdrom/cdrom0. Type the command:

```
# cd /cdrom/cdrom0
```
4. Copy the compressed package files from the software disc to the temporary directory.

```
# cp -r storage_foundation/pkgs/* /tmp/install
```
5. Go to the temporary directory and unzip the compressed package files.

Note If your system does not have the gunzip utility, copy it from the disc:

```
# cp /cdrom/cdrom0/gnu/gunzip /tmp/install
```

```
# cd /tmp/install  
# gunzip VRTS*.gz
```

6. Decompress and extract each package.

```
# tar xf package_name.tar  
# tar xf package_name.tar  
# tar xf package_name.tar  
.  
.
```



7. List the files in the temporary directory.

```
# ls /tmp/install
VRTScpi  VRTSvlic VRTSperl  VRTSob   VRTSobgui VRTSat  VRTSvxvm
VRTSvmman VRTSvmdoc VRTSvmpro VRTSfspro VRTSalloc VRTSddlpr
VRTSvxfs  VRTStep  VRTSap   VRTSfsman VRTSfsdoc VRTSfssdk
VRTSfsmnd VRTSl1t  VRTSgab  VRTSvxfen VRTSvcs   VRTSvcsmsg
VRTSvcsag VRTSvcsmn VRTSvcsdc VRTSjre  VRTScutil VRTScssim
VRTScscw  VRTSweb  VRTSvcs  VRTScscm VRTSvail  VRTSfas
VRTSfasag VRTSvrpro VRTSvcsvr VRTSvrw  VRTSvrdoc VRTSdb2ed
VRTSsybed VRTSdbed  VRTSodm  VRTSvxmsa VRTSd2gui VRTSorgui
VRTSdbdoc VRTSvcsor VRTScsocw
```

Installation Order

You must install the packages in the correct order. This section provides the package lists for each product in the correct order.

Note For details on all language packages, see [“Disk Space”](#) on page 9.

VERITAS Storage Foundation

VRTSvlic VRTSperl VRTSob 115209-16 115210-16 117499-02 VRTSobgui
VRTSat VRTSvxvm VRTSvmman VRTSvmdoc VRTSvmpro VRTSfspro VRTSalloc
VRTSddlpr VRTSvxfs VRTStep VRTSap VRTSfsman VRTSfsdoc VRTSfssdk
VRTSfsmnd VRTSl1t VRTSgab VRTSvxfen VRTSvcs VRTSvcsmsg VRTSvcsag
VRTSvcsmn VRTSvcsdc VRTSjre VRTScutil VRTScssim VRTScscw VRTSweb
VRTSvcs VRTScscm VRTSvail VRTSfas VRTSfasag VRTSvrpro VRTSvcsvr
VRTSvrw VRTSvrdoc VRTSodm VRTSvxmsa VRTSvcsor VRTScsocw

Note Patch 115209-16 is for the VRTSob package and must be installed after VRTSob.
Patch 115210-16 is for the VRTSobgui package and can be installed in any order.
Patch 117499-02 is for HA installations only and is for the VRTSat package. Patch
117499-02 can be installed in any order.

VERITAS Storage Foundation for DB2

VRTSvlic VRTSperl VRTSob 115209-16 115210-16 117499-02 VRTSobgui
VRTSat VRTSvxvm VRTSvmman VRTSvmdoc VRTSvmpro VRTSfspro VRTSalloc
VRTSddlpr VRTSvxfs VRTStep VRTSap VRTSfsman VRTSfsdoc VRTSfssdk
VRTSfsmnd VRTSl1t VRTSgab VRTSvxfen VRTSvcs VRTSvcsmg VRTSvcsag
VRTSvcsmn VRTSvcsdc VRTSjre VRTScutil VRTScssim VRTScscw VRTSweb
VRTSvcsw VRTScscm VRTSvail VRTSfas VRTSfasag VRTSvrpro VRTSvcsvr
VRTSvrw VRTSvrdoc VRTSdb2ed VRTSvxmsa VRTSd2gui VRTSdbdoc
VRTSvcsor VRTScsocw

Note Patch 115209-16 is for the VRTSob package and must be installed after VRTSob.
Patch 115210-16 is for the VRTSobgui package and can be installed in any order.
Patch 117499-02 is for HA installations only and is for the VRTSat package. Patch
117499-02 can be installed in any order.

VERITAS Storage Foundation for Oracle

VRTSvlic VRTSperl VRTSob 115209-16 115210-16 117499-02 VRTSobgui
VRTSat VRTSvxvm VRTSvmman VRTSvmdoc VRTSvmpro VRTSfspro VRTSalloc
VRTSddlpr VRTSvxfs VRTStep VRTSap VRTSfsman VRTSfsdoc VRTSfssdk
VRTSfsmnd VRTSl1t VRTSgab VRTSvxfen VRTSvcs VRTSvcsmg VRTSvcsag
VRTSvcsmn VRTSvcsdc VRTSjre VRTScutil VRTScssim VRTScscw VRTSweb
VRTSvcsw VRTScscm VRTSvail VRTSfas VRTSfasag VRTSvrpro VRTSvcsvr
VRTSvrw VRTSvrdoc VRTSdbed VRTSodm VRTSvxmsa VRTSorgui VRTSdbdoc
VRTSvcsor VRTScsocw

Note Patch 115209-16 is for the VRTSob package and must be installed after VRTSob.
Patch 115210-16 is for the VRTSobgui package and can be installed in any order.
Patch 117499-02 is for HA installations only and is for the VRTSat package. Patch
117499-02 can be installed in any order.



VERITAS Storage Foundation for Sybase

VRTSvlic VRTSperl VRTSob 115209-16 115210-16 117499-02 VRTSobgui
VRTSat VRTSvxvm VRTSvmman VRTSvmdoc VRTSvmpro VRTSfspro VRTSalloc
VRTSddlpr VRTSvxfs VRTStep VRTSap VRTSfsman VRTSfsdoc VRTSfssdk
VRTSfsmnd VRTSllt VRTSgab VRTSvxfen VRTSvcs VRTSvcsmsg VRTSvcsag
VRTSvcsmn VRTSvcsdc VRTSjre VRTScutil VRTScssim VRTScscw VRTSweb
VRTSvcsw VRTScscm VRTSvail VRTSfas VRTSfasag VRTSvrpro VRTSvcsvr
VRTSvrw VRTSvrdoc VRTSsybed VRTSvxmsa VRTSorgui VRTSdbdoc
VRTSvcsor VRTScsocw

Note Patch 115209-16 is for the VRTSob package and must be installed after VRTSob.
Patch 115210-16 is for the VRTSobgui package and can be installed in any order.
Patch 117499-02 is for HA installations only and is for the VRTSat package. Patch
117499-02 can be installed in any order.

Volume Manager

VRTSvlic VRTSob 115209-16 115210-16 117499-02 VRTSobgui VRTSvxvm
VRTSvmpro VRTSfspro VRTSalloc VRTSddlpr VRTSvmman VRTSvmdoc

Note Patch 115209-16 is for the VRTSob package and must be installed after VRTSob.
Patch 115210-16 is for the VRTSobgui package and can be installed in any order.
Patch 117499-02 is for HA installations only and is for the VRTSat package. Patch
117499-02 can be installed in any order.

File System

VRTSvlic VRTSob 115209-16 115210-16 117499-02 VRTSobgui VRTSvxfs
VRTStep VRTSap VRTSfspro VRTSfssdk VRTSfsmnd VRTSfsman VRTSfsdoc

Note Patch 115209-16 is for the VRTSob package and must be installed after VRTSob.
Patch 115210-16 is for the VRTSobgui package and can be installed in any order.
Patch 117499-02 is for HA installations only and is for the VRTSat package. Patch
117499-02 can be installed in any order.

Summary of JumpStart Installation Tasks

Caution For detailed instructions, follow the JumpStart documentation that came with your OS. These steps are provided as a summary only.

Installing the VERITAS packages on a JumpStart server consists of the following tasks:

1. Unzip the packages.
2. Copy the packages to a JumpStart server under a shared directory on the network.
3. Issue a command similar to the following on a JumpStart client:

```
# pkgadd -R /pathname -a admin_file -d mount_point package_name \  
package_name ...
```

where *mount_point* is the mount point of the network shared directory to which you copied the packages in step 2.

For the list of packages, see “[Installation Order](#)” on page 48.

Note This command can be added as part of the `finish_install` (post-install) script of the JumpStart client.

4. Run the `installsf -configure` command to configure the VERITAS software.



Installing Language Packages

If you are installing a VERITAS Storage Foundation product in a language other than English, you must install the required language packages *after* installing the English packages. If you are planning to use the GUI, you must install the language package for the VEA client.

▼ To install the product language packages on the server

1. Make sure the VEA Service is not running.

```
# /opt/VRTS/bin/vxsvcctl status
Current state of server : RUNNING
```

2. If the VEA Service is running, stop it using the `vxsvcctl stop` command.

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

3. Insert the “Language” disc into the CD-ROM drive. If you are using Solaris volume management software, the disc is automatically mounted as `/cdrom/cdrom0`.

4. Install the language packages using the `install_lp` command.

```
# cd /cdrom/cdrom0
# ./install_lp
```

5. After installing the language packages, restart the VEA Service.

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

▼ To install the client language package on a Solaris machine other than the server

1. Make sure the VEA Service is not running.

```
# /opt/VRTS/bin/vxsvcctl status
Current state of server : RUNNING
```

2. If the VEA Service is running, stop it using the `vxsvcctl stop` command.

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

3. Insert the “Language” disc into the CD-ROM drive. If you are using Solaris volume management software, the disc is automatically mounted as `/cdrom/cdrom0`.

4. From the appropriate package directory, copy the `VRTSmuobg.tar.gz` package to the current working directory on your system.

```
# cp -r /cdrom/cdrom0/ja/storage_foundation/pkgs \
/VRTSmuobg.tar.gz .
```

Note If you are installing the client package for the Chinese or French version of VERITAS Volume Manager, the directory will be different.

5. Decompress the package and then extract the contents.

```
# /cdrom/cdrom0/storage_foundation/scripts/install\
/gunzip VRTSmuobg.tar.gz
# tar xvf VRTSmuobg.tar
```

6. Use the `pkgadd` command to install the package.

```
pkgadd -d . VRTSmuobg
```

7. Press Return.

The VEA client package for Solaris is installed.

▼ To install the client language package on a Windows machine

1. Insert the “Language” disc into the CD-ROM drive.
2. Go to the directory containing the client language package.
Go to `D:\language\windows`
where D is the CD-ROM drive.
3. Double-click on the `VRTSmuobg.msi` package to install it.
4. Follow any instructions during installation.



Installing VERITAS Volume Manager

If you purchased VERITAS Volume Manager only, use the steps in this section to install the product. If you purchased one of the Storage Foundation products, see [“Installing VERITAS Storage Foundation”](#) on page 30.

Installing VxVM Using the Product Installer

▼ To install VxVM

1. Mount the disc. For more information, see [“Mounting the Software Disc”](#) on page 30.

2. Go to the top level directory of the disc:

```
# cd /cdrom/cdrom0
```

3. Run the product installer:

```
# ./installer
```

The Selection Menu appears and prompts you to enter a letter indicating your selection. In the following example, the selection is “I” to select a product. The product being installed is VERITAS Volume Manager.

4. You are then prompted to enter the system names. The installation script performs an initial system check, and confirms success by displaying information regarding the OS version, whether the VRTSvxvm package is installed, and whether the necessary patches are installed.
5. Press **Return**. The utility begins installing the infrastructure packages.
6. Press **Return** to begin license verification.
7. Enter the license key. For example:

```
XXXX-XXXX-XXXX-XXXX-XXXX-XXXX-XXX
```

The output resembles the following:

```
Registering VERITAS Volume Manager NFR key on test1
Do you want to enter another license key for test1? [y,n,q,?] (n)
```

8. Repeat [step 7](#) as prompted for any other systems. When this is complete, the following is displayed:

```
VxVM licensing completed successfully.
```

9. Press **Return** to view the optional VxVM packages.
10. Enter **1** to install all optional packages.
11. Press **Return**. The utility then checks the installation requirements on the systems.
If the requirements are met, the following is displayed:
12. Press **Return**. The packages will install.
13. Press **Return**. The installation is complete.

Installing VxVM Using the installvm Script

Before installing VxVM, you must first mount the software disc. See [“Mounting the Software Disc”](#) on page 30 for instructions.

Note The VERITAS product installer is not available if you purchased VERITAS Volume Manager from Sun Microsystems.

If you intend to install VxVM on a remote host, you should ensure that `rsh` or `ssh` are set up. See [“Completing the Installation Procedure on an HA Environment”](#) on page 37 for further information.

▼ To Install VxVM

1. If you are installing VxVM on the local system or on multiple systems, which may or may not include the local system, you may:
 - ◆ Run the simple form of the `installvm` command
 - or
 - ◆ Invoke `installvm` with some command line options. You might do this if you want to avoid the performance penalty of the installation scripts copying packages from the CD-ROM to a disk attached to each system. To avoid this performance penalty, you can copy the VxVM packages and patches to a network-shared file system that is connected to all of the systems on which you want to install the software.

To use the simple form of the command, enter:

```
# ./installvm
```

and proceed to step 2.



To avoid the performance penalty, enter the following commands, which assume that your NFS mountable file system is `$NFS_FS`:

- a.** `# cd /cdrom/disc_name`
- b.** `# cp -r * $NFS_FS`
- c.** `# cd volume_manager`
- d.** `# ./installvm -pkgpath $NFS_FS/volume_manager/pkgs \`
`-patchpath $NFS_FS/volume_manager/patches`

At the prompt, enter the name of the system or systems on which you want to install VxVM.

Enter the system names separated by spaces on which to install VxVM:

- 2.** The `installvm` script performs an initial system check, and confirms success by displaying information regarding the OS version, whether the `VRTSvxvm` package is installed and whether the necessary patches are installed.

The initial system check might tell you that you need to obtain Solaris OS patches. If this happens, you need to see the *VERITAS Storage Foundation Release Notes*.

When the `installvm` script completes its initial check, you will see the following message:

```
Initial system check completed successfully.
```

Press Return to continue.

- 3.** The `installvm` script proceeds to install the Infrastructure packages, `VRTScpi` and `VRTSvlic`. When this is completed, the `installvm` script tells you:

```
VERITAS Infrastructure packages installed successfully.
```

Press Return to continue.

- 4.** At the prompt, you have the option to install the optional packages. Enter your selection at the prompt:

```
Select the optional packages to be installed on all systems?  
[1-3,q,?] (1)
```

- 5.** Press Return if you want to install all of the VxVM packages.

6. The installation script will then confirm that the Installation Requirements checks have been successfully completed. Press Return to continue the installation:

Installation requirement checks completed successfully.

7. If the VxVM 3.5 or VxVM 4.0 version of VRTSvxvm is already installed, you will see a message such as:

A copy of a previous VxVM configuration is present on the system
host1

You will be asked if you want to restore and rerun the previous VxVM configuration.

8. The VxVM packages are installed. You will see a display similar to this:

```
Installing VRTSperl 4.1 on host1 ..... Done 1 of 12 steps
Installing VRTSob 4.1 on host1 ..... Done 2 of 12 steps
Adding patch 115209-16 on host1 ..... Done 3 of 12 steps
Installing VRTSobgui 4.1 on host1 ..... Done 4 of 12 steps
Adding patch 115210-16 on host1 ..... Done 5 of 12 steps
Installing VRTSvxvm 4.1 on host1 ..... Done 6 of 12 steps
Installing VRTSvmman 4.1 on host1 ..... Done 7 of 12 steps
Installing VRTSvmddoc 4.1 on host1 ..... Done 8 of 12 steps
Installing VRTSvmpro 4.1 on host1 ..... Done 9 of 12 steps
Installing VRTSfspro 4.1 on host1 ..... Done 10 of 12 steps
Installing VRTSalloc 1.0 on host1 ..... Done 11 of 12 steps
Installing VRTSddlpr 1.0 on host1 ..... Done 12 of 12 steps
Volume Manager Installation completed successfully.
Press [Return] to continue:
```

9. The script then checks whether you have a license installed. Enter a license if required and press Return to continue. You can also install additional licenses if required.
10. You may choose to configure VxVM now or later. To configure now, answer 'Y' to the question and continue. On-screen instructions guide you on how to proceed. If you answer 'N', you must configure VxVM later by using the `installvm -configure` command.
11. You will be asked whether you want to use enclosure-based naming. If you reply 'Y' to the enclosure-based naming question, the `installvm` script determines if the system is eligible for enclosure-based naming. If it is eligible, you will be asked to confirm that you want to continue.
12. At the next prompt, confirm that you want to start VxVM.
13. At the next prompt, confirm whether you want to name a default disk group; this is optional. The `installvm` script determines whether the system is eligible.



14. If you answered ‘Y’ to the disk groups question, specify a disk group for the system.
15. Confirm the name of the default disk group. This step only registers a default disk group with VxVM. You will need to create the default disk group as a separate task after installation is complete.

VxVM will now be started. If you chose to restore a previous VxVM configuration, you will need to reboot the system.

Note `installvm` cannot be used to reconfigure an existing configuration. This means that you cannot run the following two commands after completing a configuration using `installvm`:

```
# installvm -configure
# installvm -responsefile
```

Installing VxVM Using the `pkgadd` Command

A VxVM installation uses the Solaris `pkgadd` utility and, as documented below, includes the packages for the VEA server and VEA client. The VEA server is an integral part of VxVM and usually resides on the VxVM host; it must reside on the VxVM host to be administered. The VEA client can also reside on machines other than the VxVM host. See “[Installing the VERITAS Enterprise Administrator Client](#)” on page 40 for VEA client information.

Note The VERITAS packages and patches are not compressed when you purchase VERITAS Volume Manager through Sun Microsystems.

Before installing VxVM, you must first mount the software disc; see “[Mounting the Software Disc](#)” on page 30 for instructions.

▼ To install VxVM

1. The VxVM packages are compressed using GNU compression, so you will need to uncompress them using the `gunzip` command. First, copy the packages from the directory containing the packages to a location to which you can write and then uncompress and untar the packages. If the current directory is your selected location, create a directory `pkgs`, which will be the target path, and enter the commands:

```
# cp -R /cdrom/disc_name/volume_manager/pkgs/* pkgs
# cp /cdrom/disc_name/volume_manager/scripts/VRTSobadmin pkgs
```

2. Uncompress the packages using the `gunzip` command, and place the uncompressed packages in the `pkgs` directory that you created:

```
# /cdrom/cdrom0/volume_manager/scripts/install/gunzip pkgs/*.gz
```

3. Change to the `pkgs` directory that now contains the VxVM packages:

```
# cd pkgs
```

and use `tar` to extract the packages. You should extract each package individually using a command such as:

```
# tar xvf VRTSvxvm.tar
```

and then repeat the command for each package.

4. Install the packages:

```
# pkgadd -d . VRTSvlic VRTSvxvm VRTSvmdoc VRTSvmman  
# pkgadd -a VRTSobadmin -d . VRTSob VRTSobgui  
# pkgadd -d . VRTSalloc VRTSddlpr  
# pkgadd -d . VRTSfspro VRTSvmpro  
# pkgadd -d . VRTScpi VRTSperl VRTSmuob
```

After you have installed VxVM using `pkgadd`, you should proceed to set up and configure VxVM. See [“Configuring VERITAS Volume Manager”](#) on page 141 for more information.



Installing VERITAS File System

If you purchased VERITAS File System only, use the steps in this section to install the product. If you purchased one of the Storage Foundation products, see “[Installing VERITAS Storage Foundation](#)” on page 30.

Installing VxFS Using the Product Installer

▼ To install VxFS

1. Mount the disc. For more information, see “[Mounting the Software Disc](#)” on page 30.

2. Go to the top level directory of the disc:

```
# cd /cdrom/cdrom0
```

3. Run the product installer:

```
# ./installer
```

The Selection Menu appears and prompts you to enter a letter indicating your selection. In the following example, the selection is “I” to select a product. The product being installed is VERITAS File System.

4. You are then prompted to enter the system names. The installation script performs an initial system check, and confirms success by displaying information regarding the OS version, whether the VRTSvxfs package is installed, and whether the necessary patches are installed.
5. Press **Return**. The utility begins installing the infrastructure packages. When complete, the following displays:

```
VERITAS Infrastructure packages installed successfully.
```

6. Press **Return** to begin license verification.

7. Enter the license key. For example:

```
XXXX-XXXX-XXXX-XXXX-XXXX-XXXX-XXX
```

The output resembles the following:

```
Registering VERITAS File System NFR key on test1
```

```
Do you want to enter another license key for test1? [y,n,q,?] (n)
```

8. Enter **n** to decline. The utility then checks for the license key on any other specified systems, of which there are none in this example.
9. Repeat [step 7](#) and [step 8](#) as prompted for the other systems, if any. When this is complete, the following is displayed:

VxFS licensing completed successfully.

10. Press **Return** to view the optional VxFS packages.

installfs can install the following optional VxFS packages:

VRTSobgui	VERITAS Enterprise Administrator
VRTStep	VERITAS Task Provider
VRTSap	VERITAS Action Provider
VRTSfsman	VERITAS File System Manual Pages
VRTSfsdoc	VERITAS File System Documentation
VRTSfsmnd	VERITAS File System Software Developer Kit Manual Pages

- 1) Install all of the optional packages
- 2) Install none of the optional packages
- 3) View package descriptions and select optional packages

Select the optional packages to be installed on all systems?
[1-3,q,?] (1)

11. Enter **1** to install all optional packages.

installfs will install the following VxFS packages:

VRTSperl	VERITAS Perl 5.8.0 Redistribution
VRTSob	VERITAS Enterprise Administrator Service
VRTSobgui	VERITAS Enterprise Administrator
VRTSvxfs	VERITAS File System
VRTStep	VERITAS Task Provider
VRTSap	VERITAS Action Provider
VRTSfspro	VERITAS File System Management Services Provider
VRTSfsman	VERITAS File System Manual Pages
VRTSfsdoc	VERITAS File System Documentation
VRTSfssdk	VERITAS File System Software Developer Kit
VRTSfsmnd	VERITAS File System Software Developer Kit Manual Pages

Press [Return] to continue:



- 12. Press **Return**.** The utility then checks the installation requirements on the systems. If the requirements are met, the following is displayed:

Installation requirement checks completed successfully.

- 13. Press **Return**.** The packages will install.

Installing File System 4.1 on test1:

```
Installing VRTSperl 4.0.12 on test1 ..... Done 1 of 13 steps
Installing VRTSob 3.2.514.0 on test1 ..... Done 2 of 13 steps
Adding patch 115209-16 on test1 ..... Done 3 of 13 steps
Installing VRTSobgui 3.2.514.0 on test1 .... Done 4 of 13 steps
Adding patch 115210-16 on test1 ..... Done 5 of 13 steps
Installing VRTSvxfs 4.1 on test1 ..... Done 6 of 13 steps
Installing VRTStep 1.20.028 on test1 ..... Done 7 of 13 steps
Installing VRTSap 2.00.023 on test1 ..... Done 8 of 13 steps
Installing VRTSfspro 4.1 on test1 ..... Done 9 of 13 steps
Installing VRTSfsman 4.1 on test1 ..... Done 10 of 13 steps
Installing VRTSfsdoc 4.1 on test1 ..... Done 11 of 13 steps
Installing VRTSfssdk 4.1 on test1 ..... Done 12 of 13 steps
Installing VRTSfsmnd 4.1 on test1 ..... Done 13 of 13 steps
```

File System installation completed successfully.

Press [Return] to continue:

- 14. Press **Return**.** The installation is complete.

Installation of File System 4.1 has completed successfully.

The installation summary is saved at:

```
/opt/VRTS/install/logs/installfs111091856.summary
```

The installfs log is saved at:

```
/opt/VRTS/install/logs/installfs111091856.log
```

The installation response file is saved at:

```
/opt/VRTS/install/logs/installfs111091856.response
```

Reboot all systems on which VxFS was installed or upgraded.
shutdown -y -i6 -g0

See the VERITAS File System Administrators Guide for information on using VxFS.



Installing Using the pkgadd Command

▼ To install VxFS

1. The VxFS packages are compressed using GNU compression, so you will need to uncompress them using the `gunzip` command. First, copy the packages from the directory containing the packages to a location to which you can write and then uncompress and untar the packages. If the current directory is your selected location, create a directory `pkgs`, which will be the target path, and enter the commands:

```
# cp -R /cdrom/cdrom0/file_system/pkgs/* pkgs
```

2. Uncompress the packages using the `gunzip` command, and place the uncompressed packages in the `pkgs` directory that you created:

```
# /cdrom/cdrom0/file_system/scripts/install/gunzip pkgs/*.gz
```

3. Change to the `pkgs` directory that now contains the VxFS packages:

```
# cd pkgs
```

Use `tar` to extract the packages. You should extract each package individually using a command such as:

```
# tar xvf VRTSvxfs.tar
```

Repeat the command for each package.

4. Install the packages:

```
# pkgadd -d . VRTSvlic VRTSob VRTSobgui VRTSvxfs VRTStep \
  VRTSap VRTSfspro VRTSfsman VRTSfsdoc VRTSfssdk VRTSfsmnd
```

5. If you are installing VxFS on a file system with disk layout Version 3 or prior, continue with [“Upgrading VxFS Disk Layout Versions”](#) on page 80. If you performed a fresh installation, go to [“Verifying VxFS Installation”](#) on page 42.



Upgrading the VERITAS Software

3

If you are running an earlier release of VERITAS Storage Foundation, VERITAS Storage Foundation *for DB2*, VERITAS Storage Foundation *for Oracle*, VERITAS Storage Foundation *for Sybase*, VERITAS Volume Manager, or VERITAS File System, you can upgrade your product using the procedures described in this chapter.

Note The information in [“Upgrading VERITAS Storage Foundation”](#) on page 82 pertains to VERITAS Storage Foundation, VERITAS Storage Foundation *for DB2*, VERITAS Storage Foundation *for Oracle*, and VERITAS Storage Foundation *for Sybase*.

Topics covered in this chapter include:

- ◆ [“Preparing to Upgrade VERITAS Volume Manager”](#) on page 66
- ◆ [“Retaining Older VERITAS Volume Manager Releases”](#) on page 79
- ◆ [“Preparing to Upgrade VERITAS File System”](#) on page 80
- ◆ [“Upgrading VERITAS Storage Foundation”](#) on page 82
- ◆ [“Verifying the VERITAS Storage Foundation Upgrade”](#) on page 92
- ◆ [“Upgrading from SUNWvxdm”](#) on page 96
- ◆ [“Upgrading Language Packages”](#) on page 97
- ◆ [“Upgrading VERITAS Volume Manager \(VxVM\)”](#) on page 98
- ◆ [“Upgrading VERITAS File System”](#) on page 129



Preparing to Upgrade VERITAS Volume Manager

This section lists required pre-upgrade tasks for VxVM.

Upgrading VxVM with Alternate Pathing Enabled

Dynamic Multipathing (DMP) on VxVM 4.1 co-exists with Sun's Alternate Pathing (AP) driver 2.3.1. For VxVM 4.1 to function, the DMP driver (vxvmp) must always be present on the system. Upgrading to this version of VxVM automatically enables the DMP driver.

If you do not know which version of AP is installed, run the following command:

```
# pkginfo -l SUNWapdv | grep VERSION
```

For VxVM to co-exist with AP successfully, you must upgrade AP before installing or upgrading to VxVM 4.1.

If AP is installed and the AP version is prior to 2.3.1, the installation is aborted and you are instructed to upgrade your AP package to version 2.3.1.

Pre-Upgrade Requirements

You can prepare for VxVM 4.1 upgrade requirements in two phases:

- ◆ Tasks that can be done well ahead of starting the upgrade (see [“Planning the Upgrade”](#) on page 66).
- ◆ Tasks that need to be done just before starting the upgrade (see [“Preparing for the Upgrade”](#) on page 68).

Planning the Upgrade

Complete the following tasks in advance of upgrading:

- ◆ Be sure that the administrator doing the upgrade has root access and a working knowledge of Solaris operating system administration.
- ◆ Check that all terminal emulation issues are worked out. The terminal selected should be fully functional during OpenBoot prompts and single-user and multi-user run levels.
- ◆ Check the latest *Storage Foundation Release Notes* to verify that the system has all required Solaris patches.
- ◆ Schedule sufficient outage time for the upgrade and possibly several system reboots.

- ◆ If using EMC PowerPath, ensure that you are using at least mandatory patch level 2.0.3. See <http://support.veritas.com/docs/234734> for more information. The patch level makes changes to `/etc/system` that prevent panics and failure of `vxconfigd`. Upgrading PowerPath may require a system reboot.
- ◆ To reliably save information on a mirrored disk, shut down the system and physically remove the mirrored disk. (This may not be practical, but if done, offers a fallback point.)
- ◆ Make a directory on the root file system to save vital information. Use the root filesystem so that if root is the only file system that can be mounted, the information is available.
- ◆ `# mkdir /VXVM4.1-UPGRADE-CHECK`
- ◆ Save important files. The `vxprint` commands in the examples below save information in two formats. One format is easily readable and the other is suitable for the `vxmake` command.

```
# cp /etc/vfstab.prevm /VXVM4.1-UPGRADE-CHECK
# df -k > /VXVM4.1-UPGRADE-CHECK/df-k.sav
# mount > /VXVM4.1-UPGRADE-CHECK/mount.sav
# vxprint -ht > /VXVM4.1-UPGRADE-CHECK/vxprint-ht.sav
# vxprint -m > /VXVM4.1-UPGRADE-CHECK/vxprint-m.sav
# vxdisk list > /VXVM4.1-UPGRADE-CHECK/vxdisk-list.sav
# vxdg list > /VXVM4.1-UPGRADE-CHECK/vxdg-list.sav
# prtvtoc /dev/rdisk/c?t?d?s2 > /VXVM4.1-UPGRADE-CHECK/vtoc.sav
```

Substitute the appropriate root disk in the `prtvtoc` command, and use the command to collect a partition table (or `vtoc`) from your root disk and any other bootable mirror.

```
# cp /etc/vfstab /VXVM4.1-UPGRADE-CHECK/vfstab.sav
# cp /etc/system /VXVM4.1-UPGRADE-CHECK/system.sav
```

- ◆ Document the current VERITAS software version:


```
# pkginfo -l > /VXVM4.1-UPGRADE-CHECK/pkginfo-l.sav
# showrev -p > /VXVM4.1-UPGRADE-CHECK/showrev-p.sav
```
- ◆ Make sure that all applicable license information is available and copy the contents of `/etc/vx/licenses` to a safe directory. If it exists, you should also copy the contents of `/etc/vx/elm` to a safe directory.



Preparing for the Upgrade

▼ To prepare for the upgrade

1. Ensure that you have created a valid backup.
2. Review the *VERITAS Storage Foundation Release Notes*.
3. Ensure that you have enough file system space to upgrade VERITAS Volume Manager. Also, identify where you will be copying the distribution and patch tar files. The usual place is `/patches/VERITAS` when the root file system has enough space or `/var/tmp/patches` if the `/var` file system has enough space.

Do not put the files under `/tmp`, which is erased during a system reboot. Do not put the files on a file system that is inaccessible prior to running the upgrade script.

Note You may use a VERITAS-supplied CD-ROM for the upgrade as long as modifications to the upgrade script are not required. If `/usr/local` was originally created as a slice, modifications are required. See Step 8 below for details.

4. If you are installing using `pkgadd` instead of the installation script, untar VERITAS Volume Manager and patch files (preferably into separate sub-directories). Within the untarred Volume Manager files is a script directory. Note the location of the script directory.
5. For any startup scripts in `/etc/rcS.d`, you should comment out any application commands or processes that are known to hang if their file systems are not present.
6. Make sure that all users are logged off and that all major user applications are properly shut down.
7. Copy `vfstab` to `vfstab.orig`:

```
# cp /etc/vfstab /etc/vfstab.orig
# cp /etc/vfstab /VXVM4.1-UPGRADE-CHECK/vfstab.orig
```
8. VERITAS recommends that all file systems not on the root disk (therefore not required for booting) be unmounted, their entries commented out in `/etc/vfstab`, the associated volumes stopped, and the associated disk groups deported. Any file systems that the Solaris operating system or VERITAS assumes should be in `rootdg` but are not, *must* be unmounted and the associated entry in `/etc/vfstab` commented out.

9. Any swap partitions not in `rootdg` must be commented out of `/etc/vfstab`. If possible, swap partitions other than those on the root disk should be commented out of `/etc/vfstab` and not mounted during the upgrade. Active swap partitions that are not in `rootdg` cause `upgrade_start` to fail.
10. Copy the modified `/etc/vfstab` file to the save directory and to alternate machine locations:

```
# cp /etc/vfstab /VXVM4.1-UPGRADE-CHECK/vfstab.modified.sav
```
11. Copy to another system all the information saved in `/VXVM4.1-UPGRADE-CHECK`. Leave the original files on the machine being upgraded.

Determining if the Root Disk is Encapsulated

Before you upgrade, you need to determine if the root disk is encapsulated by running the following command:

```
# mount | grep "/" on
```

If the output from this command includes a path name that contains `vx` and `rootvol` as in `/dev/vx/dsk/rootvol`, then the root disk is encapsulated.

After you complete the upgrade procedure, read [“Configuring the VERITAS Software”](#) on page 131 for important details about initializing (where required), setting up, and using the VERITAS software shipped with VERITAS Storage Foundation *for Oracle*.

Unsuppressing DMP for EMC PowerPath Disks

Note This section is only applicable if you are upgrading a system that includes EMC PowerPath disks.

Note If you are upgrading a system from VxVM 4.0 to VxVM 4.1, which has PowerPath installed, and the Cx600 ASL and its associated Cx600 APM are also installed, you must uninstall both the Cx600 ASL and APM, otherwise the Cx600 will claim the disks and the PowerPath disks will not be identified.

If you are upgrading a system from VxVM 4.0 to VxVM 4.1, which does not have PowerPath installed, but the Cx600 ASL and its APM are both installed, then the Cx600 ASL and its associated APM should not be uninstalled.



In previous releases of VxVM, a combination of DMP subpaths and the controllers of DMP subpaths were usually suppressed to prevent interference between DMP and the EMC PowerPath multipathing driver. Suppression has the effect of hiding these subpaths and their controllers from DMP, and as a result the disks on these subpaths and controllers cannot be seen by VxVM.

VxVM 4.1 has the ability to discover EMCpower disks, and configure them as autodiscovered disks that DMP recognizes are under the control of a separate multipathing driver. This has the benefit of allowing such disks to be reconfigured in cluster-shareable disk groups. Before upgrading to VxVM 4.1, you must remove the suppression of the subpaths and controllers so that DMP can determine the association between EMCpower metadevices and `c#t#d#` disk devices.

There are two scenarios where you need to unsuppress DMP subpaths and controllers:

- ◆ “[Converting a Foreign Disk to auto:simple](#)” on page 70.
- ◆ “[Converting a Defined Disk to auto:simple](#)” on page 72
- ◆ “[Converting a Powervxvm Disk to auto:simple](#)” on page 75

Because `emcpower` disks are auto-discovered, the `powervxvm` script should be disabled and removed from the startup script. To remove the `powervxvm` script, use the command:

```
#powervxvm remove
```

Converting a Foreign Disk to auto:simple

Release 4.0 of VxVM provided the `vxddladm addforeign` command to configure foreign disks with default disk offsets for the private and public regions, and to define them as simple disks. A foreign disk must be manually converted to `auto:simple` format before upgrading to VxVM 4.1.

Note If the foreign disk is defined on a slice other than `s2`, you must copy the partition entry for that slice to that for `s0` and change the tag. If the tag of the original slice is changed, the status of the disk is seen as `online:aliased` after the upgrade.

The following example is used to illustrate the procedure. The `vxdisk list` command can be used to display the EMCpower disks that are known to VxVM:

```
# vxdisk list
DEVICE          TYPE          DISK          GROUP         STATUS
c6t0d12s2       auto:sliced   -             -             online
emcpower10c     simple       fdisk         fdg           online
...
```

The `vxprint` command is used to display information about the disk group, `fdg`:

```
# vxprint
Disk group: fdg
TY NAME      ASSOC          KSTATE  LENGTH    PLOFFS  STATE  TUTILO
PUTILO
dg fdg       fdg              -        -        -        -        -
dm fdisk     emcpower10c      -       17673456  -        -        -
...
```

▼ **To convert a foreign disk to `auto:simple` format:**

1. Stop all the volumes in the disk group, and then deport it:

```
# vxvol -g fdg stopall
# vxdg deport fdg
```

2. Use the `vxddladm` command to remove definitions for the foreign devices:

```
# vxddladm rmforeign blockpath=/dev/dsk/emcpower10c \
  charpath=/dev/rdisk/emcpower10c
```

If you now run the `vxdisk list` command, the EMCpower disk is no longer displayed:

```
# vxdisk list
DEVICE      TYPE          DISK      GROUP      STATUS
c6t0d12s2   auto:sliced   -         -          online
...
```

3. Run the `vxprtvtoc` command to retrieve the partition table entry for the device:

```
# /etc/vx/bin/vxprtvtoc -f /tmp/vtoc /dev/rdisk/emcpower10c
```

4. Use the `vxedvtoc` command to modify the partition tag and update the VTOC:

```
# /etc/vx/bin/vxedvtoc -f /tmp/vtoc /dev/vx/rdmp/emcpower10c
```

```
# THE ORIGINAL PARTITIONING IS AS FOLLOWS:
```

```
# SLICE  TAG  FLAGS    START    SIZE
      0   0x0  0x201      0         0
      1   0x0  0x200      0         0
      2   0x5  0x201      0       17675520
```



```
# THE NEW PARTITIONING WILL BE AS FOLLOWS:
# SLICE  TAG  FLAGS      START      SIZE
      0    0xf  0x201        0      17675520
      1    0x0  0x200        0         0
      2    0x5  0x201        0      17675520
```

```
DO YOU WANT TO WRITE THIS TO THE DISK ? [Y/N] :Y WRITING THE NEW
VTOC TO THE DISK #
```

5. Upgrade to VxVM 4.1 using the appropriate upgrade procedure.
6. After upgrading VxVM, use the `vxdisk list` command to validate the conversion to `auto:simple` format:

```
# vxdisk list
DEVICE          TYPE          DISK      GROUP      STATUS
c6t0d12s2       auto:sliced  -         -          online
emcpower10s2    auto:simple  -         -          online
...
```

To display the physical device that is associated with the metadvice,
emcpower10s2, enter the following command:

```
# vxddmmpadm getsubpaths dmpnodename=emcpower10s2
```

7. Import the disk group and start the volumes:

```
# vxvg import fdg
# vxvol -g fdg startall
```

You can use the `vxdisk list` command to confirm that the disk status is displayed as `online:simple`:

```
# vxdisk list
DEVICE          TYPE          DISK      GROUP      STATUS
c6t0d12s2       auto:sliced  -         -          online
emcpower10s2    auto:simple  fdisk     fdg        online
```

Converting a Defined Disk to auto:simple

In VxVM 4.0, and particularly in prior releases, EMCpower disks could be defined by a persistent disk access record (darec), and identified as simple disks. If an EMCpower disk is defined with a persistent darec, it must be manually converted to `auto:simple` format before upgrading to VxVM 4.1.

Note If the foreign disk is defined on a slice other than s2, you must copy the partition entry for that slice to that for s0 and change the tag. If the tag of the original slice is changed, the status of the disk is seen as `online:aliased` after the upgrade.

The following example is used to illustrate the procedure. The `ls` command shows the mapping of the EMC disks to persistent disk access records:

```
# ls -l /dev/vx/dmp/emcdisk1
lrwxrwxrwx 1 root other 36 Sep 24 17:59 /dev/vx/dmp/emcdisk1->
/dev/dsk/c6t0d11s5
# ls -l /dev/vx/rdmp/emcdisk1
lrwxrwxrwx 1 root other 40 Sep 24 17:59 /dev/vx/rdmp/emcdisk1->
/dev/dsk/c6t0d11s5
```

Here the fifth partition of `c6t0d11s5` is defined as the persistent disk access record `emcdisk1`.

The `vxdisk list` command can be used to display the EMCpower disks that are known to VxVM:

```
# vxdisk list
DEVICE      TYPE          DISK      GROUP      STATUS
c6t0d12s2   auto:sliced   -         -         online
emcdisk1    simple        fdisk     fdg        online
...
```

The `vxprint` command is used to display information about the disk group, `fdg`:

```
# vxprint
Disk group: fdg
TY NAME      ASSOC      KSTATE  LENGTH    PLOFFS    STATE  TUTILO
PUTILO
dg fdg       fdg        -        -         -         -      -
dm fdisk     emcdisk1   -        17673456  -         -      -
...
```

▼ To convert a disk with a persistent disk access record to `auto:simple` format:

1. Stop all the volumes in the disk group, and then deport it:

```
# vxvol -g fdg stopall
# vxdg deport fdg
```

2. Use the `vxdisk rm` command to remove the persistent record definitions:

```
# vxdisk rm emcdisk1
```

If you now run `vxprint`, the EMCpower disk is no longer displayed:

```
# vxdisk list
DEVICE      TYPE          DISK      GROUP      STATUS
c6t0d12s2   auto:sliced   -         -         online
...
```



3. Use the `vxprtvtoc` command to retrieve the partition table entry for the device:

```
# /etc/vx/bin/vxprvtoc -f /tmp/hdisk /dev/rdisk/c6t0d11s2
```

4. Use the `vxedvtoc` command to modify the partition tag and update the VTOC:

```
# /etc/vx/bin/vxedvtoc -f /tmp/hdisk /dev/rdisk/c6t0d11s2
```

```
# THE ORIGINAL PARTITIONING IS AS FOLLOWS:
```

```
# SLICE   TAG  FLAGS   START   SIZE
      4    0x0  0x200    0       0
      5    0x0  0x200 3591000 2100375
      6    0x0  0x200    0       0
```

```
# THE NEW PARTITIONING WILL BE AS FOLLOWS:
```

```
# SLICE   TAG  FLAGS   START   SIZE
      4    0x0  0x200    0       0
      5    0xf  0x200 3591000 2100375
      6    0x0  0x200    0       0
```

```
DO YOU WANT TO WRITE THIS TO THE DISK ? [Y/N] :Y WRITING THE NEW
VTOC TO THE DISK #
```

5. Upgrade to VxVM 4.1 using the appropriate upgrade procedure.
6. After upgrading VxVM, use the `vxdisk list` command to validate the conversion to `auto:simple` format:

```
# vxdisk list
DEVICE          TYPE          DISK      GROUP      STATUS
c6t0d12s2       auto:sliced   -         -          online
emcpower10s2    auto:simple   -         -          online:aliased
...
```

To display the physical device that is associated with the metadvice, `emcpower10s2`, enter the following command:

```
# vxddmadm getsubpaths dmpnodename=emcpower10s2
```

7. Import the disk group and start the volumes:

```
# vxvg import fdg
# vxvol -g fdg startall
```

You can use the `vxdisk list` command to confirm that the disk status is displayed as `online:simple`:

```
# vxdisk list
DEVICE          TYPE          DISK          GROUP          STATUS
c6t0d12s2      auto:sliced    -             -              online
emcpower10s2   auto:simple    fdisk         fdg            online:aliased
```

Note To allow DMP to receive correct enquiry data, the common Serial Number (C-bit) Symmetrix Director parameter must be set to enabled.

Converting a Powervxvm Disk to auto:simple

In VxVM 4.0, and particularly in prior releases, EMCpower disks could be defined by a persistent disk access record (darec) using `powervxvm` script, and identified as simple disks. If an EMCpower disk is used using `powervxvm`, it must be manually converted to `auto:simple` format before upgrading to VxVM 4.1.

Note If there are any controllers or devices that are suppressed from VxVM as `powervxvm` requirement, then such controllers/disks must be unsuppressed. This is required for VERITAS DMP to determine the association between PowerPath metanodes and their subpaths. After the conversion to `auto:simple` is complete, the `powervxvm` script is no longer useful, and should be disabled from startup script.

The following example is used to illustrate the procedure. The `ls` command shows the mapping of the EMC disks to persistent disk access records:

```
# ls -l /dev/vx/rdmp/
crw----- 1 root    root      260, 76 Feb  7 02:36 emcpower0c
#
# vxdisk list
DEVICE          TYPE          DISK          GROUP          STATUS
c6t0d12s2      auto:sliced    -             -              online
emcpower0c     simple        ppdsk01       ppdg           online
#
# vxprint
Disk group: ppdg
TY NAME      ASSOC      KSTATE  LENGTH  PLOFFS  STATE  TUTILO
PUTILO
dg ppdg      ppdg      -        -        -        -        -
dm ppdsk01 emcpower0c -      2094960  -        -        -        -
#
```



▼ To convert an EMCpower disk (defined using powervxvm) to auto:simple format

1. Stop all the volumes in the disk group, and then deport it:

```
# vxvol -g ppgdg stopall
# vxdg deport ppgdg
```

2. Use the `vxdisk rm` command to remove all emcpower disks from VxVM:

```
# vxdisk rm emcpower0c
```

If you now run the `vxdisk list` command, the EMCpower disk is no longer displayed:

```
# vxdisk list
DEVICE          TYPE          DISK          GROUP          STATUS
c6t0d12s2       auto:sliced    -             -              online
#
```

3. Use the `vxprtvtoc` command to retrieve the partition table entry for this device:

```
# /etc/vx/bin/vxprtvtoc -f /tmp/vtoc /dev/vx/rdmp/emcpower0c
```

4. Use the `vxedvtoc` command to modify the partition tag and update the VTOC:

```
# /etc/vx/bin/vxedvtoc -f /tmp/vtoc /dev/vx/rdmp/emcpower0c
# THE ORIGINAL PARTITIONING IS AS FOLLOWS:
# SLICE  TAG  FLAGS  START  SIZE
    0    0x0  0x201    0      0
    1    0x0  0x200    0      0
    2    0x5  0x201    0  17675520
```

```
# THE NEW PARTITIONING WILL BE AS FOLLOWS:
# SLICE  TAG  FLAGS  START  SIZE
    0    0xf  0x201    0  17675520
    1    0x0  0x200    0      0
    2    0x5  0x201    0  17675520
```

```
DO YOU WANT TO WRITE THIS TO THE DISK ? [Y/N] :Y WRITING THE NEW
VTOC TO THE DISK #
```

5. Upgrade to VxVM 4.1 using the appropriate upgrade procedure.

After upgrading VxVM, use the `vxdisk list` command to validate the conversion to auto:simple format:

```
# vxdisk list
DEVICE          TYPE          DISK          GROUP          STATUS
c6t0d12s2       auto:sliced    -             -              online
emcpower0s2     auto:simple    -             -              online
#
```

6. Import the disk group and start the volumes.

```
# vxdg import ppgd
# vxvol -g ppgd startall
# vxdisk list
```

DEVICE	TYPE	DISK	GROUP	STATUS
c6t0d12s2	auto:sliced	-	-	online
emcpower0s2	auto:simple	ppdisk01	ppdg	online

VxVM and Solaris Release Support Matrix

The table below indicates which VxVM releases support which Solaris operating system releases. If you are running a release earlier than VxVM 3.5, you should first upgrade to VxVM 4.0 before upgrading to VxVM 4.1.

	Solaris 2.6	Solaris 7	Solaris 8	Solaris 9	Solaris 10
VxVM 4.1			Supported	Supported	Supported
VxVM 4.0		Supported	Supported	Supported	
VxVM 3.5	Supported	Supported	Supported	Supported	
VxVM 3.2	Supported	Supported	Supported	Supported	
VxVM 3.1.1	Supported	Supported	Supported		
VxVM 3.1	Supported	Supported	Supported		



VxVM and Solaris Operating System Upgrade Paths

The following table shows possible VxVM/Solaris upgrade paths.

Note If you are upgrading from a release earlier than VxVM 3.5, you must upgrade to VxVM 4.0 before upgrading to VxVM 4.1.

Upgrade Paths

You can upgrade VxVM and Solaris versions:	To VxVM and Solaris versions:	Notes:
VxVM 3.0.x, 3.1, 3.1.1, 3.2 & Solaris 2.6, 7, 8	VxVM 4.1 & Solaris 8, 9, 10	You must first upgrade to VxVM 4.0.
VxVM 3.5, 4.0 & Solaris 2.6, 7, 8, 9	VxVM 4.1 & Solaris 8, 9, 10	
You can upgrade Solaris OS only:	To Solaris OS versions:	
VxVM 4.0 & Solaris 7,8, 9	VxVM 4.1 & Solaris 8, 9,10	

Note If the `upgrade_start` script fails for any reason, run the `upgrade_finish` script to undo any changes already made. Verify that the system is restored by comparing `/etc/system`, `/etc/vfstab`, and the output of the `format` command. Then determine and correct the cause of the `upgrade_start` failure. If you cannot correct the problem in a timely manner, restore the `vfstab` file to the version saved in “[Preparing for the Upgrade](#)” on page 68, restore any other applications, and perform an `init 6` to completely restore the system.

Determining if the Root Disk is Encapsulated

Before you upgrade, you also need to determine if the root disk is encapsulated. See “[Determining if the Root Disk is Encapsulated](#)” on page 69 for more information.

After you complete the upgrade procedure, read “[Configuring the VERITAS Software](#)” on page 131 for important details about initializing (where required), setting up, and using the VERITAS software shipped with VERITAS Storage Foundation.

Retaining Older VERITAS Volume Manager Releases

To retain an older version of VERITAS Volume Manager and not upgrade to the current release shipped with VERITAS Storage Foundation, you must set a special environment variable before starting the upgrade procedure.

- ◆ If you are using Bourne or Korn shell (`sh` or `ksh`), use the commands:

```
$ NO_VXVM_UPGRADE=yes
$ export NO_VXVM_UPGRADE
```

- ◆ If you are using a C shell (`csh` or `tcsh`), use the command:

```
% setenv NO_VXVM_UPGRADE yes
```

The installation program checks for the `NO_VXVM_UPGRADE` environment variable during the upgrade and displays messages similar to the following if this variable is set:

```
Checking existing package installation...
NOTICE: Package VRTSvxvm is being skipped (NO_VXVM_UPGRADE set).
NOTICE: Package VRTSvmsa is being skipped (NO_VXVM_UPGRADE set).
```

Note We recommend that you upgrade to the current version of VERITAS Volume Manager if you want to use the Database FlashSnap or Storage Mapping options.

Upgrading the Disk Group Version Separately

If you plan to implement VERITAS FastResync and Database FlashSnap, you must use Disk Group Version 90 or later, which is supported in VERITAS Volume Manager 3.2 and higher. However, if you choose to retain a version of VERITAS Volume Manager older than 3.2, which does not contain Disk Group Version 90 or later, upgrade your disk group version separately.

Note You cannot return to an older disk group version once you have upgraded.

▼ To determine the disk group version you are using

Use the `vxvg list` command as follows:

```
# vxvg -q list diskgroup | grep version
```

where the `-q` option means no header is printed describing output fields.



Example

To determine the disk group version on PRODDg:

```
# vxdg -q list PRODDg | grep version
version: 90
```

▼ To upgrade the disk group version

Use the vxdg upgrade command as follows:

```
# vxdg -T diskgroup_version upgrade diskgroup
```

where the -T option means upgrading the disk group to a specific version.

Example

To upgrade the disk group to version 110 on PRODDg:

```
# vxdg -T 110 upgrade PRODDg
```

Preparing to Upgrade VERITAS File System

This section lists required pre-upgrade tasks for VxFS.

Upgrading VxFS Disk Layout Versions

VxFS 4.1 allows mounting of three file system disk layouts:

- ◆ Disk layout Version 6
- ◆ Disk layout Version 5
- ◆ Disk layout Version 4

Disk layout Version 1, Version 2, and Version 3 are not supported on VxFS 4.1.

To determine the disk layout version of a VxFS file system, run the fstyp command on the file system physical device. For example:

```
# /opt/VRTS/bin/fstyp -v /dev/vx/dsk/rootdg/volname | grep version
magic a501fcf5 version 6 ctime Thu Oct 31 11:29:31 2005
```

When to Upgrade Disk Layout Versions

To use the extended features available in the VxFS 4.1 release, upgrade older disk layout versions to disk layout Version 6. See the *VERITAS Storage Foundation Release Notes* for information on new VERITAS File System 4.1 features.

When to Use vxupgrade or vxfsconvert

You can use the `vxupgrade` command to upgrade an earlier VxFS disk layout to disk layout Version 6 while the file system remains mounted.

You can use the `vxfsconvert` command to upgrade an earlier VxFS disk layout to a higher disk layout version when the file system is unmounted.

Disk layout Version 1 and Version 2 cannot be mounted on VxFS 4.1. You can upgrade these layout versions online before installing VxFS 4.1, or upgrade them using `vxfsconvert` after installing VxFS 4.1, as shown in the following table:

	Disk Layout Version 1	Disk Layout Version 2	Disk Layout Version 4	Disk Layout Version 5
VxFS Release 3.5 MP2 or lower	Use <code>vxupgrade</code> to upgrade to disk layout Version 4 or Version 5.			
VxFS Release 4.0 or higher	Use <code>vxfsconvert</code> to upgrade to disk layout Version 4.		Use <code>vxupgrade</code> to upgrade to disk layout Version 5 or Version 6.	

The `vxupgrade` command does not upgrade previous disk layouts directly to Version 6. You must upgrade older disk layouts in stages. For example, a Version 4 file system disk layout must first be upgraded to Version 5, then to Version 6, in two separate invocations of the command:

```
# vxupgrade -n 5 /mount_point
# vxupgrade -n 6 /mount_point
```

The `vxfsconvert` command converts any older disk layout versions directly to Version 5, but you must use `vxupgrade` to convert from Version 5 to Version 6. See the `vxfsconvert(1M)`, `vxupgrade(1M)`, and `fsadm(1M)` manual pages for more information on upgrading VxFS file systems.

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



Space and Time Requirements for Upgrading to Disk Layout Version 6

Converting a Version 5 disk layout to Version 6 disk layout requires adequate free space to complete. 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 VERITAS Storage Foundation

You can upgrade a VERITAS Storage Foundation product with the product installer. We recommend that you perform this upgrade from single-user mode. No VxFS file systems can be in use at the time of the upgrade.

The following procedures are for VERITAS Storage Foundation, VERITAS Storage Foundation *for DB2*, VERITAS Storage Foundation *for Oracle*, and VERITAS Storage Foundation *for Sybase*.

Upgrading VERITAS Storage Foundation on Solaris 8 or 9

This section describes upgrading to the current VERITAS Storage Foundation if you are already running Solaris 8 or 9, the root disk is unencapsulated, and do not intend to upgrade your Solaris version. If you are running SUNWvxxvm, go to [“Upgrading from SUNWvxxvm”](#) on page 96. If your root disk is encapsulated, go to [“Upgrading VERITAS Storage Foundation on an Encapsulated Root Disk”](#) on page 83.

▼ To upgrade a VERITAS Storage Foundation product

1. Make sure the root disk is not encapsulated. See [“Determining if the Root Disk is Encapsulated”](#) on page 69 for more information.
2. Unmount any mounted VxFS file systems.

Note If you are upgrading multiple hosts, the installer supports the upgrade of the same version of VxVM and VxFS from 3.5 or 4.0 to 4.1. Hosts must be upgraded separately if they are running mixed versions such as 3.5 and 4.0.

If any VxFS file systems are mounted with the QuickLog feature, QuickLog must be disabled before upgrading. See the “VERITAS QuickLog” chapter of the *VERITAS File System Administrator’s Guide* for more information.

3. If the VxFS NetBackup libraries package (`VRTSfsnbl`) is installed, remove it before you install the new packages.

To remove the package, use the `pkgrm` command as follows:

```
# pkgrm VRTSfsnbl
```

Respond to any system messages as needed.

The libraries contained in this package are included in the `VRTSvxfs` package in 4.1.

4. Reboot the machine to single-user mode (using a command such as `reboot -- -s`).
5. If your system has separate `/opt` and `/var` file systems, make sure they are mounted before proceeding with installation. When the system is in single-user mode, `/opt` and `/var` are not normally mounted.
6. Load and mount the disc as described in “[Mounting the Software Disc](#)” on page 30. Then, follow the installation instructions.
7. To invoke the common installer, run the `install` command on the disc as shown in this example:

```
# cd /cdrom/cdrom0
# ./installer
```

8. Depending on your existing configuration, various messages and prompts may appear. Answer the prompts appropriately.

If you do not intend to view or print the online documentation, you can omit the `VRTSdbdoc`, `VRTSfsdoc`, and `VRTSvm doc` packages. If you do not intend to use the GUI, you can omit the `VRTSobgui` package.

Upgrading VERITAS Storage Foundation on an Encapsulated Root Disk

This section explains how to upgrade VERITAS Storage Foundation if the root disk is encapsulated.

The following procedures are for VERITAS Storage Foundation, VERITAS Storage Foundation *for DB2*, VERITAS Storage Foundation *for Oracle*, and VERITAS Storage Foundation *for Sybase*.

Note If your root disk is not encapsulated, see “[Upgrading VERITAS Storage Foundation on Solaris 8 or 9](#)” on page 82.



If you are upgrading a VERITAS Storage Foundation product on a system with an encapsulated root disk, you must first remove the previous release of VERITAS Volume Manager.

Note It is important that you follow these steps in the specified order.

▼ **To upgrade on a system with an encapsulated root disk**

1. Load and mount the disc as described in “[Mounting the Software Disc](#)” on page 30. Then, follow the installation instructions.
2. Run the `upgrade_check` command to see the status of the root disk.

```
# upgrade_check
```

3. Run the `upgrade_start` script to prepare the previous release of VERITAS Volume Manager for removal:

- ◆ If the disc is mounted automatically, enter:

```
# cd /cdrom/cdrom0/storage_foundation/scripts
# ./upgrade_start
```

- ◆ If the disc is mounted manually, enter:

```
# /mount_point/storage_foundation/scripts
# ./upgrade_start
```

The `upgrade_start` script looks for volumes containing file systems. If certain key file systems must be converted back to using partitions, the script indicates that a reboot is necessary. If any volumes are in use, you must either unmount those volumes or reboot to single-user mode.

If any error messages are encountered during the `upgrade_start` process, run the `upgrade_finish` script immediately to restore the system. Examine the error messages and address them accordingly. Then, run the `upgrade_start` script again. Do not proceed to Step 3 until `upgrade_start` runs without producing any errors.

4. Boot the machine to single-user mode (using a command such as `shutdown`).
5. If the VxFS NetBackup libraries package (`VRTSfsnbl`) is installed, remove it before you install the new packages.

To remove the package, use the `pkgrm` command as follows:

```
# pkgrm VRTSfsnbl
```

Respond to any system messages as needed.

The libraries contained in this package are included in the `VRTSvxfs` package in 4.0.

6. Remove any existing VxVM packages.

For example, if you are removing older VxVM packages, which could be stand-alone or part of VERITAS Foundation Suite 3.5, follow this sequence:

```
# pkgrm VRTSvmdoc VRTSvmmman VRTSvmpro VRTSvxvm
```

or

If you have multiple versions of VxVM loaded, remove the packages using this sequence:

```
# pkgrm VRTSvmdoc VRTSvmmman VRTSvmpro VRTSvxvm.*
```

Note If you have made any additional modifications or have applied any patches, remove these before removing the VRTSvxvm package. If you are using SUNWvxvm and SUNWvxva packages, see the Sun documentation for details on how to remove SUNWvxvm and SUNWvxva patches and packages.

7. If your system has separate /opt and /var file systems, make sure they are mounted before proceeding with installation. When the system is in single user mode, /opt and /var are not normally mounted.**8.** Remount the disc manually.

```
# mount -F hsfs -o ro /dev/dsk/c0t6d0s2 /mount_point
```

where c0t6d0s2 is the default address for the CD-ROM drive. For more information, see [“Mounting the Software Disc”](#) on page 30.

9. To invoke the common installer, run the install command on the disc as shown in this example:

```
# cd /cdrom/cdrom0
# ./installer
```

10. Depending on your existing configuration, various messages and prompts may appear. Answer the prompts appropriately.

If you do not intend to view or print the online documentation, you can omit the VRTSdbdoc, VRTSfsdoc, and VRTSvmdoc packages. If you do not intend to use the GUI, you can omit the VRTSobgui package.

11. If VxFS file systems are commented out in the /etc/vfstab file, uncomment them.**12.** To disable the hot-relocation feature, comment out the vxrelocd line.

For Solaris 8 and 9, this line is in the startup file /etc/rc2.d/S95vxvm-recover.

```
# vxrelocd root & commented out to disable hot-relocation
```



For Solaris 10 this line is in the startup file `/lib/svc/method/vxvm-recover`:

```
# vxrelocd root & commented out to disable hot-relocation
```

13. Complete the upgrade using the `upgrade_finish` script.

```
# /mount_point/storage_foundation/scripts/upgrade_finish
```

14. Perform a reconfiguration reboot.

```
# reboot -- -r
```

At this point, your pre-upgrade configuration should be in effect and any file systems previously defined on volumes should be defined and mounted.

15. Importing a pre-4.1 VERITAS Volume Manager disk group does not automatically upgrade the disk group version to the VxVM 4.1 level. You may need to manually upgrade each of your disk groups following a VxVM upgrade. See [“Upgrading the Disk Group Version Separately”](#) on page 79.

16. Follow the instructions in [“VERITAS Enterprise Administrator”](#) on page 24 to set up and start VEA.

Upgrading VERITAS Storage Foundation and Earlier Solaris Releases

This section describes upgrading to the current VERITAS Storage Foundation if you are not running Solaris 8, 9, or 10, have an unencapsulated root disk and need to upgrade the Solaris version in addition to the VERITAS packages. If you are running SUNWvxvm, go to [“Upgrading from SUNWvxvm”](#) on page 96.

This upgrade procedure allows you to retain existing VxVM and VxFS configurations. After upgrading, you can resume using your file systems and volumes as before (without having to run `vxinstall` again).

Note It is important that you follow these steps in the specified order.

▼ To prepare to upgrade the operating system

1. Ensure that if any of the file systems `/`, `/usr`, `/var`, or `/opt` are defined on volumes, at least one plex for each of those volumes is formed from a single subdisk that begins on a cylinder boundary.

This is necessary because part of the upgrade process involves temporarily converting file systems on volumes back to using direct disk partitions, and Solaris requires that disk partitions start on cylinder boundaries. Upgrade scripts (located in the

/scripts directory on the disc) automatically convert file systems on volumes back to using regular disk partitions, as necessary. If the upgrade scripts detect any problems (such as lack of cylinder alignment), they display an explanation of the problem and the upgrade does not proceed.

2. Check to see if any VxFS file systems are mounted using the `df` command. If so, unmount them by using the `umountall` command:

```
# df -F vxfs
# umountall -F vxfs
```

Note You need to remove previous versions of VxFS packages prior to upgrading the operating system and the VERITAS Storage Foundation product. You do not need to remove existing VxFS file systems, but all of them must remain unmounted throughout the upgrade process. If any VxFS file systems are mounted with the QuickLog option, QuickLog must be disabled.

3. Check to see if any VERITAS packages are on the machine using the `pkginfo` command.

```
# pkginfo | grep VRTS
```

If any VxFS packages, including VERITAS Quick I/O (VRTSfdd or VRTSqio) or VERITAS QuickLog (VRTSvxld or VRTSqlog) are present, remove them as shown in Step 4.

4. Remove the VxFS related packages using the `pkgrm` command.

```
# pkgrm VRTSfsdoc VRTSfdd VRTSqio VRTSvxld VRTSqlog VRTSvxfs \
VRTSfsnbl
```

Note If the VxFS NetBackup libraries package (VRTSfsnbl) is installed, remove it before upgrading.

5. Load and mount the disc as described in [“Mounting the Software Disc”](#) on page 30.
6. Run the `upgrade_start` script to prepare the previous release of the Volume Manager for its removal.

- ◆ If the disc is mounted automatically, enter:

```
# /cdrom/cdrom0/storage_foundation/scripts/upgrade_start
```

- ◆ If the disc is mounted manually, enter:

```
# /mount_point/storage_foundation/scripts/upgrade_start
```



The `upgrade_start` script looks for volumes containing file systems. If certain key file systems must be converted back to using partitions, the script indicates that a reboot is necessary. If any volumes are in use, you must either unmount those volumes or reboot to single-user mode.

7. Reboot the machine to single-user mode (using a command such as `shutdown`).
8. Remove any existing VxVM packages.

For example, if you are removing older VxVM packages, which could be stand-alone or part of VERITAS Foundation Suite 3.5, follow this sequence:

```
# pkgrm VRTSvmdoc VRTSvmmman VRTSvmpo VRTSvxvm
```

or

If you have multiple versions of VxVM loaded, remove the packages using this sequence:

```
# pkgrm VRTSvmdoc VRTSvmmman VRTSvmpo VRTSvxvm.*
```

Note If you have made any additional modifications or have applied any patches, remove these before removing the `VRTSvxvm` package. If you are using `SUNWvxvm` and `SUNWvxva` packages, see the Sun documentation for details on how to remove `SUNWvxvm` and `SUNWvxva` patches and packages.

9. If you have VxFS file systems specified in the `/etc/vfstab` file, comment them out.
10. Shut down and halt the machine (using a command such as `shutdown`).

▼ To upgrade the operating system

1. Upgrade the operating system to Solaris 8, 9, or 10, according to the Solaris installation documentation.

Note Instructions on upgrading the operating system are beyond the scope of this document.

2. Reboot the machine to single-user mode (using a command such as `shutdown`).

▼ To upgrade the VERITAS Storage Foundation packages after upgrading the operating system

1. If your system has separate `/opt` and `/var` file systems, make sure they are mounted before proceeding with installation. When the system is in single user mode, `/opt` and `/var` are not normally mounted.

2. Remount the disc manually.

```
# mount -F hsfs -o ro /dev/dsk/c0t6d0s2 /mount_point
```

where `c0t6d0s2` is the default address for the CD-ROM drive.

3. To invoke the common installer, run the `install` command on the disc as shown in this example:

```
# cd /cdrom/cdrom0
# ./installer
```

4. Depending on your existing configuration, various messages and prompts may appear. Answer the prompts appropriately.

If you do not intend to view or print the online documentation, you can omit the `VRTSdbdoc`, `VRTSfsdoc`, and `VRTSvmdoc` packages. If you do not intend to use the GUI, you can omit the `VRTSobgui` package.

5. If you commented out VxFS File System entries in the `/etc/vfstab` file in [step 9](#) of the pre-upgrade procedures, uncomment them.

6. To disable the hot-relocation feature, comment out the `vxrelocd` line.

For Solaris 8 and 9, this line is in the startup file `/etc/rc2.d/S95vxvm-recover`:

```
# vxrelocd root & # commented out to disable hot-relocation
```

For Solaris 10, this line is in the startup file `/lib/svc/method/vxvm-recover`:

```
# vxrelocd root & # commented out to disable hot-relocation
```

7. Complete the upgrade using the `upgrade_finish` script.

```
# /mount_point/storage_foundation/scripts/upgrade_finish
```

8. Reboot the machine to multiuser mode (using a command such as `shutdown`).

At this point, your pre-upgrade configuration should be in effect and any file systems previously defined on volumes should be defined and mounted.



9. Importing a pre-4.1 VERITAS Volume Manager disk group does not automatically upgrade the disk group version to the VxVM 4.1 level. You may need to manually upgrade each of your disk groups following a VxVM upgrade. See [“Upgrading the Disk Group Version Separately”](#) on page 79.
10. Follow the instructions in [“VERITAS Enterprise Administrator”](#) on page 24 to set up and start VEA.

Upgrading from Database Edition 3.5 for Oracle with Database FlashSnap

In this release of VERITAS Storage Foundation *for Oracle*, Database FlashSnap does not support snapshots of `vxdbavol` and `ORACLE_HOME`. After you have upgraded from VERITAS Database Edition 3.5 *for Oracle* with Database FlashSnap to this release, you must remove the volume plexes for `vxdbavol` and `ORACLE_HOME`, and revalidate the snapplan before using Database FlashSnap with this release of VERITAS Storage Foundation *for Oracle*.

▼ To remove the volume plexes for `vxdbavol` and `ORACLE_HOME`

1. As root, snapback the snapshot plexes.

```
# vxassist [-g diskgroup] snapback snapvol
```
2. Turn off FastResync.

```
# vxvol [-g diskgroup] set fastresync=off volume
```
3. Remove the DCO object.

```
# vxassist [-g diskgroup] remove log volume logtype=dc
```
4. Remove the volume plexes for `vxdbavol` and `ORACLE_HOME`.

```
# vxplex -g diskgroup -o rm dis plex_name
```
5. Log in as the DBA user and revalidate your snapplan.

```
$ /opt/VRTS/bin/dbed_vmchecksnap -S ORACLE_SID -H ORACLE_HOME \
-f SNAPPLAN -o validate -F
```
6. See the “Using Database FlashSnap for Backup and Off-Host Processing” chapter of the *VERITAS Storage Foundation for Oracle Administrator’s Guide* for information on how to validate the snapplan.

Upgrading the VEA Client on a Solaris System

▼ To upgrade the VEA client on a Solaris machine (other than the host) using pkgadd

1. Log in as superuser (`root`).

2. First, check to determine whether the VEA client package is already installed.

```
# pkginfo | grep VRTSobgui
```

This command will return `VRTSobgui` if `VRTSobgui` is already installed. It will return nothing if the package has not been installed.

3. If the package is installed, remove it using the `pkgrm` command.

```
# pkgrm VRTSobgui
```

4. To install the new VEA client package for Solaris, insert the appropriate media disc into your system's CD-ROM drive.

5. Copy the `VRTSobgui.tar.gz` package to the current working directory on your system.

```
# cp /cdrom/cdrom0/storage_foundation/pkgs/VRTSobgui.tar.gz .
```

6. Decompress the package and then extract the contents.

```
# /cdrom/cdrom0/storage_foundation/scripts/install\  
/gunzip VRTSobgui.tar.gz  
# tar xvf VRTSobgui.tar
```

7. Use the `pkgadd` command to install the package.

```
pkgadd -d . VRTSobgui
```

8. Press Return.

The VEA client package for Solaris is installed.



Upgrading the VEA Client on a Windows System

▼ To upgrade the VEA client on a Windows system

1. Log in as the database 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.

After removing the existing package, install the new VEA client package by following the procedure in [“Installing the VERITAS Enterprise Administrator Client”](#) on page 40.

Verifying the VERITAS Storage Foundation Upgrade

Use the following sections to verify the product upgrade.

Checking Volume Manager Processes

After the Storage Foundation software has been successfully upgraded, you can confirm that key Volume Manager processes (`vxconfigd`, `vxnotify`, and `vxrelocd`) are running by using the following command:

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

Entries for these processes appear in output similar to the following:

```
142 ?    00:00:00vxiod
143 ?    00:00:00vxiod
.
.
.
150 ?    00:00:00vxiod
151 ?    00:00:00vxiod
159 ?    00:01:12vxconfigd
405 ?    00:00:00vxrelocd
410 ?    00:00:00vxnotify
411 ?    00:00:00vxrelocd
```



Note If you have disabled hot-relocation, the `vxrelocd` and `vxnotify` processes are not displayed.

Checking Cluster Operation

Note This section is only relevant 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
```

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.

To display the VCS attribute values for each node in the cluster, enter the following command on any node:

```
# hasys -display
```

For more information on interpreting the output from this command, see the `hasys(1M)` manual page and the *VERITAS Cluster Server User's Guide*.

LLT (Low Latency Transport)

The `/etc/llthosts` File

The file `llthosts(4)` is a database containing one entry per node that links the 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 /etc/llttab File

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.

LLT Operation

Use the `lltstat` command to verify that links are active for LLT. This command returns information about the links for LLT for the node on which it is typed.

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.

For information on ports open for LLT, type `lltstat -p` on any node.

GAB Files, GAB and Cluster Operation

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

The /etc/gabtab File

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.

GAB Operation

To verify that GAB is operating, type the following command on each node:

```
# /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 random generation number, and membership 01 indicates that nodes 0 and 1 are connected.

Port h indicates that VCS is started, gen fd570002 is a random generation 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*.



Upgrading from SUNWvxxvm

This section provides instructions for upgrading SUNWvxxvm.

▼ To upgrade from SUNWvxxvm if the root disk is unencapsulated

1. Run the `upgrade_start` script to prepare the previous release of VERITAS Volume Manager for its removal:

- ◆ If the disc is mounted automatically, enter:

```
# /cdrom/cdrom0/storage_foundation/scripts/upgrade_start
```

The `upgrade_start` script looks for volumes containing file systems. If certain key file systems must be converted back to using partitions, the script will indicate that a reboot is necessary. If so, reboot the machine to single-user mode before proceeding to the next step. If any volumes are in use, you must either unmount those volumes or reboot to single-user mode.

2. Reboot the machine to single-user mode (using a command such as `shutdown`).
3. If your system has separate `/opt` and `/var` file systems, make sure they are mounted before proceeding with installation. When the system is in single user mode, `/opt` and `/var` are not normally mounted.
4. Remove all SUNWvxxvm and SUNWvxxva patches and packages.
Refer to Sun documentation for this procedure.
5. Load and mount the disc as described in “[Mounting the Software Disc](#)” on page 30.
6. Run the `installsf` program.

- ◆ If the disc is mounted automatically, enter:

```
# cd /cdrom/cdrom0/storage_foundation
# ./installsf
```

- ◆ If the disc is mounted manually, enter:

```
# cd /mount_point/storage_foundation
# ./installsf
```

7. When you see the prompt for a license key, enter the appropriate license key. The `installsf` program then installs the VERITAS Storage Foundation to include the necessary packages on your system.

8. Depending on your existing configuration, various messages and prompts may appear. Answer the prompts appropriately.

If you do not intend to view or print the online documentation, you can omit the VRTSdbdoc, VRTSfsdoc, and VRTSvmdoc packages. If you do not intend to use the GUI, you can omit the VRTSobgui package.

9. Complete the upgrade by using the `upgrade_finish` command:

```
# /cdrom/cdrom0/storage_foundation/scripts/upgrade_finish
```

or

```
# /mount_point/storage_foundation/scripts/upgrade_finish
```

10. Reboot the machine to multiuser mode (using a command such as `shutdown`).

At this point, your pre-upgrade configuration should be in effect and any file systems previously defined on volumes should be defined and mounted.

Upgrading Language Packages

If you are upgrading VERITAS Storage Foundation in a language other than English, you must install the required language packages *after* installing the English packages. If you are planning to use the GUI, you must install the language package for the VEA client.

Note If you purchased VERITAS Volume Manager or VERITAS File System only, you must use this procedure to install language packages.

▼ To upgrade the product language packages on the server

1. Make sure the VEA Service is not running.

```
# /opt/VRTS/bin/vxsvcctl status
Current state of server : RUNNING
```

2. If the VEA Service is running, stop it using the `vxsvcctl stop` command.

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

3. Insert the “Language” disc into the CD-ROM drive. If you are using Solaris volume management software, the disc is automatically mounted as `/cdrom/cdrom0`.

4. Install the language packages using the `install_lp` command.

```
# cd /cdrom/cdrom0
# ./install_lp
```



5. After installing the language packages, restart the VEA Service.

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

▼ To upgrade the client language package on Windows

1. Insert the “Language” disc into the CD-ROM drive.
2. Go to the directory containing the client language package.

Go to `D:\language\windows`

where D is the CD-ROM drive.

3. Double-click on the `VRTSmuobg.msi` package to install it.
4. Follow any instructions during installation.

Upgrading VERITAS Volume Manager (VxVM)

If you purchased VERITAS Volume Manager only, use the steps in the following section to upgrade VxVM. If you purchased Storage Foundation, use the Storage Foundation upgrade procedure.

Note If you plan to take advantage of Live Upgrade support, you must use the traditional method to upgrade VxVM. To see the benefits of Live Upgrade, see [“Beginning the Live Upgrade”](#) on page 120.

This chapter describes how to upgrade VERITAS Volume Manager (VxVM). There are several ways to upgrade:

- ◆ Upgrading VxVM Only; see [“Upgrading VxVM Only”](#) on page 99
- ◆ Upgrading VxVM and the Solaris operating system; see [“Upgrading VxVM and the Solaris OS”](#) on page 111.
- ◆ Upgrading the Solaris operating system only; see [“Upgrading the Solaris OS Only”](#) on page 116.

Within these scenarios, there are other different upgrade paths depending on whether you have an encapsulated disk.

Note If you are planning to use VxVM in a cluster environment, follow the instructions in [“Enabling Cluster Support in VxVM \(Optional\)”](#) on page 149.

Upgrading VxVM Only

This section explains how to upgrade VxVM. Refer to the [“VxVM and Solaris Release Support Matrix”](#) on page 77 to determine if upgrading the operating system is required.

If you are planning to use the `installvm` script to upgrade VxVM, go to [“Upgrading VxVM Using the Product Installer”](#) on page 99.

Note If you purchase your copy of VERITAS Volume Manager from Sun Microsystems, the `installvm` script program is not available.

There are several options to choose from if you want to use the `pkgadd` method to upgrade VxVM:

- ◆ A quick upgrade with just one reboot [“Upgrading VxVM Using pkgadd”](#) on page 102.
- ◆ A cleaner upgrade method which may require more than one reboot, go to [“Upgrading VxVM Using Upgrade Scripts”](#) on page 106.
- ◆ An upgrade with just one reboot [“VxVM Live Upgrade Commands and Usage”](#) on page 119.

Upgrading VxVM Using the Product Installer

You can use the product installer (`installvm` script) to upgrade VxVM with an encapsulated or unencapsulated root disk.

To upgrade VxVM on a remote host, `rsh` or `ssh` must be set up. See [“Completing the Installation Procedure on an HA Environment”](#) on page 37 for more information.

Note If you are performing a multi-host installation, note that the `installvm` script does not support a mixture of new installations and upgrades. You should either install on all hosts or upgrade all hosts. In addition, every host to be upgraded in a multi-host installation must be running the same older version of VxVM.

Note If you use this `installvm` script to upgrade, you will not use the `upgrade_start` and `upgrade_finish` scripts.



▼ **To upgrade using the installvm script**

1. Mount the software disc; see “[Mounting the Software Disc](#)” on page 30 for instructions.

2. Remove the older VRTS packages using the `pkgrm` command:

```
# pkgrm VRTSvras VRTSlic VRTSvmsa
```

Note Some of the above packages may not exist on your system.

3. Insert the CD-ROM in the CD-ROM drive.

Once the CD-ROM is inserted, the Solaris volume management software automatically mounts the CD-ROM. Change directory:

```
# cd /cdrom/cdrom0/volume_manager
```

4. If you are installing VxVM on the local system or on multiple systems, which may or may not include the local system, you may:

- ◆ Run the simple form of the `installvm` command

```
# ./installvm
```

and proceed to step 5.

Or

- ◆ Run a more complex version of the `installvm` command. You might do this if you want to avoid the performance penalty of the installation scripts copying packages from the CD-ROM to a disk attached to each system. To avoid this performance penalty, you can copy the VxVM packages and patches to a network-shared file system that is connected to all of the systems on which you want to install the software.

To avoid the performance penalty, enter the following commands, which assume that your NFS mountable file system is `$NFS_FS`:

a. `# cd /cdrom/cdrom0`

b. `# cp -r * $NFS_FS`

c. `# cd volume_manager`

d. `# ./installvm -pkgpath $NFS_FS/volume_manager/pkgs -patchpath $NFS_FS/volume_manager/patches`

5. At the prompt, enter the name of the system or systems on which you want to install VxVM:

Enter the system names separated by spaces on which to install VxVM:

The `installvm` script will carry out an initial system check, and will confirm success by displaying information regarding the OS version, whether the VRTSvxvm package is installed and whether the necessary patches are installed. The initial system check might tell you that you need to obtain SunOS patches. If this happens, you need to see “Solaris Patch Requirements” in the *VERITAS Storage Foundation Release Notes*.

When the system check is complete, the `installvm` script displays this message:

```
Initial system check completed successfully.
Press Return to continue.
```

6. The infrastructure packages, VRTSvlic and VRTScpi, are now installed. When this step is complete, you will see this message:

```
VERITAS Infrastructure packages installed successfully.
Press Return to continue.
```

7. The `installvm` script then checks the system upgrade requirements, and displays this message:

```
Upgrade requirement checks completed successfully. Press Return to
continue.
```

8. Existing VxVM packages will now be removed prior to replacement by the VxVM 4.1 packages.

9. The VxVM packages are then installed. You will see a display similar to the following:

```
Installing VRTSvxvm 4.1 on host1 ..... Done 1 of 7 steps
Installing VRTSvmman 4.1 on host1 ..... Done 2 of 7 steps
Installing VRTSvmdoc 4.1 on host1 ..... Done 3 of 7 steps
Installing VRTSvmpo 4.1 on host1 ..... Done 4 of 7 steps
Installing VRTSfspro 4.1 on host1 ..... Done 5 of 7 steps
Installing VRTSalloc 1.0 on host1 ..... Done 6 of 7 steps
Installing VRTSddlpr 1.0 on host1 ..... Done 7 of 7 steps
```



10. The program then checks whether you have a license installed. If required, enter a license key and press Return to continue.

Do you want to start Volume Manager processes now [y,n,q] (y)

Note If you reply “yes” to these prompts, you may see a message advising you that an upgrade is in process, and that you should reboot later.

11. VxVM is now upgraded, and you should see a message stating that VxVM 4.1 has been successfully installed. You will see a message advising you to reboot. Reboot your system by entering:

```
# reboot -- -r
```

12. To take advantage of the new features in this release, upgrade to the latest disk group version. To confirm that the VxVM upgrade has been successful, and to upgrade your disk group version, see “[Verifying the VERITAS Storage Foundation Upgrade](#)” on page 92.

Note `installvm` cannot be used to reconfigure an existing configuration. This means that you cannot run the following two commands after completing an upgrade using `installvm`.

```
# ./installvm -configure
# ./installvm -responsefile
```

For the installation to be complete, you must either have fully run `installvm` or you must have run `installvm -installonly` followed by `installvm -configure`.

Upgrading VxVM Using pkgadd

This section describes the procedure for upgrading using the `pkgadd` command. This works with both an encapsulated and unencapsulated root disk. The procedure requires only one reboot, but it overwrites the new VxVM package on the existing VxVM package.

▼ To upgrade using pkgadd

1. If you have not already obtained and installed a VxVM 4.1 license key, do so now. See “[VERITAS Product Licensing](#)” on page 5 for details.
2. Verify that the root disk is encapsulated. Bring the system down to single-user mode using the following command:

```
# init s
```

3. Stop the vxiod daemon:

```
# vxiod -f set 0
```

4. You might have the VMSA or VEA software installed. To remove the VMSA software, enter:

```
# pkgrm VRTSvmsa
```

To remove the VEA software, enter:

```
# pkgrm VRTSvmpro VRTSfspro  
# pkgrm VRTSob VRTSobgui
```

5. Remove the other old VxVM packages by entering:

```
# pkgrm VRTSman VRTSvmdoc VRTSvmdev VRTSvmman VRTSvras VRTSvrdoc
```

Note VRTSvras will only exist on your system if you are running VxvM 3.2.

6. Load and mount the CD-ROM by starting the volmgt daemon.

```
# /etc/init.d/volmgt start
```

Note If you still have clients running previous versions of VxVM, refer to “[VMSA and VEA Co-existence](#)” on page 25.

Note The VERITAS packages and patches are not compressed when you purchase VERITAS Volume Manager through Sun Microsystems. In addition, there is no volume_manager directory. The pkgs, patches, docs, release_notes and other directories are at the top level of the disc.

7. The VxVM packages are compressed using GNU compression, so you must uncompress them using the gunzip command. First, copy the packages from the directory containing the packages to a location to which you can write and then uncompress and untar the packages. If the current directory is your selected location, create a directory volume_manager, which will be the target path, and enter the commands:

```
# cp -R /cdrom/cdrom0/volume_manager/pkgs/* volume_manager  
# cp /cdrom/cdrom0/volume_manager/scripts/VRTSobadmin \  
volume_manager
```

Note You can copy the packages to any directory and call it by any name.



8. Change to the `volume_manager` directory that now contains the VxVM packages, and uncompress the packages:

```
# cd volume_manager
# /cdrom/cdrom0/volume_manager/scripts/install/gunzip *.gz
```

9. Use `tar` to extract the packages. You should extract each package individually using a command such as:

```
# tar xvf VRTSvxvm.tar
```

and then repeat the command for each package.

10. Remove the old VRTSvlic licensing package

```
# pkgrm VRTSvlic
```

11. Install the new VxVM 4.1 licensing package:

```
# pkgadd -d . VRTSvlic
```

Note VxVM 4.1 requires the 4.1 licensing package, `VRTSvlic`. You do not need to remove the previous versions of `VRTSlic`.

12. Restart the `vxconfigd` daemon.

```
# vxconfigd -k
```

13. Make a copy of the default admin file, `/var/sadm/install/admin/default`

```
# cp /var/sadm/install/admin/default \
/var/sadm/install/admin/vxvm_admin
```

14. In the file `vxvm_admin`, find the line, “`instance=unique`”, and replace it with “`instance=overwrite`”. Resetting the value of *instance* is important because, in the event of a system outage, setting the value and running the next step will prevent the system from being unbootable.

15. Install the `VRTSvxvm` package with the command, edit the file `/var/sadm/install/admin/vxvm_admin` and add an entry “`overwrite=true`” if one doesn’t exist. This will avoid multiple instances of `VRTSvxvm` (like `VRTSvxvm.1` `VRTSvxvm.2` ...).

```
# pkgadd -a /var/sadm/install/admin/vxvm_admin -d . VRTSvxvm
```

16. If warnings are displayed that include the string `/etc/vx`, ignore them and continue. Using the `pkgadd` command, install the additional packages:

```
# pkgadd -d . VRTSvmdoc VRTSvmman
# pkgadd -a VRTSobadmin -d . VRTSob VRTSobgui
# pkgadd -d . VRTSalloc VRTSddlpr
# pkgadd -d . VRTSfspro VRTSvmpro
# pkgadd -d . VRTScpi VRTSperl VRTSmuob
```

Note It is recommended that you install both `VRTSvmpro` and `VRTSfspro` if you intend to use the VEA GUI.

17. Use the following steps to install VxVM and VEA patches. For information on patches, see the *VERITAS Storage Foundation Release Notes*.

Create a temporary directory:

```
# mkdir -p /41/patches
```

18. Copy the patches into the temporary directory:

```
# cd /cdrom/cdrom0/volume_manager/patches
# cp *.* /41/patches
```

19. Verify that the patches have been copied:

```
# ls -la /41/patches
```

The output should display four patches with an id similar to `#####-##.tar.gz`

20. Uncompress the patches:

```
# cd /cdrom/cdrom0/gnu
# ./gunzip /41/patches/
```

21. Extract the patches:

```
# cd /41/patches
# tar -xvf #####-##.tar
```

Repeat the command for all patches.

22. Install the patches:

```
# patchadd #####-##
```

Repeat the command for all patches.



23. Verify that the patch is installed:

```
# showrev -p #####-##
```

Repeat the command for all patches.

24. To disable the hot-relocation feature, comment out the vxrelocd line.

For Solaris 8 and 9, this line is in the startup file `/etc/rc2.d/S95vxvm-recover`:

```
# vxrelocd root & # commented out to disable hot-relocation
```

For Solaris 10, this line is in the startup file `/lib/svc/method/vxvm-recover`:

```
# vxrelocd root & # commented out to disable hot-relocation
```

25. Perform a system reboot:

```
# cd /; shutdown -g0 -y -i6
```

26. To take advantage of the new features in this release, you should upgrade to the latest disk group version. To confirm that the VxVM upgrade has been successful, and to upgrade your disk group version, see [“To verify the upgrade”](#) on page 126.

27. See [“Starting the VEA Server”](#) on page 147 and [“Starting the VEA Client”](#) on page 148 to start VEA.

Upgrading VxVM Using Upgrade Scripts

This section explains a clean solution (no overwrite on the older version of VxVM) to upgrade VxVM which may require more than one reboot to complete the upgrade process.

This procedure upgrades the following cases:

- ◆ All versions of VxVM to 4.1
- ◆ Rootdisk encapsulated (requires two reboots)
- ◆ Rootdisk Not encapsulated (requires one reboot)

▼ **To upgrade VxVM using upgrade scripts**

1. If you have not already obtained and installed a VxVM 4.1 license key, do so now. See [“VERITAS Product Licensing”](#) on page 5 for details.

Note The directory `/opt` must exist, be writable, and must not be a symbolic link. This is because the volumes not temporarily converted by `upgrade_start` are unavailable during the upgrade process. If you have a symbolic link from `/opt` to one of the unconverted volumes, the symbolic link will not function during the upgrade and items in `/opt` are not installed.

2. Load and mount the CD-ROM by starting the `volmgt` daemon.

```
# /etc/init.d/volmgt start
```

3. Run `upgrade_start` with the `-check` argument to detect any problems that exist which could prevent a successful upgrade. Be sure to run the `upgrade_start` and `upgrade_finish` scripts that are supplied with the VxVM 4.1 release. If this command reports success, you can proceed with running the `upgrade_start` script, but if it reports errors, correct the problem(s) and rerun `upgrade_start -check`.

```
# /cdrom/cdrom0/volume_manager/scripts
# ./upgrade_start -check
```

4. Run the `upgrade_start` script so that the system can come up with partitions. Be sure to run the `upgrade_start` and `upgrade_finish` scripts that are supplied with the VxVM 4.1 release. The `upgrade_start` script searches for volumes containing file systems, and if any are found, converts them to partitions:

```
# /cdrom/cdrom0/volume_manager/scripts
# ./upgrade_start
```

Skip the next step if the root disk is not encapsulated, meaning when the root disk is not in VxVM control.

5. A reboot is required now if the root disk is encapsulated. If the root disk is not encapsulated, skip this step.

```
# reboot -- -s
```

Note You need to mount `/opt` manually before you can run `pkgrm` to remove VxVM packages if `/opt` is on its own partition.

6. Remove the old VxVM packages by entering:

```
# pkgrm VRTSvmdoc VRTSvmdev VRTSvmman VRTSvxvm VRTSlic VRTSvrdoc \
VRTSvras
```



Note VRTSvras may not exist on your system.

Note If you still have clients running previous versions of VxVM, refer to “[VMSA and VEA Co-existence](#)” on page 25.

Note Licensing in VxVM 4.1 requires the new VRTSvlic package. You do not need to remove the existing VRTSlic package.

7. You might have the VMSA or VEA software installed. To remove the VMSA software, enter:

```
# pkgrm VRTSvmsa
```

To remove the VEA software, enter:

```
# pkgrm VRTSvmpro VRTSfspro  
# pkgrm VRTSob VRTSobgui
```

8. If Sun Volume Manager is installed:

- ◆ Remove any SUNWvxvm related patches using the procedure in the Sun documentation.
- ◆ Remove SUNWvxvm:

```
# pkgrm SUNWvxvm SUNWvmdoc SUNWvmdev
```

Note If you have made any additional modifications or have applied any patches, they must be removed before removing the SUNvxvm package.

9. Load and mount the CD-ROM by starting the volmgt daemon.

```
# /etc/init.d/volmgt start
```

Note The VERITAS packages and patches are not compressed when you purchase VERITAS Volume Manager through Sun Microsystems. In addition, there is no volume_manager directory. The pkgs, patches, docs, release_notes and other directories are at the top level of the disc.

10. The VxVM packages are compressed using GNU compression, so you will need to uncompress them using the `gunzip` command. First, copy the packages from the directory containing the packages to a location to which you can write and then uncompress and untar the packages. If the current directory is your selected location, create a directory `volume_manager`, which will be the target path, and enter the commands:

```
# cp -R /cdrom/cdrom0/volume_manager/pkgs/* volume_manager
# cp /cdrom/cdrom0/volume_manager/scripts/VRTSobadmin \
  volume_manager
```

Note You can copy the packages to any directory and call it by any name.

11. Change to the `volume_manager` directory that now contains the VxVM packages, and uncompress the packages:

```
# cd volume_manager
# /cdrom/cdrom0/volume_manager/scripts/install/gunzip *.gz
```

12. Use `tar` to extract the packages. You should extract each package individually using a command such as:

```
# tar xvf VRTSvxvm.tar
```

and then repeat the command for each package.

13. Add the VxVM 4.1 licensing package using the following command:

```
# pkgadd -d . VRTSvlic
```

14. Add the VxVM 4.1 package using the following command:

```
# pkgadd -d . VRTSvxvm
```

If warnings are displayed that include the string `/etc/vx`, ignore them and continue.

15. Using the `pkgadd` command, install the additional packages:

```
# pkgadd -d . VRTSvmdoc VRTSvmman
# pkgadd -a VRTSobadmin -d . VRTSob VRTSobgui
# pkgadd -d . VRTSalloc VRTSddlpr
# pkgadd -d . VRTSfspro VRTSvmpro
# pkgadd -d . VRTScpi VRTSperl VRTSmuob
```

16. Complete the upgrade using the following command:

```
# /cdrom/cdrom0/volume_manager/scripts/upgrade_finish
```



17. The following steps contain instructions on Installing the VxVM and VEA patches.

Create a temporary directory:

```
# mkdir -p /41/patches
```

18. Copy the patches into the temporary directory:

```
# cd /cdrom/cdrom0/volume_manager/patches
# cp *.* /41/patches
```

19. Verify that the patches have been copied:

```
# ls -la /41/patches
```

The output should display four patches with an id similar to 115209-##.tar.gz

20. Uncompress the patches:

```
# cd /cdrom/cdrom0/gnu
# ./gunzip /41/patches/
```

21. Extract the patches:

```
# cd /41/patches
# tar -xvf #####-##.tar
```

Repeat the command for all patches.

22. Install the patches:

```
# patchadd #####-##
```

Repeat the command for all patches.

23. Verify that the patch is installed:

```
# showrev -p #####-##
```

Repeat the command for all patches.

24. To disable the hot-relocation feature, comment out the vxrelocd line in the startup file /etc/rc2.d/S95vxvm-recover:

```
# vxrelocd root & # commented out to disable hot-relocation
```

25. Perform reconfiguration reboot:

```
# reboot -- -r
```

26. See [“Starting the VEA Server”](#) on page 147 and [“Starting the VEA Client”](#) on page 148 to start VEA.

Upgrading VxVM and the Solaris OS

If you are upgrading from VxVM 3.5 or earlier and the Solaris operating system go to [“Upgrading VxVM and the Solaris OS”](#) on page 111.

If you are upgrading only the Solaris operating system, go to [“Upgrading the Solaris OS Only”](#) on page 116.

This section explains how to upgrade both the Solaris operating system and VxVM. (Refer to the [“VxVM and Solaris Operating System Upgrade Paths”](#) on page 78 to determine if an operating system upgrade is required.). This upgrade procedure covers both the possible scenarios, which are:

- ◆ Upgrading from VxVM 3.5 or later and the root disk is encapsulated (this procedure requires two reboots from VxVM)
- ◆ Upgrading from VxVM 3.5 or later and the root disk is not encapsulated (this procedure requires one reboot for VxVM)

▼ To upgrade VxVM and Solaris OS

1. If you have not already obtained and installed a VxVM 4.1 license key, do so now. See [“VERITAS Product Licensing”](#) on page 5 for details.

Note The directory `/opt` must exist, be writable, and must not be a symbolic link. This is because the volumes not temporarily converted by `upgrade_start` are unavailable during the upgrade process. If you have a symbolic link from `/opt` to one of the unconverted volumes, the symbolic link will not function during the upgrade and items in `/opt` are not installed.

2. Load and mount the CD-ROM by starting the `volmgt` daemon.

```
# /etc/init.d/volmgt start
```

3. Run the `upgrade_start` with the `-check` argument to detect any problems that exist which could prevent a successful upgrade. (Be sure to run the `upgrade_start` and `upgrade_finish` scripts that are supplied with the VxVM 4.1 release.) If this command reports success, you can proceed with running the `upgrade_start` script, but if it reports errors, correct the problem(s) and rerun `upgrade_start -check`.

```
# /cdrom/cdrom0/volume_manager/scripts
# ./upgrade_start -check
```



4. Run the `upgrade_start` script so that the system can come up with partitions. The `upgrade_start` script searches for volumes containing file systems, and if any are found, converts them to partitions:

```
# /cdrom/cdrom0/volume_manager/scripts
# ./upgrade_start
```

If the root disk is not encapsulated skip the next step (reboot is not required).

5. If the root disk is not encapsulated go to next step.

Reboot to single-user mode.

```
# reboot -- -s
```

Note You need to mount `/opt` manually before you can run `pkgrm` to remove VxVM packages if `/opt` is on its own partition.

6. Remove the old VxVM packages by entering:

```
# pkgrm VRTSvmdoc VRTSvmdev VRTSvmman VRTSvxvm VRTSlic VRTSvras \
VRTSvrdoc
```

Note VRTSvras may not exist on your system.

Note If you still have clients running previous versions of VxVM, refer to “[VMSA and VEA Co-existence](#)” on page 25.

Note Licensing in VxVM 4.1 requires the new VRTSvlic package. You do not need to remove the existing VRTSlic package.

7. You might have the VMSA or VEA software installed. To remove the VMSA software, enter:

```
# pkgrm VRTSvmsa
```

To remove the VEA software, enter:

```
# pkgrm VRTSfspro VRTSvmpro
# pkgrm VRTSob VRTSobgui
```

8. If Sun Volume Manager is installed:

- ◆ Remove any SUNWvxxvm related patches.

Refer to the Sun documentation for the procedure.

- ◆ Remove SUNWvxxvm:

```
# pkgrm SUNWvxxvm SUNWvmdoc SUNWvmdev
```

Note If you have made any additional modifications or have applied any patches, they must be removed before removing the SUNvxxvm package.

9. Upgrade the operating system to Solaris 8, 9 or 10.

Note Refer to the Solaris installation documentation for instructions on how to upgrade the Solaris operating system. After installing the Solaris operating system, install the required patches that are listed in “Solaris Patch Requirements” in the *VERITAS Storage Foundation Release Notes*.

10. Once the system is up after upgrading the Solaris operating system, load and mount the volume_manager CD-ROM by starting the volmgt daemon.

```
# /etc/init.d/volmgt start
```

Note VERITAS packages and patches are not compressed when you purchase VERITAS Volume Manager through Sun Microsystems. In addition, there is no volume_manager directory. The pkgs, patches, docs, release_notes and other directories are at the top level of the disc.

11. The VxVM packages are compressed using GNU compression, so you will need to uncompress them using the gunzip command. First, copy the packages from the directory containing the packages to a location to which you can write and then uncompress and untar the packages. If the current directory is your selected location, create a directory volume_manager, which will be the target path, and enter the command:

```
# cp -R /cdrom/cdrom0/volume_manager/pkgs/* volume_manager
# cp /cdrom/cdrom0/volume_manager/scripts/VRTSobadmin \
volume_manager
```

Note You can copy the packages to any directory and call it by any name.



12. Change to the `volume_manager` directory that now contains the VxVM packages, and uncompress the packages:

```
# cd volume_manager
# /cdrom/cdrom0/volume_manager/scripts/install/gunzip *.gz
```

13. Use `tar` to extract the packages. You should extract each package individually using a command such as:

```
# tar xvf VRTSvxvm.tar
```

Repeat the command for each package.

14. Remove the old VRTSvlic licensing package

```
# pkgrm VRTSvlic
```

15. Add the new VxVM 4.1 licensing package using the following command:

```
# pkgadd -d . VRTSvlic
```

16. Add the VxVM 4.1 package using the following command:

```
# pkgadd -d . VRTSvxvm
```

If warnings are displayed that include the string `/etc/vx`, ignore them and continue.

17. Complete the upgrade using the following command:

```
# /cdrom/cdrom0/volume_manager/scripts/upgrade_finish
```

18. Using the `pkgadd` command, install the additional packages:

```
# pkgadd -d . VRTSvmdoc VRTSvmman
# pkgadd -a VRTSobadmin -d . VRTSob VRTSobgui
# pkgadd -d . VRTSalloc VRTSddlpr
# pkgadd -d . VRTSfspro VRTSvmpro
# pkgadd -d . VRTScpi VRTSperl VRTSmuob
```

19. Create a temporary directory for the installation of the VxVM and VEA patches:

```
# mkdir -p /41/patches
```

20. Copy the patches into the temporary directory:

```
# cd /cdrom/cdrom0/volume_manager/patches
# cp *.* /41/patches
```

21. Verify that the patches have been copied:

```
# ls -la /41/patches
```

The output should display four patches with an ID similar to 115209-##.tar.gz.

22. Uncompress the patches:

```
# cd /cdrom/cdrom0/gnu
# ./gunzip /41/patches/#####-##.tar.gz
```

Repeat the gunzip command for all patches.

23. Extract the patches:

```
# cd /41/patches
# tar -xvf #####-##.tar
```

Repeat the command for all patches.

24. Install the patches:

```
# patchadd 115209-xx
```

Repeat the command for all patches.

25. Verify that the patch is installed:

```
# showrev -p #####-##
```

Repeat the command for all patches.

26. To disable the hot-relocation feature, comment out the vxrelocd line in the startup file /etc/rc2.d/S95vxvm-recover:

```
# vxrelocd root & # commented out to disable hot-relocation
```

27. Perform reconfiguration reboot:

```
# reboot -- -r
```

To take advantage of the new features in this release, you should upgrade to the latest disk group version. To confirm that the VxVM upgrade has been successful, and to upgrade your disk group version, see [“To verify the upgrade”](#) on page 126. See [“VERITAS Enterprise Administrator”](#) on page 134 to start VEA.



Upgrading the Solaris OS Only

If you are running VxVM 4.1 with an earlier release of the Solaris operating system, you can upgrade the Solaris operating system using the following procedure.

Caution You should only use this procedure to upgrade the Solaris operating system if you are running VxVM 4.1.

Note The directory `/opt` must exist, be writable, and must not be a symbolic link. This is because the volumes not temporarily converted by the `upgrade_start` are unavailable during the upgrade process. If you have a symbolic link from `/opt` to one of the unconverted volumes, the symbolic link will not function during the upgrade and items in `/opt` will not be installed.

▼ To upgrade the Solaris operating system only

1. Bring the system down to single-user mode using the following command:

```
# init S
```

Note You must mount `/opt` manually if `/opt` is on its own partition.

2. Load and mount the CD-ROM by starting the `volmgt` daemon.

```
# /etc/init.d/volmgt start
```

3. Change directory:

```
# cd /cdrom/cdrom0/volume_manager/scripts
```

4. Run the `upgrade_start` with the `-check` argument to detect any problems that exist which could prevent a successful upgrade. Run the `upgrade_start` and `upgrade_finish` scripts that are supplied with the VxVM 4.1 release. If this command reports success, you can proceed with running the `upgrade_start` script, but if it reports errors, correct the problem(s) and rerun `upgrade_start -check`.

```
# ./upgrade_start -check
```

5. Run the `upgrade_start` script so that the system can come up with partitions. Run the `upgrade_start` and `upgrade_finish` scripts that are supplied with the VxVM 4.1 release. The `upgrade_start` script searches for volumes containing file systems, and if any are found, converts them to partitions:

```
# ./upgrade_start
```

6. Bring the system down to run level 0.

```
# init 0
```

7. Upgrade the operating system to Solaris 8, 9 or 10.

Note You should boot up the system from run level 0 depending on the Solaris upgrade procedure that you want to follow. Refer to the Solaris installation documentation for instructions on how to upgrade the Solaris operating system. After installing the Solaris operating system, install the required patches that are listed in “Solaris Patch Requirements” in the *VERITAS Storage Foundation Release Notes*.

8. Once the system is up with the upgraded Solaris operating system, bring the system down to single-user mode by entering:

```
# init S
```

9. Load and mount the CD-ROM by starting the volmgt daemon.

```
# /etc/init.d/volmgt start
```

10. Change directory:

```
# cd /cdrom/cdrom0/volume_manager/scripts
```

11. Complete the upgrade by entering:

```
# ./upgrade_finish
```

12. Perform the reconfiguration reboot:

```
# reboot -- -r
```

Upgrading Using Live Upgrade

Solaris Live Upgrade is the feature that performs an operating system upgrade with no downtime. The upgrade is done on an alternate disk using the current boot environment (BE). After the Live Upgrade, the alternate disk has all the information from the current BE and just one reboot will bring the system up on the alternate disk with the upgraded Solaris Version.

Note Currently only you may only use the Live Upgrade steps for VxVM and the Solaris OS. Live Upgrade will be supported on other products in the future.

Volume Manager uses Solaris Live Upgrade to upgrade VxVM software in a live environment.



The advantages of using Live Upgrade are:

- ◆ Less system downtime - just one reboot will bring the system up and running on the new Solaris version
- ◆ You can revert to the previous OS version at any time
- ◆ Alternate root disk partitions can be resized to grow or shrink
- ◆ If you do not carry out an upgrade of the Disk Group version on the alternate boot environment, you can create more than one boot environment with different versions of VxVM/Solaris and easily switch between them with just one reboot

VxVM Live Upgrade requires an alternate disk to upgrade. This disk can be a mirrored rootdisk or an independent unused disk which supports bootability. VxVM Live Upgrade is mainly done using the Solaris Live Upgrade commands.

Upgrading VxVM or Solaris OS or Both Using Live Upgrade

VxVM Live Upgrade supports the following:

- ◆ Upgrading VxVM only (both encapsulated and unencapsulated root disk)
- ◆ Upgrading Solaris OS only (both encapsulated and unencapsulated root disk)
- ◆ Upgrading both Solaris OS and VxVM (both encapsulated and unencapsulated root disk)
- ◆ Installing any VxVM or Solaris OS patches

Live Upgrade requires an alternate disk to perform the upgrade. An alternate root disk can be a mirrored root disk (chosen by default), or you can specify an alternate disk. The size of the alternate disk should be greater than or equal to the size of the rootdisk. This procedure will upgrade all the mounted partitions on the root disk with entry in `/etc/vfstab`. Unmounted partitions and raw volumes will not be migrated to alternate disk.

Installing Live Upgrade on the Current Root Disk

To begin upgrading the system you must first install the Solaris Live Upgrade software on the system. This Solaris Live Upgrade package is available on the latest Solaris software disc. Load the latest Solaris Software 2 of 2 disc. Execute the command `liveupgrade20` in the directory `/cdrom/cdrom0/Solaris9/Tools/Installer/` which installs the Solaris Live Upgrade packages on the system. Read the *Solaris Installation Guide* for the procedure to install the latest Solaris Live Upgrade package.

VxVM Live Upgrade Commands and Usage

Volume Manager Live Upgrade uses the two commands `vxlustart` and `vxlufinish`. These commands are on the Volume Manager 4.1 software disc. The command `vxlustart` configures the machine (like virtual un-encapsulation, setting up alternate disk, etc.) and performs the Solaris Live Upgrade. The command `vxlufinish` completes the upgrade process by encapsulating the alternate root disk, if required. The `vxlustart` command can upgrade the Solaris operating system either from CD-ROM or from a network path. Copy the `vxlustart` and `vxlufinish` commands to the local directory so that the CD-ROM can be used to load the Solaris installation discs if you are upgrading the operating system. The usage of these commands is described below.

Using `vxlustart`

The `vxlustart` command and its option are:

```
vxlustart [-V] [-v] [-f] [-m] [-D] [-u 5.8|5.9|5.10] [-d diskname]
[-g diskgroup] [-s path_to_solaris_installation_image] [-F
filesystem]
```

```
vxlustart [-V] [-v] [-f] [-m] [-D] [-U] [-u 5.8|5.9|5.10] [-d
diskname]
```

```
vxlustart [-r] [-v] [-u 5.8|5.9|5.10]
```

`[-v]` Verbose option, which will print the list of commands executed by `vxlustart` without executing them. This option can be used as a pre-check for `vxlustart` command. This may not find all possible errors.

`[-v]` Verbose option to print the list of commands executed by `vxlustart`.

`[-D]` This is for debugging. With this option `ksh` turns on the “-x” option to print every line it executes.

`[-u]` Option to specify the Solaris version to be upgraded. In case of upgrading only VxVM, the version should be the current Solaris version.

`[-g]` This is to specify diskgroup on which the rootdisk stays. This option is useful only if “`vxldg bootdg`” fails.

`[-d]` Use this option to specify the alternate diskname which is used as the new Solaris root disk. If the option is not specified, `vxlustart` will prompt for the diskname. By default, it prompts the mirror root disk to use.

`[-s]` Use this option to specify the path to the new Solaris image. This path must be network/directory path which has the complete Solaris image (one like in JumpStart image directory). If this option is not specified, the script assumes that the upgrade is from discs and the script will prompt for loading a disc. After loading the disc, the path to the image must be specified (For example: `/cdrom/cdrom0/s0`).



[-F] Specify the filesystem for the system volumes to be on. Default filesystem is “ufs” for all the file systems.

[-U] Use this option to upgrade VxVM only. The command won’t prompt for Solaris discs.

[-m] If this option is specified, the command assumes the VTOC is created manually. This is helpful if you want to increase the size of alternate root disk partition size. If this is not specified, the VTOC of the alternate rootdisk is created very similar to the current rootdisk.

[-f] This option forces VTOC creation, if the partitions are not cylinder aligned..

[-r] Use this option to remount the alternate rootdisk in case the system was rebooted or crashed after running `vxlustart` command and before completing `vxlufinish`.

Using `vxlufinish`

The `vxlufinish` command options are:

```
# vxlufinish [-v] [-D] [-g DG] [-f] [-u 5.8|5.9|5.10]
```

[-v] This is a verbose option to print the list of commands executed by `vxlustart`.

[-D] This is for debugging. With this option ksh turns on “-x” option to print every line it executes.

[-u] Specify the upgraded Solaris version. This Solaris version must be the same as specified in `vxlustart` command.

[-g] Specify bootdg diskgroup for the alternate root disk. The specified disk group must be unique. If the current boot environment is encapsulated, the alternate disk is also encapsulated with the different diskgroup name.

[-f] This command option forces the upgrade to complete in case Volume Manager is not upgraded. Before using this option make sure the Volume Manager drivers in the alternate disks are compatible to the upgraded Solaris operating system. Otherwise Volume Manager may not perform optimally.

Beginning the Live Upgrade

▼ To begin the Live Upgrade

1. If you have not already obtained and installed a VxVM 4.1 license key, do so now. See [“VERITAS Product Licensing”](#) on page 5 for details.
2. Load and mount the CD-ROM by starting the `volmgt` daemon.

```
# /etc/init.d/volmgt start
```

3. The two commands which are involved in Live Upgrade are `vxlustart` and `vxlufinish`. These commands are on the CD-ROM. The `vxlustart` command configures the machine (like un-encapsulation, setting up alternate disk, etc.) and performs the upgrade. The `vxlufinish` command completes the upgrade process by encapsulating the root disk if required. The `vxlustart` command can upgrade the Solaris operating system either from CD-ROM or from a network directory path. Copy these two commands to the local directory so that the CD-ROM drive can be used to load the Solaris installation discs.

```
# cp /cdrom/cdrom0/.../vxlustart /
# cp /cdrom/cdrom0/.../vxlufinish /
```

4. Run `vxlustart` with a `[-V]` argument to detect any problems that prevent a successful upgrade. If this command reports success, proceed with running the `vxlustart` script, but if it reports errors, correct the problem and rerun `vxlustart -V`. This `-V` option will not catch the failures reported by Solaris Live Upgrade commands.

For example:

- a. If you want to upgrade 5.9 to 5.10 run the following command to check whether the upgrade will run successfully.

```
# vxlustart -u 5.10 -V -s <path to image or cd>
```

- b. If you want to upgrade just VxVM on Solaris 5.9, run

```
# vxlustart -V -u 5.9 -U
```

5. Upgrade Solaris from CD-ROM or from a network directory path.

If you are not upgrading Solaris, skip this step. If you want to upgrade Solaris, read the *Solaris Installation Guide for Live Upgrade* for more information. If you do not want to upgrade Solaris, continue to [step 6](#) on page 122.

▼ Upgrade Solaris from CD-ROM or network path:

- ◆ “[Upgrading Solaris from CD-ROM](#)” on page 121
- ◆ “[Upgrading Solaris from Network Directory Path](#)” on page 122.

Upgrading Solaris from CD-ROM

Load the Solaris software disc 1 of 1. Run the `vxlustart` command to upgrade to the version which is on the disc.

For example: to upgrade from Solaris 9 to Solaris 10, use the following command

```
# vxlustart -u 5.10 -d c0t8d0s2 -s /cdrom/sol_9_404_sparc/s0
```



Once all the packages are installed from disc 1, the command prompts for the second disc. Load the second disc and specify the disc path at the prompt. For example: `/cdrom/cdrom0`. After you have installed the second disc, install the language disc if required. Enter `NONE` after installing all the required discs. The `-s` option is optional. If `-s` is not specified, the command will prompt to load the CD starting with the first CD.

Upgrading Solaris from Network Directory Path

Upload the disc images to a network directory. Once completed, all the packages are available in one location so path to the directory will upgrade the complete Solaris operating system. To upgrade from Solaris 8 to Solaris 9, use the following command:

```
# vxlustart -u 5.9 -d c0t8d0s2 -s \  
/net/pdx.veritas.com/jumpstart/solaris2.9
```

This command upgrades the packages and activates the boot environment.

Skip the next step (which is only for upgrading VxVM).

6. If only Volume Manager needs to be upgraded, specify the `-U` option and the current Solaris version to the command. If you want to upgrade only Volume Manager on Solaris 8, use the following command,

```
# vxlustart -u 5.8 -d c0t8d0s2 -U
```

7. Once the command `vxlustart` is completed means the Solaris OS upgrade on the alternate disk is also completed. The important information to be noted is that the alternate disk is mounted on the current rootdisk as `/altroot.<OS_VERSION>`. Say the alternated rootdisk is upgraded to 5.10 with 2 system partitions (`/` and `/usr`), then the alternate rootdisk is mounted as

```
/altroot.5.10  
/altroot.5.10/usr
```

These two directories must be remounted manually in case the system crashes or if the partition is accidentally unmounted before going to the next step.

8. This step is not required if you are not upgrading Volume Manager. To upgrade Volume Manager, follow the steps below:

- a. Load and mount the CD-ROM by starting the `volmgt` daemon.

```
# /etc/init.d/volmgt start
```

- b. Remove the old Volume Manager packages on the alternate root by entering:

```
# pkgrm -R /altroot.5.10 VRTSvmdoc VRTSvmdev VRTSvmmman \  
VRTSvxvm VRTSlic VRTSvras VRTSvrdoc
```

Note Your system may not have all listed packages installed.

Note If you still have clients running previous versions of VxVM, refer to “[VMSA and VEA Co-existence](#)” on page 25.

Note Licensing in VxVM 4.1 requires the new VRTSvlic package. You do not need to remove the existing VRTSlic package.

- c. You might have the VMSA or VEA software installed. To remove the VMSA software on an alternate root disk, enter:

```
# pkgrm -R /altroot.5.10 VRTSvmsa
```

To remove the VEA software, enter:

```
# pkgrm -R /altroot.5.10 VRTSfspro VRTSvmpro
# pkgrm -R /altroot.5.10 VRTSob VRTSobgui
```

- d. If Sun Volume Manager is installed:

Remove any SUNWvxvm related patches. Refer to the Sun documentation for the procedure, Remove SUNWvxvm on alternate root disk:

```
# pkgrm -R /altroot.5.10 SUNWvxvm SUNWvmdoc SUNWvmdev
```

Note If you have made any additional modifications or have applied any patches, they must be removed before removing the SUNvxvm package.

Note The VERITAS packages and patches are not compressed when you purchase VERITAS Volume Manager through Sun Microsystems. In addition, there is no volume_manager directory. The pkgs, patches, docs, release_notes and other directories are at the top level of the disc.

- e. The Volume Manager packages are compressed using GNU compression, so you will need to uncompress them using the gunzip command. First, copy the packages to a location to which you can write and then uncompress and untar the packages. If the current directory is your selected location, create a directory volume_manager, which will be the target path, and enter the commands:

```
# cp -R /cdrom/cdrom0/volume_manager/pkgs/* volume_manager
# cp /cdrom/cdrom0/volume_manager/scripts/VRTSobadmin \
    volume_manager
```

Note You can copy the packages to any directory and call it by any name.



- f. Change to the `volume_manager` directory that now contains the Volume Manager packages, and uncompress the packages:

```
# cd volume_manager
# /cdrom/cdrom0/volume_manager/scripts/install/gunzip *.gz
```

- g. Use the `tar` command to extract the packages. You should extract each package individually using a command such as:

```
# tar xvf VRTSvxvm.tar
```

Repeat this step for each package.

- h. Remove the old VRTSvlic licensing package on an alternate root disk:

```
# pkgrm -R /altroot.5.10 VRTSvlic
```

- i. Add the new VxVM 4.1 licensing package on an alternate root disk using the following command:

```
# pkgadd -R /altroot.5.10 -d . VRTSvlic
```

- j. Add the VxVM 4.1 package on the alternate root disk using the following command:

```
# pkgadd -R /altroot.5.10 -d . VRTSvxvm
```

If warnings are displayed include the string `/etc/vx`, ignore them and continue.

- k. Using the `pkgadd` command, install the additional packages on alternate root disk:

```
# pkgadd -R /altroot.5.10 -d . VRTSvmdoc VRTSvmman
# pkgadd -R /altroot.5.10 -a VRTSobadmin -d . VRTSob VRTSobgui
# pkgadd -R /altroot.5.10 -d . VRTSalloc VRTSddlpr
# pkgadd -R /altroot.5.10 -d . VRTSfspro VRTSvmpo
# pkgadd -R /altroot.5.10 -d . VRTScpi VRTSperl VRTSmuob
```

▼ To install VxVM and VEA patches

- l. Create a temporary directory:

```
# mkdir -p /41/patches
```

- m. Copy the patches into the temporary directory:

```
# cd /cdrom/cdrom0/volume_manager/patches
# cp *.* /41/patches
```

- n. Verify that the patches have been copied:

```
# ls -la /41/patches
```

The output should display four patches with an id similar to #####-##.tar.gz

- o. Uncompress all the patches:

```
# cd /cdrom/cdrom0/gnu
# ./gunzip /41/patches/#####-##.tar.gz
```

- p. Extract all the patches:

```
# cd /41/patches
# tar -xvf #####-##.tar
```

- q. Install all the patches on the alternate root disk:

```
# patchadd -R /altroot.5.10 #####-xx
```

9. After installing the Volume Manager software and patches, use the `vxlufinish` command to complete the Live Upgrade process. Use the following command if the Solaris operating system is upgraded from Solaris 9 to 10 and Volume Manager is installed.

```
# vxlufinish -u 5.10 -g root510
```

Now the upgrade process is complete.

10. Shut down the machine using `shutdown` or “`init 6`” to reboot the machine on the alternate root disk.

```
# init 6
```

Note Don't use the command “`reboot`” to reboot the machine on an alternate root disk. If the alternate rootdisk has a problem rebooting or any upgrade issue, reboot the machine back to the older disk.



▼ To verify the upgrade

11. Check that Volume Manager and the file system, if upgraded, are the new version.

```
# pkginfo -l VRTSvxvm.*
# pkginfo -l VRTSob.*
# pkginfo -l VRTSalloc.*
# pkginfo -l VRTddlpr.*
# pkginfo -l VRTSvmpro.*
# pkginfo -l VRTSfspro.*
# pkginfo -l VRTSobgui.*
# pkginfo -l VRTSvxfs.*
```

12. Verify that all the file systems that were under VxVM control prior to the upgrade are now under VxVM control.

```
# df -k
```

Upgrading VxVM Language Versions

This section applies if you have purchased a localized version of VxVM. Language discs enable you to use the VxVM software in a supported languages other than English. VERITAS Storage Solutions includes three software discs, and if you purchase a language version, other than English, the product includes an additional disc with software and documentation.

▼ To upgrade language version software

1. Verify that the VERITAS Cluster Server Cluster Manager is not running. Consult your cluster server documentation for instructions on how to determine whether the cluster manager is running and how to stop it.

2. Make sure the VEA Service is not running.

```
# /opt/VRTS/bin/vxsvcctl status
Current state of server : RUNNING
```

3. If the VEA Service is running, stop it using the `vxsvcctl stop` command.

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

4. Remove the old language packages. For example, in the case of the Japanese packages, use a command similar to the following:

```
# pkgrm VRTSjavms VRTSvmjac VRTSvmjad VRTSvmjam VRTSmulic VRTSmuobg
VRTSmuob
```

Some of the packages listed in this command may not be installed, depending on the actual installation or the version of the VxVM software.

5. Upgrade the base VxVM software.
6. Insert the language disc and install the language packages using one of the following two methods:
 - ◆ The language install script. See “[Upgrading VxVM Language Versions](#)” on page 126

Note This method only applies to the Japanese version. For other languages use the `pkgadd` command.

- ◆ The `pkgadd` command.

Upgrading VEA Windows Client Package

To upgrade the Windows Client Package, you need to uninstall the existing packages, and then install the new versions.

▼ To upgrade the VEA Windows client package

1. Click **Start > Settings > Control Panel > Add or Remove Programs** and select “VERITAS Enterprise Administrator language pack” for removal.
2. Uninstall the base VEA package the same way.
3. Install the base and language packages as described in the section entitled “[Installing on Windows](#)” on page 41.



Upgrading CVM Protocol and Disk Group Version

If you want to take advantage of the new features in this release, you must upgrade the VERITAS Cluster Volume Manager (CVM) protocol version (50), and upgrade to the latest disk group version (110).

1. To upgrade the CVM protocol version to version 50, enter the following command on the master node:

```
# vxdctl upgrade
```

2. To upgrade the disk group version to 110, enter the command:

```
# vxdg -T 110 upgrade dgname
```

3. After upgrading CVM in a VCS environment, you should run the command:

```
# vxcmconfig upgrade
```

If this command is not run, you will see a warning in the engine log file, `/opt/VRTSvcs/log/engine_A.log`.

Note Downgrading disk group versions is not supported. If a VERITAS cluster is used, the disk group version should match the lowest Volume Manager version installed in the cluster.

Updating Variables

In `/etc/profile`, update the `PATH` and `MANPATH` variables as needed.

Default Disk Group

In releases prior to Volume Manager 4.0, the default disk group was `rootdg` (the root disk group). For Volume Manager to function, the `rootdg` disk group had to exist and it had to contain at least one disk.

This requirement no longer exists, however you may find it convenient to create a system wide default disk group. This upgrade has created `rootdg` as the default disk group, however you can change it. For instructions on how to change the default disk group, see the *VERITAS Volume Manager System Administrator's Guide*. The main benefit of creating a default disk group is that VxVM commands default to the default disk group and you will not need to use the `-g` option. If you want to confirm that the root disk is encapsulated, enter the command:

```
# vxdg bootdg
```

Upgrading VERITAS File System

If you purchased VERITAS File System only, use the steps in this section to upgrade the product. If you purchased Storage Foundation, use the Storage Foundation upgrade procedure.

Upgrading Using the Product Installer

1. Unmount all VxFS file systems and Storage Checkpoints as described in “[Uninstalling VERITAS File System](#)” on page 170.
2. Remove VxFS packages using either the `uninstallfs` script as described in “[Uninstalling Using the Uninstallation Script](#)” on page 170, or using the `pkgrm` command as described in the section “[Uninstalling Using the pkgrm Command](#)” on page 171.
3. If you have VxFS file systems specified in the `/etc/vfstab` file, comment them out before rebooting, but do not remove the entries.
4. Add the VxFS packages as described in “[Installing VxFS Using the Product Installer](#)” on page 60 or “[Installing Using the pkgadd Command](#)” on page 63.
5. Undo the changes to `/etc/vfstab` done in [step 3](#).



Configuring the VERITAS Software

This chapter covers important details about initializing (where required), setting up, and configuring the VERITAS software.

Topics covered in this document include:

- ◆ [“Database Configuration Requirements”](#) on page 131
- ◆ [“Configuring VERITAS Storage Foundation”](#) on page 133
- ◆ [“Configuring VERITAS Volume Manager”](#) on page 141
- ◆ [“Enabling Cluster Support in VxVM \(Optional\)”](#) on page 149
- ◆ [“Configuring VERITAS File System”](#) on page 155

Database Configuration Requirements

Most relational database management system (RDBMS) software requires operating system parameters to be set prior to operation. The DB2, Oracle, and Sybase databases require modifications to kernel settings in the `/etc/system` file before the databases will run correctly. The most critical settings are normally located in the Shared Memory and Semaphore settings on Solaris. For precise settings, consult your current database installation and configuration documentation.

DB2

The following list is an example of the changes that need to be made to the `/etc/system` file for DB2. After making the changes, a reboot is needed before you can use your database:

```
* start DB2 *
set msgsys:msginfo_msgmax=65535
set msgsys:msginfo_msgmnb=65535
set msgsys:msginfo_msgssz=32
set msgsys:msginfo_msgseg=32767
set msgsys:msginfo_msgmni=1792
set msgsys:msginfo_msgtql=1792
```



```
*
set semsys:seminfo_semmap=2050
set semsys:seminfo_semmni=2048
set semsys:seminfo_semmns=4300
set semsys:seminfo_semmnu=2048
set semsys:seminfo_semume=240
*
set shmsys:shminfo_shmmax=966367641
set shmsys:shminfo_shmmni=2048
set shmsys:shminfo_shmseg=240

* end DB2 *
```

Note These settings are recommended kernel parameters for systems with 1 - 2GB of physical memory. If your system is configured differently, consult your DB2 UDB installation guide for the appropriate system parameters.

Oracle

The following list is an example of the changes that need to be made to the `/etc/system` file for Oracle, before a reboot, so you can use your database:

```
* start Oracle *
set shmsys:shminfo_shmmax=0xffffffff
set shmsys:shminfo_shmmni=1
set shmsys:shminfo_shmmns=100
set shmsys:shminfo_shmseg=200

set semsys:seminfo_semmap=100
set semsys:seminfo_semmni=1000
set semsys:seminfo_semmns=4000
set semsys:seminfo_semmnu=800
set semsys:seminfo_semmsl=512

* end Oracle *
```

Sybase

The following list is an example of the changes that need to be made to the `/etc/system` file for Sybase, before a reboot, so you can use your database:

```
* start Sybase *
set shmsys:shminfo_shmmax=0xffffffff
set shmsys:shminfo_shmmin=1
set shmsys:shminfo_shmseg=60

set semsys:seminfo_semmnu=60

* end Sybase *
```

Configuring VERITAS Storage Foundation

Once you install and initialize all of the VERITAS software, you can take advantage of the various storage management features to ease the task of system and database administration.

Setting Administrative Permissions

To allow database administrators to administer a database using VERITAS Storage Foundation, 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.

DB2

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
```

Oracle

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
```

Sybase

No changes are required.

VERITAS Enterprise Administrator

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

Adding Users to the VEA Service Console Registry for DB2

You may want to add users to the VEA server console registry 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 Service console registry**

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

```
# pkginfo -l VRTSd2gui
PKGINST:  VRTSd2gui
      NAME:  VERITAS Storage Foundation Graphical User Interface for
            DB2
CATEGORY:  application
      ARCH:  Sparc
  VERSION:  4.1
      VENDOR: VERITAS Software
      DESC:  VERITAS Storage Foundation Graphical User Interface for
            DB2
    PSTAMP: 020322155315
INSTDATE:  Jan 03 2005 15:55
  HOTLINE:  1-800-342-0652
      EMAIL: support@veritas.com
  STATUS:  completely installed
    FILES:      29 installed pathnames
              8 shared pathnames
              13 directories
              4 executables
          13514 blocks used (approx) PKGINST:  VRTSd2gui
```

2. Stop the VEA server.

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

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

```
# /opt/VRTS/bin/vxdb2edusr -a <user or group> [-A] [-f] -n \
  user_name
```

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.



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 vxdbedusr 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 -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/vxdb2edusr -a group -n dba
```

6. Restart the VEA Server.

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

Removing Users from the VEA Service Console Registry for DB2

You may need to restrict access to the VEA server console registry. You can remove users or user groups from the registry if they have been previously added.

Note You cannot remove root from the VEA console registry.

▼ To remove users other than root from the VERITAS Enterprise Administrator Service console registry

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

```
# pkginfo -l VRTsd2gui
```

```
PKGINST:  VRTsd2gui
NAME:     VERITAS Storage Foundation Graphical User Interface for
          DB2
CATEGORY: application
ARCH:     Sparc
VERSION:  4.1
VENDOR:   VERITAS Software
```

```

DESC:  VERITAS Storage Foundation Graphical User Interface for
      DB2
PSTAMP: 020322155315
INSTDATE: Jan 03 2005 15:55
HOTLINE: 1-800-342-0652
EMAIL:  support@veritas.com
STATUS:  completely installed
FILES:   29 installed pathnames
        8 shared pathnames
        13 directories
        4 executables
        13514 blocks used (approx)

```

2. Stop the VEA server.

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

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

```
# /opt/VRTS/bin/vxdb2edusr -r <user or group> \
  -n <user_name or group_name>
```

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
```

Adding Users to the VEA Service Console Registry for Oracle

You may want to add users to the VEA server console registry 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 Service console registry

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

```
# pkginfo -l VRTSorgui
```

```

PKGINST:  VRTSorgui
NAME:     VERITAS Storage Foundation Graphical User Interface for
          Oracle
CATEGORY: application

```



```

    ARCH:   Sparc
VERSION:   4.1
VENDOR:    VERITAS Software
    DESC:   VERITAS Storage Foundation Graphical User Interface for
            Oracle
    PSTAMP: 020322155315
INSTDATE:  Jan 03 2005 15:55
HOTLINE:    1-800-342-0652
    EMAIL:  support@veritas.com
STATUS:     completely installed
    FILES:  29 installed pathnames
            8 shared pathnames
            13 directories
            4 executables
            13514 blocks used (approx) PKGINST:  VRTSorgui

```

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 or group> [-A] [-f] -n user_name
```

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.

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 `vxdbedusr` command as follows:

```
# /opt/VRTS/bin/vxdbedusr -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/vxdbedusr -a group -n dba
```

6. Restart the VEA Server.

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

Removing Users from the VEA Service Console Registry for Oracle

You may need to restrict access to the VEA server console registry. You can remove users or user groups from the registry if they have been previously added.

Note You cannot remove root from the VEA console registry.

▼ To remove users other than root from the VERITAS Enterprise Administrator Service console registry

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

```
# pkginfo -l VRTSorgui
```

```
PKGINST:  VRTSorgui
NAME:     VERITAS Storage Foundation Graphical User Interface for
          Oracle
CATEGORY: application
ARCH:     Sparc
VERSION:  4.1
VENDOR:   VERITAS Software
DESC:     VERITAS Storage Foundation Graphical User Interface for
          Oracle
PSTAMP:   020322155315
INSTDATE: Jan 03 2005 15:55
HOTLINE:  1-800-342-0652
EMAIL:    support@veritas.com
STATUS:   completely installed
FILES:    29 installed pathnames
          8 shared pathnames
          13 directories
          4 executables
          13514 blocks used (approx)
```



2. Stop the VEA server.

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

3. Use the vxdbedusr command to remove a group or user.

```
# /opt/VRTS/bin/vxdbedusr -r <user or group> \  
-n <user_name or 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/vxdbedusr -r user -n oracle
```

4. Restart the VEA Server.

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

vxtunefs Command Permissions and Cached Quick I/O

By default, you must have superuser (root) privileges to use the /opt/VRTS/bin/vxtunefs command. The vxtunefs command is a tool that lets you change caching policies to enable Cached Quick I/O and change other file system options. Database administrators can be granted permission to change default file system behavior in order to enable and disable Cached Quick I/O. The system administrator must change the vxtunefs executable permissions as follows:

```
# chown root /opt/VRTS/bin/vxtunefs  
# chgrp dba /opt/VRTS/bin/vxtunefs  
# chmod 4550 /opt/VRTS/bin/vxtunefs
```

Note Setting the permissions for /opt/VRTS/bin/vxtunefs to 4550 allows all users in the dba group to use the vxtunefs command to modify caching behavior for Quick I/O files.

For more information, see the *VERITAS File System Administrator's Guide*.

Configuring VERITAS Volume Manager

This section explains how to set up VxVM enclosure-based naming. To carry out further tasks such as disk encapsulation or initialization, please see the *VERITAS Volume Manager System Administrator's Guide*.

Note In releases of VxVM (Volume Manager) prior to 4.0, a system installed with Volume Manager was configured with a default disk group, `rootdg`, that had to contain at least one disk. By default, operations were directed to the `rootdg` disk group. From release 4.0 onward, Volume Manager can function without any disk group having been configured. Only when the first disk is placed under Volume Manager control must a disk group be configured. There is no longer a requirement that you name any disk group `rootdg`, and any disk group that is named `rootdg` has no special properties by having this name. During the setup procedures, you will be asked if you want to create a default disk group, and asked to specify its name.

Enabling Enclosure-based Naming

Note If you used the VERITAS Installation Menu or the `installvm` script, you do not need to carry out the instructions in this section. Licensing, configuration of enclosure based naming and creation of a default disk group are managed by the menu installer and the `installvm` script.

Because you are no longer required to configure VxVM disks immediately, `vxinstall` no longer invokes the `vxdiskadm` program, so it is much simpler than in previous versions, and will cover the following three functions:

- ◆ Licensing VxVM
- ◆ Enabling Enclosure-based naming
- ◆ Setting up a system-wide default group

To run the command, enter

```
# vxinstall
```

which will prompt you to enter a license key:

```
VxVM INFO V-5-2-1310 Are you prepared to enter a license key
[y,n,q,?] (default: y) y
```

- ◆ If you don't have a license key, see [“VERITAS Product Licensing”](#) on page 5.

Note The presence of certain hardware arrays (for example, A5000) automatically generates a key.



The `vxinstall` program then asks if you want to use enclosure-based naming:

```
VxVM INFO V-5-2-1341 Do you want to use enclosure based names for
all disks ?
[y,n,q,?] (default: n)
```

After installation, disks use the traditional naming format, usually `c#t#d#s#`. Enclosure based naming provides an alternative that allows disk devices to be named for enclosures rather than for the controllers through which they are accessed. In a Storage Area Network (SAN) that uses Fibre Channel hubs or fabric switches, information about disk location provided by the operating system may not correctly indicate the physical location of the disks. Enclosure-based naming allows Volume Manager to access enclosures as separate physical entities. By configuring redundant copies of your data on separate enclosures, you can safeguard against failure of one or more enclosures. If you want to use enclosure-based naming, enter 'y' and `vxinstall` asks you whether you want to set up a systemwide default disk group:

```
Do you want to setup a system wide default disk group ?
[y,n,q,?] (default: y)
```

VxVM will continue with the question:

```
Which disk group ?
```

If you know the name of the disk group that you want to use as the default disk group, enter it at the prompt, or use the `list` option and make a selection.

In releases prior to Volume Manager 4.0, the default disk group was `rootdg` (the *root disk group*). For Volume Manager to function, the `rootdg` disk group had to exist and it had to contain at least one disk. This requirement no longer exists, however you may find it convenient to create a system-wide default disk group. For operations that require a disk group, the system-wide default disk group will be used if the VxVM command is not specified with the `-g` option. The main benefit of creating a default disk group is that VxVM commands default to the default disk group and you will not need to use the `-g` option. To verify the default disk group after it has been created, enter the command:

```
# vxvg defaultdg
```

Note VxVM does not allow you use the following names for the default disk group because they are reserved words: `bootdg`, `defaultdg` and `nodg`.

At this stage, the installation of VxVM is complete. To carry out further tasks such as disk encapsulation or initialization, please see the *VERITAS Volume Manager System Administrator's Guide*.

Using Storage Expert

System administrators often find that gathering and interpreting data about large and complex configurations can be a difficult task. VERITAS Storage Expert (*vxse*) is designed to help in diagnosing configuration problems with VxVM.

Storage Expert consists of a set of simple commands that collect VxVM configuration data and compare it with “best practice.” Storage Expert then produces a summary report that shows which objects do not meet these criteria and makes recommendations for VxVM configuration improvements. These user-configurable tools help you as an administrator to verify and validate systems and non-optimal configurations in both small and large VxVM installations. Storage Expert components include a set of rule scripts and a rules engine. The rules engine runs the scripts and produces ASCII output, which is organized and archived by Storage Expert’s report generator. This output contains information about areas of VxVM configuration that do not meet the set criteria. By default, output is sent to the screen, but you can redirect it to a file using standard UNIX redirection. For more information on using Storage Expert, see the *VERITAS Volume Manager System Administrator’s Guide*.

Using Dynamic MultiPathing

To allow DMP to receive correct enquiry data, the common Serial Number (C-bit) Symmetrix Director parameter must be set to enabled.

Preventing Multipathing/Suppress Devices from VxVM’s View

This section describes how to exclude a device that is under VxVM or Dynamic Multipathing control. To prevent multipathing or suppress devices, enter the command

```
# vxdiskadm
```

1. Select menu item 17 (Prevent Multipathing/Suppress devices from VxVM’s view) from the vxdiskadm main menu.

The following message displays:

```
VxVM INFO V-5-2-1239 This operation might lead to some devices
being suppressed from VxVM’s view or prevent them from being
multipathed by vxdmp. (This operation can be reversed using the
vxdiskadm command).
```

```
Do you want to continue? [y,n,q,?] (default: n) y
```

2. Enter **y**.



3. Select an operation.

- ◆ Suppress all paths through a controller from VxVM's view:

Select Option 1.

Enter a controller name when prompted:

Enter a controller name: [ctrl_name,all,list,list-exclude,q,?]

- ◆ Suppress a path from VxVM's view:

Select Option 2.

Enter a path when prompted.

Enter a pathname or pattern: [<Pattern>,all,list,list-exclude,q,?]

- ◆ Suppress disks from VxVM's view by specifying a VID:PID combination:

Select Option 3 and read the messages displayed on the screen.

Enter a VID:PID combination when prompted.

Enter a VID:PID combination: [<Pattern>,all,list,exclude,q,?]

The disks that match the VID:PID combination are excluded from VxVM. Obtain the Vendor ID and Product ID from the Standard SCSI inquiry data returned by the disk.

For example, the VID:PID combination for Sun's T3 disk array can be specified as SUN:T3. Obtain the Vendor ID and Product ID of the disk by the command `/usr/lib/vxvm/diag.d/vxdmping`.

- ◆ Suppress all but one path to a disk:

Select Option 4 and read the messages displayed on the screen before specifying a path.

Enter a path when prompted:

Enter pathgroup: [<pattern>,list,list-exclude,q,?]

The next three options allow you to exclude devices from vxdmp.

- ◆ Prevent multipathing of all disks on a controller by VxVM.

Select Option 5 and read the messages displayed on the screen before specifying a controller.

Enter a controller name when prompted. The controller entered is excluded from DMP control.

Enter a controller name: [<ctrl-name>,all,list,list-exclude,q,?]

- ◆ Prevent multipathing of a disk by VxVM.

Select Option 6 to exclude the specified path from multipathing. The corresponding disks are claimed in the OTHER_DISKS category and are not multipathed. Read the messages displayed on the screen before specifying a path.

Enter a path at the prompt:

Enter a pathname or pattern: [<pattern>,all,list,list-exclude,q,?]

- ◆ Prevent multipathing of disks by specifying a VID:PID combination.

Select Option 7 to exclude disks by a VIP:PID combination. All disks returning a VID:PID combination are claimed in the OTHER_DISKS category and are not multipathed. Read the messages displayed on the screen before specifying a VIP:PID.

Enter the VID:PID combination at the prompt.

Enter a VID:PID combination: [<pattern>,all,list,list-exclude,q,?]

Note If you selected any of the options, reboot the system for device exclusion to take effect and re-run `vxdiskadm`. After the reboot for menu item #17 (Prevent Multipathing/Suppress devices) run `vxdiskadm` again to complete the installation.

Checking the Installation

After VxVM is successfully initialized and you have rebooted the system, confirm that key VxVM processes (`vxconfigd`, `vxnotify`, and `vxrelod`) are running.

Use the following command to get output similar to the following:

```
# ps -ef | grep vx
root 458 180 10:23:34? 0:00 vxrelod root
root 414 180 10:23:06? 0:03 vxconfigd
root 478 414 10:23:37? 0:00 vxrelod root
root 479 478 5 10:23:37? 0:00 vxnotify -f -w 15
```

You can also use the `pkginfo` command to check that all of the packages have been installed. For example, the following command checks that the `VRTSvxvm` package is installed:

```
# pkginfo -l VRTSvxvm.*
```



Starting and Enabling the Configuration Daemon

The VxVM configuration daemon (`vxconfigd`) maintains VxVM disk and disk group configurations. The `vxconfigd` communicates configuration changes to the kernel and modifies configuration information stored on disk.

Startup scripts usually invoke `vxconfigd` at system boot time. The `vxconfigd` daemon must be running for VxVM to operate properly.

The following procedures describe how to check that `vxconfigd` is started, whether it is enabled or disabled, how to start it manually, or how to enable it as required.

To determine whether `vxconfigd` is enabled, use the following command:

```
# vxctl mode
```

The following message indicates that the `vxconfigd` daemon is running and enabled:

```
mode: enabled
```

This message indicates that `vxconfigd` is not running:

```
mode: not-running
```

To start the `vxconfigd` daemon, enter the following command:

```
# vxconfigd
```

This message indicates that `vxconfigd` is running, but not enabled:

```
mode: disabled
```

To enable the volume daemon, enter the following command:

```
# vxctl enable
```

Once started, `vxconfigd` automatically becomes a background process.

By default, `vxconfigd` writes error messages to the console. However, you can configure it to write errors to a log file. For more information, see the `vxconfigd(1M)` and `vxctl(1M)` manual pages.

Starting the Volume I/O Daemon

The volume I/O daemon (`vxiod`) provides extended I/O operations without blocking calling processes. Several `vxiod` daemons are usually started at system boot time after initial installation, and they should be running at all times. The procedure below describes how to verify that the `vxiod` daemons are running, and how to start them if necessary.

To verify that `vxiod` daemons are running, enter the following command:

```
# vxiod
```

Note The `vxiod` daemon is a kernel thread and is not visible using the `ps` command.

If, for example, 10 `vxiod` daemons are running, the following message displays:

```
10 volume I/O daemons running
```

where 10 is the number of `vxiod` daemons currently running. If no `vxiod` daemons are currently running, start some by entering this command:

```
# vxiod set 10
```

where 10 is the desired number of `vxiod` daemons. It is recommended that at least one `vxiod` daemon should be run for each CPU in the system.

For more information, see the `vxiod(1M)` manual page.

Starting the VEA Server

After installing the VEA packages, the VEA server needs to be stopped and restarted. To check the state of the VEA server, enter:

```
# /opt/VRTS/bin/vxsvcctl status
```

To stop the VEA server, enter:

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

You can also stop the VEA server manually by killing the `vxsvc` process.

Note The VEA server is automatically started on a reboot.

To start the VEA server, enter:

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



Starting the VEA Client

Only users with appropriate privileges can run VEA. VEA can administer the local machine or a remote machine. However, VxVM and the VEA server must be installed on the machine to be administered. The VxVM `vxconfigd` daemon and the VEA server must be running on the machine to be administered.

After installing VxVM and VEA and starting the server, start the VEA client in one of the following ways.

Solaris Operating system

To administer the Solaris machine, use the following command:

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

Windows Operating System

To administer a *remote* Solaris machine from a Windows machine, select **Start > Programs > VERITAS > VERITAS Enterprise Administrator**.

Modifying Connection Access (optional)

To allow users other than *root* to access VEA, set up a group called *vrtsadm* in `/etc/group`, and add the users to this group. For example, adding the following entry:

```
vrtsadm::600:root,ed
```

will allow the two users, *root* and *ed*, to access VEA.

To specify a group other than *vrtsadm*, you should add the group to `/etc/group`, modify the Security key and restart the ISIS server daemon, as in the following example.

1. Add a new group:

```
# groupadd -g gid veagr
```

2. Edit `/etc/group` to add users to the group.

3. Modify the Security key in the registry:

```
# /opt/VRTSob/bin/vxregctl /etc/vx/isis/Registry setvalue \
Software/VERITAS/VxSvc/Current/Version/Security AccessGroups \
REG_SZ veagr
```

4. Restart the VEA server.

```
# /opt/VRTS/bin/vxsvcctl restart
```

Enabling Cluster Support in VxVM (Optional)

Note This section assumes that you are using Sun Java System Cluster as the cluster monitor on your system.

This release includes an *optional* cluster feature that enables VxVM to be used in a cluster environment. The cluster functionality in VxVM allows multiple hosts to simultaneously access and manage a set of disks under VxVM control. A *cluster* is a set of hosts sharing a set of disks; each host is referred to as a *node* in the cluster.

Note The VxVM cluster feature requires a license, which can be obtained from your Customer Support channel. (The presence of a SPARCstorage™ Array may serve as a license, but it limits what can be done to private disk groups.)

▼ To enable the cluster functionality in VxVM

1. Obtain a license for the VxVM cluster feature. See [“VERITAS Product Licensing”](#) on page 5 for details.
2. Install the software packages onto each system (node) to be included in the cluster as described in [“Installing VxVM Using the pkgadd Command”](#) on page 58 and [“Installing the VERITAS Enterprise Administrator Client”](#) on page 40.
3. Initialize VxVM using the procedures described in [“Configuring VERITAS Volume Manager”](#) on page 141.
4. Start VEA as described in [“Starting the VEA Server”](#) on page 147 and [“Starting the VEA Client”](#) on page 148.
5. Configure shared disks as described in [“Configuring Shared Disks”](#) on page 149.

Configuring Shared Disks

This section describes how to configure shared disks. If you are installing VxVM for the first time or adding disks to an existing cluster, you need to configure new shared disks. If you are upgrading VxVM, verify that your shared disks still exist.

The shared disks should be configured from one node only. Since the VxVM software cannot tell whether a disk is shared or not, you must specify which are the shared disks.

Make sure that the shared disks are not being accessed from another node while you are performing the configuration. If you start the cluster on the node where you perform the configuration only, you can prevent disk accesses from other nodes because the quorum control reserves the disks for the single node (see [“Reserving Shared Disks”](#) on page 153).



Configuring New Disks

If you are installing and setting up VxVM for the first time, configure the shared disks using the following procedure:

1. Start the cluster on at least one node.
2. On one node, run the `vxdiskadm` program and choose option 1 to initialize new disks. When asked to add these disks to a disk group, choose none to leave the disks for future use.
3. On other nodes in the cluster, run `vxctl enable` to see the newly initialized disks.
4. From the master node, create disk groups on the shared disks. To determine if a node is a master or slave, run `vxctl -c mode`.

Use the `vxdg` program or VEA to create disk groups. In the `vxdg` program, use the `-s` option to create shared disk groups.

5. From the master node only, use `vxassist` or VEA to create volumes in the disk groups.

Note The volumes must be of type `gen`. Do not create RAID-5 volumes. Before creating any log subdisks, read the section on DRL in the *VERITAS Volume Manager Administrator's Guide*.

6. If the cluster is only running with one node, bring up the other cluster nodes. Enter the `vxdg list` command on each node to display the shared disk groups.

Verifying Existing Shared Disks

If you are upgrading from a previous release of VxVM, verify that your shared disk groups still exist using the following procedure:

1. Start the cluster on all nodes.
2. Enter the following command on all nodes:

```
# vxdg list
```

This displays the existing shared disk groups.

Converting Existing VxVM Disk Groups to Shared Disk Groups

If you are upgrading from VxVM 3.x to VxVM 4.0 and you want to convert existing disk groups to shared disk groups, configure the shared disks as follows:

1. Ensure that all systems that are running are part of the same cluster.
2. Configure the disk groups using the following procedure.

To list all disk groups, use the following command:

```
# vxdg list
```

3. Determine which node is the master. To determine if a node is a master or a slave, run the following command:

```
# vxdctl -c mode
```

To deport disk groups to be shared, use the following command:

```
# vxdg deport disk-group-name
```

To import disk groups to be shared, use the following command on the master node:

```
# vxdg -s import disk-group-name
```

This procedure marks the disks in the shared disk groups as shared and stamps them with the ID of the cluster, enabling other nodes to recognize the shared disks.

If dirty region logs exist, ensure they are active. If not, replace them with larger ones.

To display the shared flag for all the shared disk groups, use the following command:

```
# vxdg list
```

The disk groups are now ready to be shared.

4. If the cluster is only running with one node, bring up the other cluster nodes. Enter the `vxdg list` command on each node to display the shared disk groups. This command displays the same list of shared disk groups displayed earlier.
5. For information on upgrading in a Cluster Volume Manager (CVM) environment, see the *VERITAS Cluster File System Installation and Configuration Guide*.



Upgrading in a Clustered Environment and with FastResync Set

This procedure applies to two upgrade scenarios:

- ◆ Upgrading from VxVM 3.5 to VxVM 4.1
- ◆ Upgrading from VxVM 3.5 Maintenance Patch 3 or from VxVM 3.2 Maintenance Patch 5 to VxVM 4.1

If there are volumes in the shared disk groups with FastResync set (`fastresync=on`), before beginning the upgrade procedure, reattach each snapshot to its data volume, using this procedure:

▼ To upgrade in a clustered environment when FastResync is set

1. You should run this procedure from the master node; to find out if you are on the master node, enter the command:


```
# vxdctl -c mode
```
2. On the master node, list which disk groups are shared by entering:


```
# vxdg -s list
```
3. Using the diskgroup names displayed by the previous command, list the disk groups that have volumes on which FastResync is set:


```
# vxprint -g diskgroup -F "%name" -e "v_fastresync"
```
4. Reattach each snapshot:


```
# vxassist -g diskgroup -o nofmr snapback snapshot_volume
```
5. If you are upgrading from VxVM 3.5 Maintenance Patch 3 or from VxVM 3.2 Maintenance Patch 5, set FastResync to off for each volume:


```
# vxvol -g diskgroup set fastresync=off volume
```

Reserving Shared Disks

As part of its quorum control, the Sun Java System Cluster cluster manager reserves shared disk controllers when only one node is active. This prevents “rogue” hosts from accessing the shared disks. When this happens, the `vxdisk list` command used on a node that has left the cluster may show all disks on such a controller as having an error status. The more detailed options of the `vxdisk` command show the flag `unavailable`. When a new node joins the cluster, the Sun Java System Cluster software releases the controllers. VxVM attempts to access these disks, and if that is successful, the disks return to an `online` status. (See the Sun Java System Cluster documentation for further details.) If one system boots while the other system has the disks reserved, the disks can be invisible to the booting system, and the `vxdisk` command may not display any of the shared disks. When the system joins the cluster, the shared disks become visible.

Adding New Array Support

After installation, add any disk arrays that are unsupported by VERITAS to the JBOD category as described in the section “[Hot-Relocation](#)” on page 153.

Hot-Relocation

Hot-relocation automatically restores redundancy and access to mirrored and RAID-5 volumes when a disk fails. This is done by relocating the affected subdisks to disks designated as spares and/or free space in the same disk group.

The hot-relocation feature is enabled by default. The associated daemon, `vxrelocd`, is automatically started during system startup.

Follow these recommendations:

1. Leave the VxVM hot-relocation feature enabled to detect disk failures automatically. It will notify you of the nature of the failure, attempt to relocate any affected subdisks that are redundant, and initiate recovery procedures.
2. Configure at least one hot-relocation spare disk in each disk group. This will allow sufficient space for relocation in the event of a failure.

If you decide to disable hot-relocation, prevent `vxrelocd` from running after you load the VxVM software. See the section “Modifying the behavior of Hot-Relocation” in Chapter 9 of the *VERITAS Volume Manager Administrator’s Guide* for details.



Placing Disks in another Disk Group

To place disks in another disk group, use VEA or the `vxdiskadm` program after completing the `vxinstall` program. See the *VERITAS Volume Manager Administrator's Guide* for information on how to create other disk groups for your disks.

Adding Disks After Initialization

Disks that are not initially placed under VxVM control by the `vxinstall` program can be added later using another VxVM interface (such as VEA or the `vxdiskadm` program). See the *VERITAS Volume Manager Administrator's Guide* for details.

Protecting Your System and Data

A disk failure can cause loss of data on the failed disk and loss of access to your system. Loss of access is due to the failure of a key disk used for system operations. VxVM can protect your system from these problems.

To maintain system availability, data important to running and booting your system must be mirrored. The data must be preserved so it can be used in case of failure.

The following are suggestions for protecting your system and data:

- ◆ Place the disk containing the root file system (the root or boot disk) under VxVM control through encapsulation. Encapsulation converts the `root` and `swap` devices to volumes (`rootvol` and `swapvol`).
- ◆ Mirror the root disk so that an alternate root disk exists for booting purposes. By mirroring disks critical to booting, you ensure that no single disk failure leaves your system unbootable and unusable.

For maximum availability of the system, create mirrors for the `rootvol`, `swapvol`, `usr`, and `var` volumes. For more information, see the *VERITAS Volume Manager Troubleshooting Guide*.

- ◆ Use mirroring to protect data against loss from a disk failure. To preserve data, create and use mirrored volumes that have at least two data plexes. The plexes must be on different disks. If a disk failure causes a plex to fail, the data in the mirrored volume still exists on the other disk.
- ◆ Leave the VxVM hot-relocation feature enabled to detect disk failures automatically. It will notify you of the nature of the failure, attempt to relocate any affected subdisks that are redundant, and initiate recovery procedures. Configure at least one hot-relocation spare disk in each disk group. This will allow sufficient space for relocation in the event of a failure.

If the `root` disk is mirrored, hot-relocation can automatically create another mirror of the `root` disk if the original `root` disk fails. The `rootdg` must contain enough contiguous spare or free space for the volumes on the `root` disk (`rootvol` and `swapvol` volumes require contiguous disk space).

- ◆ Use the DRL feature to speed up recovery of mirrored volumes after a system crash. Make sure that each mirrored volume has at least one log subdisk.

Note `rootvol`, `swapvol`, and `usr` volumes cannot be DRL volumes.

- ◆ Use logging to prevent corruption of recovery data in RAID-5 volumes. Make sure that each RAID-5 volume has at least one log plex.
- ◆ Perform regular backups to protect your data. Backups are necessary if all copies of a volume are lost or corrupted. Power surges can damage several (or all) disks on your system. Also, typing a command in error can remove critical files or damage a file system directly. Performing regular backups ensures that lost or corrupted data is available to be retrieved.

Configuring VERITAS File System

After installing VERITAS File System, you can create a file system on a disk slice or VERITAS Volume Manager volume with the `mkfs` command. Before you can use this file system, you must mount it with the `mount` command. You can unmount the file system later with the `umount` command. A file system can be automatically mounted at system boot time if you add an entry for it in the `/etc/vfstab` file.

The VERITAS-specific commands are described in the VERITAS File System guides and online manual pages. See the Quick Start Guide Reference chapter of the *VERITAS File System Administrator's Guide* for examples of the most common VxFS operating procedures.





Uninstalling the VERITAS Software

This chapter covers uninstallation requirements and steps to uninstall the VERITAS software.

Note The information in [“Uninstalling VERITAS Storage Foundation”](#) on page 166 pertains to VERITAS Storage Foundation, VERITAS Storage Foundation *for DB2*, VERITAS Storage Foundation *for Oracle*, and VERITAS Storage Foundation *for Sybase*.

Topics covered in this document include:

- ◆ [“Uninstallation Requirements”](#) on page 157
- ◆ [“Uninstalling VERITAS Storage Foundation”](#) on page 166
- ◆ [“Uninstalling the VERITAS Enterprise Administrator Client”](#) on page 167
- ◆ [“Uninstalling Language Packages”](#) on page 168
- ◆ [“Uninstalling VERITAS Volume Manager”](#) on page 169
- ◆ [“Uninstalling VERITAS File System”](#) on page 170

Uninstallation Requirements

Review the uninstallation requirements before removing the VERITAS software.

Remote Uninstallation

For information on remote uninstallations, refer to the *VERITAS Storage Foundation and High Availability Solutions Getting Started Guide* that came with your software discs.



VERITAS Volume Manager

This section describes the steps you need to take before removing VERITAS Volume Manager to preserve the contents of the volumes.

Caution Failure to follow the preparations in this section might result in unexpected behavior.

Moving Volumes from an Encapsulated Root Disk

▼ **To uninstall VxVM if root, swap, usr, or var is a volume under Volume Manager control**

1. Ensure that the `rootvol`, `swapvol`, `usr`, and `var` volumes have only one associated plex each.

The plex must be contiguous, non-striped, non-spanned, and non-sparse. To obtain this information, enter the following:

```
# vxprint -ht rootvol swapvol usr var
```

If any of these volumes have more than one associated plex, remove the unnecessary plexes using the following command:

```
# vxplex -o rm dis plex_name
```

Note It is important that you have created the plex designated for `rootvol` using `vxrootmir`, which guarantees that the underlying subdisks start on cylinder boundaries and that partitions are created for them.

2. Run the `vxunroot` command:

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

The `vxunroot` command changes the volume entries in `/etc/vfstab` to the underlying disk partitions for `rootvol`, `swapvol`, `usr`, and `var`. It also modifies `/etc/system` and prompts for a reboot so that disk partitions are mounted instead of volumes for `root`, `swap`, `usr`, and `var`.

3. Once you have changed the `root`, `swap`, `usr`, and `var` volumes, move all remaining volumes to disk partitions. You can do this using one of these procedures:
 - ◆ Back up the entire system to tape and then recover from tape.
 - ◆ Back up each file system individually and then recover them all after creating new file systems on disk partitions.

- ◆ Move volumes incrementally to disk partitions.

Continue to the next section if you choose this last option. Otherwise, proceed to [“Shutting Down VERITAS Volume Manager”](#) on page 165.

Moving Volumes to Disk Partitions

▼ To move volumes incrementally to disk partitions

1. Evacuate disks using `vxdiskadm`, the GUI, or the `vxevac` script.

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 by entering:

```
# vxdg rmdisk diskname
# vxdisk rm devname
```

3. Decide which volume to move first, and if the volume 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 you have applied the `sync` command to the data on the volume.
5. Create a partition on free disk space of the same size as the volume using the `format` command.

If there is not enough free space for the partition, add a new disk to the system for the first volume removed. Subsequent volumes can use the free space generated by the removal of this first volume.

6. Copy the data on the volume onto the newly created disk partition using a command such as `dd`.

```
# dd if=/dev/vx/dsk/diskgroup/lhome of=/dev/dsk/c2t2d2s7
```

where `c2t2d2` is the disk outside of Volume Manager and `s7` is the newly created partition.

7. Replace the entry for that volume (if present) in `/etc/vfstab` with an entry for the newly created partition.
8. Mount the disk partition if the corresponding volume was previously mounted.



9. Stop and remove the volume from VERITAS Volume Manager using the commands.

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

10. Remove any free disks (those having no subdisks defined on them) by removing the volumes from VERITAS Volume Manager control.

To check if there are still some subdisks remaining on a particular disk, use the `vxprint` command.

```
# vxprint -F '%sdnum' diskname
```

If the output is not 0, there are still some subdisks on this disk that you need to remove. If the output is 0, remove the disk from VERITAS Volume Manager control.

```
# vxdg rmdisk diskname
# vxdisk rm devname
```

Use the free space created for adding the data from the next volume you want to remove.

11. After you successfully convert all volumes into disk partitions, reboot the system.

12. After the reboot, make sure none of the volumes are open by using the `vxprint` command.

```
# vxprint -Aht -e v_open
```

If any volumes remain open, repeat the steps listed above.

Example

This example shows how to move the data on a volume to a disk partition. In the example, there are three disks: `disk1` and `disk2` are subdisks on volume `vol01` and `disk3` is a free disk. The data on `vol01` is copied to `disk3` using `vxevac`.

Diskgroup `voldg` content before the data on `vol01` is copied to `disk3`.

```
# vxprint -g voldg -ht
DG NAME          NCONFIG      NLOG      MINORS    GROUP-ID
DM NAME          DEVICE       TYPE      PRIVLEN   PUBLEN    STATE
RV NAME          RLINK_CNT    KSTATE    STATE     PRIMARY   DATAVOL  SRL
RL NAME          RVG          KSTATE    STATE     REM_HOST  REM_DG    REM_RLKN
V NAME           RVG          KSTATE    STATE     LENGTH    READPOL   PREFPLEX
UTYPE
PL NAME          VOLUME       KSTATE    STATE     LENGTH    LAYOUT    NCOL/WID
MODE
SD NAME          PLEX         DISK      DISKOFFS  LENGTH    [COL/]OFF DEVICE
MODE
SV NAME          PLEX         VOLNAME   NVOLLAYR  LENGTH    [COL/]OFF AM/NM
MODE
```

DC NAME	PARENTVOL	LOGVOL				
SP NAME	SNAPVOL	DCO				
dg voldg	default	default	115000			
1017856044.1141.hostname.veritas.com						
dm disk1	c1t12d0s2	sliced	2591	17900352	-	
dm disk2	c1t14d0s2	sliced	2591	17899056	-	
dm disk3	c1t3d0s2	sliced	2591	17899056	-	
v vol1	-	ENABLED	ACTIVE	4196448	ROUND	-
fsgen						
pl pl1	vol1	ENABLED	ACTIVE	4196448	CONCAT	-
RW						
sd sd1	pl1	disk1	0	2098224	0	c1t12d0
ENA						
sd sd2	pl1	disk2	0	2098224	2098224	c1t14d0
ENA						

Evacuate disk1 to disk3.

```
# /etc/vx/bin/vxevac -g voldg disk1 disk3
# vxprint -g voldg -ht
```

DG NAME	NCONFIG	NLOG	MINORS	GROUP-ID		
DM NAME	DEVICE	TYPE	PRIVLEN	PUBLEN	STATE	
RV NAME	RLINK_CNT	KSTATE	STATE	PRIMARY	DATAVOLS	SRL
RL NAME	RVG	KSTATE	STATE	REM_HOST	REM_DG	REM_RLNK
V NAME	RVG	KSTATE	STATE	LENGTH	READPOL	PREFPLEX
UTYPE						
PL NAME	VOLUME	KSTATE	STATE	LENGTH	LAYOUT	NCOL/WID
MODE						
SD NAME	PLEX	DISK	DISKOFFS	LENGTH	[COL/]OFF	DEVICE
MODE						
SV NAME	PLEX	VOLNAME	NVOLLAYR	LENGTH	[COL/]OFF	AM/NM
MODE						
DC NAME	PARENTVOL	LOGVOL				
SP NAME	SNAPVOL	DCO				
dg voldg	default	default	115000			
1017856044.1141.hostname.veritas.com						
dm disk1	c1t12d0s2	sliced	2591	17900352	-	
dm disk2	c1t14d0s2	sliced	2591	17899056	-	
dm disk3	c1t3d0s2	sliced	2591	17899056	-	
v vol1	-	ENABLED	ACTIVE	4196448	ROUND	-
fsgen						
pl pl1	vol1	ENABLED	ACTIVE	4196448	CONCAT	-
RW						
sd disk3-01	pl1	disk3	0	2098224	0	c1t3d0
ENA						
sd sd2	pl1	disk2	0	2098224	2098224	c1t14d0
ENA						



Evacuate disk2 to disk3.

```
# /etc/vx/bin/vxevac -g voldg disk2 disk3
# vxprint -g voldg -ht
```

DG NAME	NCONFIG	NLOG	MINORS	GROUP-ID		
DM NAME	DEVICE	TYPE	PRIVLEN	PUBLEN	STATE	
RV NAME	RLINK_CNT	KSTATE	STATE	PRIMARY	DATAVOLS	SRL
RL NAME	RVG	KSTATE	STATE	REM_HOST	REM_DG	REM_RLNK
V NAME	RVG	KSTATE	STATE	LENGTH	READPOL	PREFPLEX
UTYPE						
PL NAME	VOLUME	KSTATE	STATE	LENGTH	LAYOUT	NCOL/WID
MODE						
SD NAME	PLEX	DISK	DISKOFFS	LENGTH	[COL/]OFF	DEVICE
MODE						
SV NAME	PLEX	VOLNAME	NVOLLAYR	LENGTH	[COL/]OFF	AM/NM
MODE						
DC NAME	PARENTVOL	LOGVOL				
SP NAME	SNAPVOL	DCO				
dg voldg	default	default	115000			
1017856044.1141.hostname.veritas.com						
dm disk1	c1t12d0s2	sliced	2591	17900352	-	
dm disk2	c1t14d0s2	sliced	2591	17899056	-	
dm disk3	c1t3d0s2	sliced	2591	17899056	-	
v vol1	-	ENABLED	ACTIVE	4196448	ROUND	-
fsgen						
pl pl1	vol1	ENABLED	ACTIVE	4196448	CONCAT	-
RW						
sd disk3-01	pl1	disk3	0	2098224	0	c1t3d0
ENA						
sd disk3-02	pl1	disk3	2098224	2098224	2098224	c1t3d0
ENA						

Remove the evacuated disks from VERITAS Volume Manager control.

```
# vxdisk -g voldg list
```

DEVICE	TYPE	DISK	GROUP	STATUS
c1t3d0s2	sliced	disk3	voldg	online
c1t12d0s2	sliced	disk1	voldg	online
c1t14d0s2	sliced	disk2	voldg	online

```
# vxdbg rmdisk disk1
# vxdbg rmdisk disk2
# vxdisk rm c1t12d0
# vxdisk rm c1t14d0
```

Verify that the evacuated disks have been removed from VERITAS Volume Manager control.

```
# vxdisk -g voldg list
DEVICE      TYPE      DISK      GROUP      STATUS
c1t3d0s2    sliced    disk3     voldg      online
```

Check to see whether the volume you want to move first is mounted.

```
# mount | grep voll
/voll on /dev/vx/dsk/voldg/voll
read/write/setuid/log/nolargefiles/dev=12dc138 on Wed Apr  3
10:13:11 2002
```

Create a partition on free disk space of the same size as the volume. In this example, a 2G partition is created on disk1 (c1t12d0s1).

```
# format
Searching for disks...done

AVAILABLE DISK SELECTIONS:
  0. c0t0d0 <SUN9.0G cyl 4924 alt 2 hd 27 sec 133>
    /sbus@1f,0/SUNW,fas@e,8800000/sd@0,0
  1. c1t3d0 <QUANTUM-ATLASIV9SCA-0808 cyl 13814 alt 2 hd 4 sec 324>
    /sbus@1f,0/SUNW,fas@2,8800000/sd@3,0
  2. c1t9d0 <QUANTUM-ATLASIV9SCA-0808 cyl 13814 alt 2 hd 4 sec 324>
    /sbus@1f,0/SUNW,fas@2,8800000/sd@9,0
  3. c1t10d0 <QUANTUM-ATLASIV9SCA-0808 cyl 13814 alt 2 hd 4 sec 324>
    /sbus@1f,0/SUNW,fas@2,8800000/sd@a,0
  4. c1t11d0 <QUANTUM-ATLASIV9SCA-0808 cyl 13814 alt 2 hd 4 sec 324>
    /sbus@1f,0/SUNW,fas@2,8800000/sd@b,0
  5. c1t12d0 <QUANTUM-ATLASIV9SCA-0808 cyl 13814 alt 2 hd 4 sec 324>
    /sbus@1f,0/SUNW,fas@2,8800000/sd@c,0
  6. c1t14d0 <QUANTUM-ATLASIV9SCA-0808 cyl 13814 alt 2 hd 4 sec 324>
    /sbus@1f,0/SUNW,fas@2,8800000/sd@e,0
  7. c1t15d0 <QUANTUM-ATLASIV9SCA-0808 cyl 13814 alt 2 hd 4 sec 324>
    /sbus@1f,0/SUNW,fas@2,8800000/sd@f,0

Specify disk (enter its number): 5
selecting c1t12d0
[disk formatted]

FORMAT MENU:
disk      - select a disk
type      - select (define) a disk type
partition - select (define) a partition table
current   - describe the current disk
format    - format and analyze the disk
repair    - repair a defective sector
label     - write label to the disk
analyze   - surface analysis
defect    - defect list management
backup    - search for backup labels
verify    - read and display labels
```



```

save          - save new disk/partition definitions
inquiry       - show vendor, product and revision
volname       - set 8-character volume name
!<cmd>        - execute <cmd>, then return
quit
format> p

PARTITION MENU:
0             - change `0' partition
1             - change `1' partition
2             - change `2' partition
3             - change `3' partition
4             - change `4' partition
5             - change `5' partition
6             - change `6' partition
7             - change `7' partition
select        - select a predefined table
modify        - modify a predefined partition table
name          - name the current table
print         - display the current table
label         - write partition map and label to the disk
!<cmd>        - execute <cmd>, then return
quit
partition> 1
Part      Tag      Flag      Cylinders      Size      Blocks
  1 unassigned    wm          0              0      (0/0/0)          0
Enter partition id tag[unassigned]:
Enter partition permission flags[wm]:
Enter new starting cyl[0]:
Enter partition size[0b, 0c, 0.00mb, 0.00gb]: 2.00gb
partition> 1
Ready to label disk, continue? y

partition> p
Current partition table (unnamed):
Total disk cylinders available: 13814 + 2 (reserved cylinders)
Part      Tag      Flag      Cylinders      Size      Blocks
  0 unassigned    wm          0              0      (0/0/0)          0
  1 unassigned    wm          0 - 3236      2.00GB      (3237/0/0)    4195152
partition> q

```

Copy the data on vol01 to the newly created disk partition.

```
# dd if=/dev/vx/dsk/voldg/vol01 of=/dev/dsk/c1t12d0s1
```

In the /etc/vfstab file, remove the following entry.

```
/dev/vx/dsk/voldg/vol1 /dev/vx/rdsk/voldg/vol1 /vol1 vxfs 4 yes rw
```

Replace it with an entry for the newly created partition.

```
/dev/dsk/c1t12d0s1 /dev/rdsk/c1t12d0s1 /vol01 vxfs 4 yes rw
```

Mount the disk partition.

```
# mount -F vxfs /dev/dsk/c1t12d0s1 /vol01
```

Remove vol01 from VERITAS Volume Manager.

```
# vxedit -rf rm /dev/vx/dsk/voldg/vol01
```

To complete the procedure, follow Steps 10 through 12 in the previous section, “[Moving Volumes to Disk Partitions](#)” on page 159.

Shutting Down VERITAS Volume Manager

▼ To shut down VERITAS Volume Manager

Enter the `vxctl` and `vxiod` commands as follows:

```
# vxctl stop
# vxiod -f set 0
```

VERITAS File System

The `VRTSvxfs` package cannot be removed if there are any mounted VxFS file systems or storage checkpoints. Unmount the VxFS file systems and storage checkpoints before uninstalling VERITAS Storage Foundation. After you remove the `VRTSvxfs` package, VxFS file systems are not mountable or accessible until another `VRTSvxfs` package is installed.

▼ To unmount a file system

1. Check if any VxFS file systems are mounted.

```
# cat /etc/mnttab | grep vxfs
```

2. Unmount any file systems.

```
# umount special | mount_point
```

Specify the file system to be unmounted as a *mount_point* or *special* (the device on which the file system resides). See the `umount_vxfs(1M)` manual page for more information about this command and its available options.

Note You can use the `-a` option to unmount all file systems except `/`, `/usr`, `/usr/kvm`, `/var`, `/proc`, `/dev/fd`, and `/tmp`.



▼ **To unmount a Storage Checkpoint**

1. Check if any Storage Checkpoints are mounted.

```
# cat /etc/mnttab | grep vxfs
```

2. Unmount any Storage Checkpoints.

```
# umount /checkpoint_name
```

Uninstalling VERITAS Storage Foundation

If you need to uninstall the VERITAS Storage Foundation software packages, use the uninstallation script.

The following procedures pertain to VERITAS Storage Foundation, VERITAS Storage Foundation *for DB2*, VERITAS Storage Foundation *for Oracle*, and VERITAS Storage Foundation *for Sybase*.

▼ **To remove a VERITAS Storage Foundation product**

1. Comment out or remove any VERITAS File System (VxFS) entries from the file system table `/etc/vfstab`. Failing to remove these entries could result in system boot problems later.

2. Unmount all mount points for VxFS file systems.

```
# umount /mount_point
```

3. If the VERITAS Volume Manager package (VRTSvxvm) is installed, read and follow the uninstallation procedures in the section titled “[VERITAS Volume Manager](#)” on page 158.

4. Stop the VEA Service.

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

5. Move to the `/opt/VRTS/install` directory on your system and use the uninstallation script to remove the VERITAS Storage Foundation product installed on your system. For example, to remove VERITAS Storage Foundation:

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

Note Most packages have kernel components. In order to ensure complete removal, a system reboot is recommended after all packages have been removed.

6. To verify the removal of the packages, use the `pkginfo` command.

```
# pkginfo | grep VRTS
```

7. The `VRTScpi`, `VRTSvlic`, `VRTSperl`, `VRTSobgui`, and `VRTSob` packages are not removed by the script. After running the `uninstallsf` script, remove these packages.

To remove the packages using `pkgrm`:

```
# pkgrm VRTScpi VRTSvlic VRTSperl VRTSobgui VRTSob
```

To remove the packages using the script located in `/opt/VRTS/install`:

```
# ./uninstallinfr
```

Uninstalling the VERITAS Enterprise Administrator Client

You should also remove the client software from any machines you used to access the VERITAS software.

▼ To remove the VEA client from a Solaris system other than the server

1. Stop the VEA Service.

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

2. Use the `pkgrm` command to remove the `VRTSobgui` software package.

```
# pkgrm VRTSobgui
```

▼ To remove the VEA client from a Windows system

1. Log in as the database 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.



Uninstalling Language Packages

Language packages are uninstalled when you remove the English packages using the product installer menu or the uninstallation scripts provided by the software. For information on removing the VERITAS Storage Foundation software, see “[Uninstalling VERITAS Storage Foundation](#)” on page 166.

Note The product installer and uninstallation scripts do not have an option to remove *ONLY* language packages.

Uninstalling Language Packages Using the pkgadd Command

If you would like to remove only the language packages, you can do so with the pkgrm command.

Note If you use the product installer menu or the uninstallation script, you can remove the language packages along with the English packages.

▼ To remove the language packages

- 1. Stop the VEA service on each system using the vxsvcctl stop command.
/opt/VRTS/bin/vxsvcctl stop
- 2. Use the pkgrm command to remove the appropriate packages.
pkgrm package_name package_name ...

For information on...	Go to...
Japanese language packages	“Japanese Language Packages” on page 13
Chinese language packages	“Chinese Language Packages” on page 16
French language packages	“French Language Packages” on page 17

Note Some of the packages listed in the tables referenced above may not be installed on your system, depending on the actual installation.

Because the packages do not contain any dependencies, you can remove them in any order.

3. After removing the appropriate packages, restart the VEA service on each system using the `vxsvcctrl start` command.

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

Uninstalling VERITAS Volume Manager

If you are using VERITAS Volume Manager only, use the steps in this section to remove the product.

Uninstalling Using the Uninstallation Script

▼ To remove the VERITAS Volume Manager software packages

1. Read and follow the uninstallation procedures in the section titled “[VERITAS Volume Manager](#)” on page 158.

2. Stop the VEA Service.

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

3. Move to the `/opt/VRTS/install` directory on your system and use the uninstallation script to remove VERITAS Volume Manager.

```
# cd /opt/VRTS/install  
# ./uninstallvm
```

Note To ensure complete removal, a system reboot is recommended after all packages have been removed.

4. The uninstall script prompts for the system name. Enter one or more system names, separated by a space, from which to uninstall VxVM, for example, **host1**:

```
Enter the system names separated by spaces from which to  
uninstall VxVM: host1
```

5. To verify the removal of the packages, use the `pkginfo` command.

```
# pkginfo | grep VRTS
```



Uninstalling Using the pkgrm Command

▼ To remove the installed VxVM packages

Use the following command:

```
# pkgrm VRTSddlpr VRTSalloc VRTSfspro VRTSvmpo VRTSvmmman VRTSvmdoc \
  VRTSob VRTSobgui VRTSvxvm
```

You can also include `VRTSvlic` in the removal line if you have not installed any other packages that use `VRTSvlic`.

Uninstalling VERITAS File System

If you are using VERITAS File System only, use the steps in this section to remove the product.

Uninstalling Using the Uninstallation Script

▼ To remove the VERITAS Storage Foundation software packages

1. Comment out or remove any VERITAS File System (VxFS) entries from the file system table `/etc/vfstab`. Failing to remove these entries could result in system boot problems later.

2. Unmount all mount points for VxFS file systems.

```
# umount /mount_point
```

3. Move to the `/opt/VRTS/install` directory on your system and use the uninstallation script to remove VERITAS File System.

```
# cd /opt/VRTS/install
# ./uninstallfs
```

Note In order to ensure complete removal, a system reboot is recommended after all packages have been removed.

4. The uninstall script prompts for the system name. Enter one or more system names, separated by a space, from which to uninstall VxFS, for example, **host1**:

Enter the system names separated by spaces from which to
uninstall VxFS: **host1**

5. After the uninstall completes, remove any VxFS file system entries from the `/etc/vfstab` file.
6. To verify the removal of the packages, use the `pkginfo` command.

```
# pkginfo | grep VRTS
```

Uninstalling Using the `pkgrm` Command

▼ To uninstall using the `pkgrm` command

1. Remove the VxFS packages using the `pkgrm` command, starting with the optional packages. Do not remove the license packages `VRTSvlic` or `VRTSlc` if there are other VERITAS products installed.

```
# pkgrm VRTSfsmnd VRTSfssdk VRTSfsdoc VRTSfsman VRTSap \
VRTStep VRTSfspro VRTSob VRTSvxfs
```

Note If the `VRTSqio` package is installed, remove it. If the `VRTSfsnbl` package is installed, remove it also.

The system responds with a message similar to the following:

```
The following package is currently installed:
VRTSvxfs          VERITAS File System
                  (sparc) 4.1,REV=4.1A14_sol

Do you want to remove this package? [y,n,?,q]
```

2. Type **y** to continue the removal.

```
## Removing installed package instance <VRTSvxfs>
This package contains scripts which will be executed with
superuser permission during the process of removing this package.
Do you want to continue with the removal of this package
[y,n,?,q]
```



3. Type **y** to continue the removal.

```
## Verifying package dependencies
## Processing package information.
## Executing preremove script.
## Removing pathnames in class <s210b64>
. . .
## Removing pathnames in class <s210>
. . .
## Removing pathnames in class <all>
. . .
## Updating system information.
Removal of <VRTSvxfs> was successful.
```

4. After the uninstall completes, remove any VxFS file system entries from the `/etc/vfstab` file.

Installation Script Options

If you choose to install VERITAS Storage Foundation, VERITAS Storage Foundation *for DB2*, VERITAS Storage Foundation *for Oracle*, or VERITAS Storage Foundation *for Sybase* using the product installation script (`installsf`) instead of the product installer, you have several options you can use. This appendix describes those options.

The following options apply to all VERITAS Storage Foundation products.

Note The `installsf` script will install VERITAS Storage Foundation, VERITAS Storage Foundation *for DB2*, VERITAS Storage Foundation *for Oracle*, or VERITAS Storage Foundation *for Sybase* depending on the license key you enter during installation.

Options for the Installation Script

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

Available Command Line Options

Command Line Option	Function
<code>-configure system1 system2...</code>	Configures the product after installing using the <code>-installonly</code> option.
<code>-installonly system1 system2...</code>	Installs packages, but does not configure the product.
<code>-license system1 system2...</code>	Updates or installs a product license.
<code>-nolic system1 system2...</code>	Installs product packages without licensing or configuring. Licensed features are not installed when using this option.



Available Command Line Options

Command Line Option	Function
<code>-patchpath <i>patch_path</i></code>	Designates a path to VERITAS patches. Used for cluster updates. This option enables the installation of patches without having to copy them to all systems in a cluster. <i>patch_path</i> must be a full path name, typically to an NFS-mounted location, that contains the patches to be installed on all systems by any cluster product installation script.
<code>-pkgpath <i>package_path</i></code>	Designates a path to VERITAS packages. Used for cluster installations. This option enables the installation of packages without having to copy them to all systems in a cluster. <i>package_path</i> must be a full path name, typically to an NFS-mounted location, that contains the packages to be installed on all systems by any cluster product installation script.
<code>-precheck <i>system1 system2...</i></code>	Performs a preinstallation check to determine if systems meet all installation requirements.
<code>-responsefile <i>response_file</i></code>	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. For more information, see “Using a Response File With the Installation Script” on page 175.
<code>-systems <i>system1 system2...</i></code>	Specifies the systems to be installed.
<code>-tmppath <i>tmp_path</i></code>	Selects 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.
<code>-usessh</code>	Specifies when the secure shell (<code>ssh</code>) or secure copy (<code>scp</code>) programs are used for communication between systems instead of <code>rsh</code> and <code>rcp</code> . The <code>-usessh</code> option requires that systems be preconfigured to allow execution of secure commands without prompting for passwords or confirmations.

Using a Response File With the Installation Script

To use a response file for a fresh installation, you can use any text editor to create a file similar to the following:

```
#
# installsf configuration values:
#
$CFG{DONOTINSTALL}=[];
$CFG{DONOTREMOVE}=[];
$CFG{INSTALL}{AUTOSTART}=1;
$CFG{INSTALL}{SIMULTANEOUS}=0;
$CFG{INSTALL}{SYSTEMS}=["system_name"];
$CFG{INSTALL}{USESSH}=0;
$CFG{KEYS}{system_name}=[];
$CFG{NEWNAMES_FILE}{system_name}=0;
$CFG{VM_RESTORE_CFG}{system_name}=1;
```

Refer to the following table for descriptions of the response file variables:

Response File Variable Explanations

Response File Variable	Description
<code>CFG{DONOTINSTALL}{package_name}</code>	Optional, two-dimensional list variable that instructs the installation script to either install or not install the optional packages designated in the list. A 1 (one) indicates that the optional packages will be installed and a 0 (zero) indicates that the optional packages will not be installed.
<code>CFG{DONOTREMOVE}{package_name}</code>	Optional, two-dimensional list variable that instructs the installation script to either remove the existing packages in the list and install new packages or to leave the existing packages on the system and skip installation of the new packages. A 1 (one) indicates that the existing packages will not be removed and a 0 (zero) indicates that the existing packages will be removed.
<code>CFG{INSTALL}{AUTOSTART}</code>	Optional, one-dimensional scalar variable that defines whether the product is to be started following installation. A 1 (one) indicates that the system will be restarted and a 0 (zero) indicates that the system will not be restarted.



Response File Variable Explanations

Response File Variable	Description
CFG{INSTALL}{SIMULTANEOUS}	Optional, one-dimensional scalar variable that defines whether the product is to be installed on systems simultaneously or consecutively. A 1 (one) indicates that the installation will be simultaneous and a 0 (zero) indicates that the installation will be consecutive.
CFG{INSTALL}{SYSTEMS}	Required, one-dimensional list variable that defines the list of systems on which the product will be installed.
CFG{INSTALL}{USESSH}	Optional, one-dimensional scalar variable that defines whether <code>ssh</code> and <code>scp</code> are configured or <code>rsh</code> is configured for execution of the local or remote installation. A 1 (one) indicates that <code>ssh</code> and <code>scp</code> are configured and a 0 (zero) indicates that <code>rsh</code> is configured.
CFG{KEYS}{ <i>system_name</i> }	Optional, two-dimensional scalar variable that defines the product keys to be registered on a system. This variable is not necessary if the system already has a license key installed.
CFG{NEWNAMES_FILE}{ <i>system_name</i> }	Optional, one-dimensional scalar variable that defines whether enclosure-based naming is being used or not. A 1 (one) indicates enclosure-based naming is being used and a 0 (zero) indicates that enclosure-based naming is not being used.
CFG{SFDB2_GROUPNAME}{ <i>system_name</i> } For an <code>installsfdb2</code> installation only.	Optional, two-dimensional scalar variable that defines the group name for the database administrators (DBAs).
CFG{SFDB2_USERNAME}{ <i>system_name</i> } For an <code>installsfdb2</code> installation only.	Optional, two-dimensional scalar variable that defines the user name of the database administrator.
CFG{SFORA_USERNAME}{ <i>system_name</i> } For an <code>installsfora</code> installation only.	An optional, two-dimensional scalar variable that defines the user name of the database administrator.

Response File Variable Explanations

Response File Variable	Description
CFG{SFORA_GROUPNAME}{ <i>system_name</i> } For an installsfora installation only.	An optional, two-dimensional scalar variable that defines the group name for the database administrators (DBAs).
CFG{VM_RESTORE_CFG}{ <i>system_name</i> }	Optional, one-dimensional scalar variable that determines whether a previously-existing configuration of VERITAS Volume Manager will be restored or not. A 1 (one) indicates that the configuration will be restored and a 0 (zero) indicates that the configuration will not be restored.
CFG{INSTALL}{SYSTEMSCONFIG}	Optional, one-dimensional list variable that defines the list of systems to be recognized for configuration when a secure environment prevents all systems from being installed simultaneously.

Note Installing on a Sybase database does not require that you set up a user name or group name for the database. However, this must be done if you are installing on a DB2 or Oracle database.

When you perform an interactive installation of VERITAS Storage Foundation using the installation script, a response file is automatically generated in the /opt/VRTS/install/logs directory. The file name is generated as *installernumber.response*, where the number is random. You can use this response file for future installations on the same machine.

Note If you installed to a remote system, the response file will be generated on that system.



Sample Output

This appendix provides a sample of the output from an installation of VERITAS Storage Foundation/HA *for Oracle* Enterprise Edition.

Note Use this example for reference only—the output for each operating system version and installation environment differs slightly.

Sample Installation Output

To invoke the common installer and install the software, enter the following command after mounting the disc:

```
# cd /cdrom/cdrom0
# ./installer
```

```
VERITAS Storage Foundation and High Availability Solutions 4.1
```

```
VERITAS Licensing utilities are not installed on this system.
Product menu cannot be displayed until VERITAS Licensing utilities are
installed.
```

Selection Menu:

I) Install/Upgrade a Product	C) Configure an Installed Product
L) License a Product	P) Perform a Preinstallation Check
U) Uninstall a Product	D) View a Product Description
Q) Quit	?) Help

```
Enter a Selection: [I,C,L,P,U,D,Q,?] I
```



VERITAS Storage Foundation and High Availability Solutions 4.1

- 1) VERITAS Cluster Server
- 2) VERITAS File System
- 3) VERITAS Volume Manager
- 4) VERITAS Volume Replicator
- 5) VERITAS Storage Foundation, Storage Foundation for Oracle,
Storage Foundation for DB2, and Storage Foundation for Sybase
- 6) VERITAS Storage Foundation Cluster File System
- 7) VERITAS Storage Foundation for Oracle RAC
- B) Back to previous menu

Select a product to install: [1-7,b,q] 5

VERITAS STORAGE FOUNDATION 4.1 INSTALLATION PROGRAM

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

system_name

Checking OS version on *system_name* SunOS 5.10

Verifying global zone on *system_name* global

Initial system check completed successfully.

Press [Return] to continue:

VERITAS STORAGE FOUNDATION 4.1 INSTALLATION PROGRAM

VERITAS Infrastructure package installation:

Installing VERITAS Infrastructure packages on *system_name*:

Checking VRTScpi package not installed

Checking VRTSvlic package not installed

Checking file system space required space is available

Installing VRTScpi 4.1.0.54 on *system_name* Done

Installing VRTSvlic 3.02.005j on *system_name* Done

VERITAS Infrastructure packages installed successfully.

Press [Return] to continue:



VERITAS STORAGE FOUNDATION 4.1 INSTALLATION PROGRAM

SF Licensing Verification:

Checking SF license key on *system_name* not licensed

Enter a SF license key for *system_name*: [?]

XXXX-XXXX-XXXX-XXXX-XXXX-XXXX-XXXX

Registering VERITAS Storage Foundation for Oracle PERMANENT key on
system_name

Do you want to enter another license key for *system_name*? [y,n,q,?]

(n) **n**

SF licensing completed successfully.

Press [Return] to continue:

VERITAS software for Oracle database will be installed automatically

Press [Return] to continue:

VERITAS STORAGE FOUNDATION 4.1 INSTALLATION PROGRAM

installer can install the following optional SF packages:

VRTSobgui	VERITAS Enterprise Administrator
VRTSvmman	VERITAS Volume Manager Manual Pages
VRTSvmdoc	VERITAS Volume Manager Documentation
VRTStep	VERITAS Task Provider
VRTSap	VERITAS Action Provider
VRTSfsman	VERITAS File System Manual Pages
VRTSfsdoc	VERITAS File System Documentation
VRTSfsmnd	VERITAS File System Software Developer Kit Manual Pages
VRTSvxfen	VERITAS I/O Fencing
VRTSvcsmn	VERITAS Cluster Server Man Pages
VRTSvcsdc	VERITAS Cluster Server Documentation
VRTScscm	VERITAS Cluster Server Cluster Manager
VRTScssim	VERITAS Cluster Server Simulator
VRTSfasag	VERITAS Cluster Server Agents for VERITAS FlashSnap Agent for Symmetrix
VRTSfasdc	VERITAS FlashSnap Agent for Symmetrix Documentation
VRTSvrw	VERITAS Volume Replicator Web Console
VRTSvrdoc	VERITAS Volume Replicator Documentation
VRTSdbdoc	VERITAS Storage Foundation Documentation for Databases



- 1) Install all of the optional packages
- 2) Install none of the optional packages
- 3) View package descriptions and select optional packages

Select the optional packages to be installed on all systems? [1-3,q,?]

(1) 1

VERITAS STORAGE FOUNDATION 4.1 INSTALLATION PROGRAM

installer will install the following SF packages:

VRTSperl	VERITAS Perl 5.8.0 Redistribution
VRTSob	VERITAS Enterprise Administrator Service
VRTSobgui	VERITAS Enterprise Administrator
VRTSat	VERITAS Authentication Service
VRTSvxvm	VERITAS Volume Manager Binaries
VRTSvmman	VERITAS Volume Manager Manual Pages
VRTSvmdoc	VERITAS Volume Manager Documentation
VRTSvmpro	VERITAS Volume Manager Management Services Provider
VRTSfspro	VERITAS File System Management Services Provider
VRTSalloc	VERITAS Volume Manager Intelligent Storage Provisioning
VRTSddlpr	VERITAS Device Discovery Layer Services Provider
VRTSvxfs	VERITAS File System
VRTStep	VERITAS Task Provider
VRTSap	VERITAS Action Provider
VRTSfsman	VERITAS File System Manual Pages
VRTSfsdoc	VERITAS File System Documentation
VRTSfssdk	VERITAS File System Software Developer Kit
VRTSfsmnd	VERITAS File System Software Developer Kit Manual Pages
VRTSl1t	VERITAS Low Latency Transport

Press [Return] to continue:

...continued:

VRTSgab	VERITAS Group Membership and Atomic Broadcast
VRTSvxfen	VERITAS I/O Fencing
VRTSvcs	VERITAS Cluster Server
VRTSvcsmg	VERITAS Cluster Server Message Catalogs
VRTSvcsag	VERITAS Cluster Server Bundled Agents
VRTSvcsmn	VERITAS Cluster Server Man Pages
VRTSvcsdc	VERITAS Cluster Server Documentation
VRTSjre	VERITAS Java Runtime Environment Redistribution
VRTScutil	VERITAS Cluster Utilities
VRTScscw	VERITAS Cluster Server Configuration Wizards
VRTSweb	VERITAS Java Web Server
VRTSvcsww	VERITAS Cluster Manager (Web Console)
VRTScscm	VERITAS Cluster Server Cluster Manager
VRTScssim	VERITAS Cluster Server Simulator

```

VRTSvail      VERITAS Array Provider
VRTSfas       VERITAS FlashSnap Agent for Symmetrix
VRTSfasag     VERITAS Cluster Server Agents for VERITAS FlashSnap Agent
               for Symmetrix
VRTSfasdc     VERITAS FlashSnap Agent for Symmetrix Documentation
VRTSvrpro     VERITAS Volume Replicator Client Extension and Provider
               for VERITAS Enterprise Administrator
VRTSvcsvr     VERITAS Cluster Server Agents for VVR

```

Press [Return] to continue:

...continued:

```

VRTSvrw       VERITAS Volume Replicator Web Console
VRTSvrdoc     VERITAS Volume Replicator Documentation
VRTSdbed      VERITAS Storage Foundation for Oracle
VRTSodm       VERITAS Oracle Disk Manager
VRTSvxmsa     VERITAS Mapping Service, Application Libraries
VRTSorgui     VERITAS Storage Foundation Graphical User Interface for
               Oracle
VRTSdbdoc     VERITAS Storage Foundation Documentation for Databases
VRTSvcSOR     VERITAS Cluster Server Oracle Enterprise Extension
VRTScsow      VERITAS Cluster Server Oracle 9i RAC Wizard

```

Press [Return] to continue:

VERITAS STORAGE FOUNDATION 4.1 INSTALLATION PROGRAM

Checking system installation requirements:

Checking SF installation requirements on *system_name*:

```

Checking VRTSperl package ..... not installed
Checking VRTSob package ..... not installed
Checking VRTSobgui package ..... not installed
Checking VRTSat package ..... not installed
Checking VRTSvxvm package ..... not installed
Checking VRTSvmman package ..... not installed
Checking VRTSvmdoc package ..... not installed
Checking VRTSvmpro package ..... not installed
Checking VRTSfspro package ..... not installed
Checking VRTSalloc package ..... not installed
Checking VRTSddlpr package ..... not installed
Checking VRTSvxfs package ..... not installed
Checking VRTStep package ..... not installed
Checking VRTSap package ..... not installed
Checking VRTSfsman package ..... not installed
Checking VRTSfsdoc package ..... not installed
Checking VRTSfssdk package ..... not installed
Checking VRTSfsmnd package ..... not installed

```



```
Checking VRTSl1t package ..... not installed
Checking VRTSgab package ..... not installed
Checking VRTSvxfen package ..... not installed
Checking VRTSvcsc package ..... not installed
Checking VRTSvcsmg package ..... not installed
Checking VRTSvcscag package ..... not installed
Checking VRTSvcsmn package ..... not installed
Checking VRTSvcscdc package ..... not installed
Checking VRTSjre package ..... not installed
Checking VRTScutil package ..... not installed
Checking VRTScscw package ..... not installed
Checking VRTSweb package ..... not installed
Checking VRTSvcsw package ..... not installed
Checking VRTScscm package ..... not installed
Checking VRTScssim package ..... not installed
Checking VRTSvail package ..... not installed
Checking VRTSfas package ..... not installed
Checking SYMCLI required for VRTSfas ..... not installed
Checking VRTSfasag package ..... not installed
Checking VRTSfasdc package ..... not installed
Checking VRTSvrpro package ..... not installed
Checking VRTSvcsvr package ..... not installed
Checking VRTSvrw package ..... not installed
Checking VRTSvrdoc package ..... not installed
Checking VRTSdbed package ..... not installed
Checking VRTSodm package ..... not installed
Checking VRTSvxmsa package ..... not installed
Checking VRTSorgui package ..... not installed
Checking VRTSdbdoc package ..... not installed
Checking VRTSvcscor package ..... not installed
Checking VRTScsocw package ..... not installed
Checking VERITAS patch 115209 ..... not installed
Checking VERITAS patch 115210 ..... not installed
Checking VERITAS patch 117499 ..... not installed
Checking for any Solaris patch issues ..... None
Checking file system space ..... required space is available
Checking for any AP driver issues ..... None
Checking vxsvc process ..... not running
Checking VRTSweb process ..... not running
Checking had process ..... not running
Checking hashadow process ..... not running
Checking CmdServer process ..... not running
Checking notifier process ..... not running
Checking vxatd process ..... not running
Checking odm driver ..... not running
Checking vxfen driver ..... not running
Checking gab driver ..... not running
```

```
Checking llt driver ..... not running
Checking vxportal driver ..... not running
Checking fdd driver ..... not running
Checking qlog driver ..... not running
Checking vxfs driver ..... not running
```

Installation requirement checks completed successfully.

Press [Return] to continue:

VERITAS STORAGE FOUNDATION 4.1 INSTALLATION PROGRAM

It is possible to install SF packages without performing configuration.

SF cannot be started without proper configuration.

It is optional to configure SF now. If you choose to configure SF later, you can either do so manually or run the `installsf -configure` command. Are you ready to configure SF? [y,n,q] (y) **y**

VERITAS STORAGE FOUNDATION 4.1 INSTALLATION PROGRAM

installer will now ask sets of SF configuration-related questions.

When a [b] is presented after a question, 'b' may be entered to go back to the first question of the configuration set.

When a [?] is presented after a question, '?' may be entered for help or additional information about the question.

Following each set of questions, the information you have entered will be presented for confirmation. To repeat the set of questions and correct any previous errors, enter 'n' at the confirmation prompt.

No configuration changes are made to the systems until all configuration questions are completed and SF is installed successfully.

Press [Return] to continue:



VERITAS STORAGE FOUNDATION 4.1 INSTALLATION PROGRAM

To configure a single-node VCS cluster a unique cluster name is required:

Enter the unique cluster name: [?] *cluster_name*
Cluster Name: *cluster_name*

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

VERITAS STORAGE FOUNDATION 4.1 INSTALLATION PROGRAM

Storage Foundation can be configured to utilize VERITAS Security Services.

Running VCS in Secure Mode guarantees that all inter-system communication is encrypted and that users are verified with security credentials.

When running VCS in Secure Mode, NIS and system usernames and passwords are used to verify identity. VCS usernames and passwords are no longer utilized when a cluster is running in Secure Mode.

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 Cluster Server Installation Guide for more information on configuring a VxSS Root Broker.

Would you like to configure SF to use VERITAS Security Services?
[y,n,q] (n) **n**

VERITAS STORAGE FOUNDATION 4.1 INSTALLATION PROGRAM

The following information is required to add VCS users:

A user name
A password for the user
User privileges (Administrator, Operator, or Guest)

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

VERITAS STORAGE FOUNDATION 4.1 INSTALLATION PROGRAM

VCS User verification:

User: admin Privilege: Administrators

Passwords are not displayed

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

VERITAS STORAGE FOUNDATION 4.1 INSTALLATION PROGRAM

The following information is required to configure Cluster Manager:

A public NIC used by each system in the cluster

A Virtual IP address and netmask for Cluster Manager

Do you want to configure Cluster Manager (Web Console) [y,n,q] (y) **n**

VERITAS STORAGE FOUNDATION 4.1 INSTALLATION PROGRAM

The following information is required to configure SMTP notification:

The domain-based hostname of the SMTP server

The email address of each SMTP recipient

A minimum severity level of messages to send to each recipient

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

VERITAS STORAGE FOUNDATION 4.1 INSTALLATION PROGRAM

The following information is required to configure SNMP notification:

System names of SNMP consoles to receive VCS trap messages

SNMP trap daemon port numbers for each console

A minimum severity level of messages to send to each console

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

VERITAS STORAGE FOUNDATION 4.1 INSTALLATION PROGRAM

Installing Storage Foundation for Oracle HA 4.1 on *system_name*:

```
Installing VRTSperl 4.0.12 on system_name ..... Done 1 of 48 steps
Installing VRTSob 3.2.514.0 on system_name .... Done 2 of 48 steps
Installing patch 115209-16 on system_name ..... Done 3 of 48 steps
Installing VRTSobgui on system_name ..... Done 4 of 48 steps
Adding patch 115210-15 on system_name ..... Done 5 of 48 steps
Installing VRTSat 4.1.2.5 on system_name ..... Done 6 of 48 steps
Installing patch 117499-02 on system_name ..... Done 7 of 48 steps
Installing VRTSvxvm 4.1 on system_name ..... Done 8 of 48 steps
Installing VRTSvmman 4.1 on system_name ..... Done 9 of 48 steps
Installing VRTSvmdoc 4.1 on system_name ..... Done 10 of 48 steps
Installing VRTSvmpro 4.1 on system_name ..... Done 11 of 48 steps
Installing VRTSfspro 4.1 on system_name ..... Done 12 of 48 steps
Installing VRTSalloc 4.1 on system_name ..... Done 13 of 48 steps
Installing VRTSddlpr 4.1 on system_name ..... Done 14 of 48 steps
Installing VRTSvxfs 4.1 on system_name ..... Done 15 of 48 steps
Installing VRTStep 1.20.028 on system_name ... Done 16 of 48 steps
Installing VRTSap 2.00.023 on system_name .... Done 17 of 48 steps
Installing VRTSfsman 4.1 on system_name ..... Done 18 of 48 steps
Installing VRTSfsdoc 4.1 on system_name ..... Done 19 of 48 steps
Installing VRTSfssdk 4.1 on system_name ..... Done 20 of 48 steps
Installing VRTSfsmnd 4.1 on system_name ..... Done 21 of 48 steps
Installing VRTSl1t 4.1 on system_name ..... Done 22 of 48 steps
Installing VRTSgab 4.1 on system_name ..... Done 23 of 48 steps
Installing VRTSvxfen 4.1 on system_name ..... Done 24 of 48 steps
Installing VRTSvcs 4.1 on system_name ..... Done 25 of 48 steps
Installing VRTSvcsmsg 4.1 on system_name ..... Done 26 of 48 steps
Installing VRTSvcsag 4.1 on system_name ..... Done 27 of 48 steps
Installing VRTSvcsmn 4.1 on system_name ..... Done 28 of 48 steps
Installing VRTSvcsdc 4.1 on system_name ..... Done 29 of 48 steps
Installing VRTSjre 1.4 on system_name ..... Done 30 of 48 steps
Installing VRTScutil 4.1 on system_name ..... Done 31 of 48 steps
Installing VRTScscw 4.1 on system_name ..... Done 32 of 48 steps
Installing VRTSweb 4.2 on system_name ..... Done 33 of 48 steps
Installing VRTSvcs 4.3 on system_name ..... Done 34 of 48 steps
Installing VRTScscm 4.3 on system_name ..... Done 35 of 48 steps
Installing VRTScssim 4.1 on system_name ..... Done 36 of 48 steps
Installing VRTSvail 4.2.41 on system_name .... Done 37 of 48 steps
Installing VRTSvrpro 4.1 on system_name ..... Done 38 of 48 steps
Installing VRTSvcsvr 4.1 on system_name ..... Done 39 of 48 steps
Installing VRTSvrw 4.1 on system_name ..... Done 40 of 48 steps
Installing VRTSvrdoc 4.1 on system_name ..... Done 41 of 48 steps
Installing VRTSdbed 4.1 on system_name ..... Done 42 of 48 steps
Installing VRTSodm 4.1 on system_name ..... Done 43 of 48 steps
```

```

Installing VRTSvxmsa 4.2.1 on system_name .... Done 44 of 48 steps
Installing VRTSorgui 4.1 on system_name ..... Done 45 of 48 steps
Installing VRTSdbdoc 4.1 on system_name ..... Done 46 of 48 steps
Installing VRTSvcscr 4.1 on system_name ..... Done 47 of 48 steps
Installing VRTScsow 4.1 on system_name ..... Done 48 of 48 steps

```

Storage Foundation for Oracle HA installation completed successfully.

Press [Return] to continue:

VERITAS STORAGE FOUNDATION 4.1 INSTALLATION PROGRAM

The following information is required to setup the permission for VxDBA Utility to support Oracle Database:

The VxDBA utility for database administration requires permission changes to allow database administrators (DBAs) access to the tools. The default settings at installation time for the /opt/VRTSdbed directory allows only the root user access to the directory. Would you like to change permissions to allow a DBA or a group of DBAs access to the VxDBA tools?

Do you want to add single user access [y,n,q,?] (y) **n**

Do you want to add group access [y,n,q,?] (y) **n**

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) **n**

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Configuring Storage Foundation for Oracle HA:

```

Creating Cluster Server configuration files ..... Done
Copying configuration files to system_name ..... Done

```

Storage Foundation for Oracle HA configured successfully.

Press [Return] to continue:



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

Note: The vxconfigd daemon will be started, which can take a while depending upon the hardware configuration.

Disabling enclosure-based naming on *system_name* Done
Starting vxconfigd for VxVM on *system_name* Started
Starting Cluster Server:

Starting Cluster Server on *system_name* Started
Confirming Cluster Server startup *system_name* RUNNING

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 the default disk group for each system?
[y,n,q,?] (y) **n**

Storage Foundation for Oracle HA was started successfully.

Press [Return] to continue:

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Installation of Storage Foundation for Oracle HA 4.1 has completed successfully.

The installation summary is saved at:

/opt/VRTS/install/logs/installer120145352.summary

The installer log is saved at:

/opt/VRTS/install/logs/installer120145352.log

The installation response file is saved at:

```
/opt/VRTS/install/logs/installer120145352.response
```

Reboot all systems on which VxFS was installed or upgraded.

```
shutdown -y -i6 -g0
```

See the VERITAS File System Administrators Guide for information on using VxFS.



