VERITAS

VERITAS® File System
Installation Guide
Release 3.3.2

READ THIS BEFORE INSTALLING THE SOFTWARE!

Introduction

This document describes how to install and upgrade the VERITAS File System™ (VxFS®). Topics include:

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Getting Help

For license information or information about VERITAS service packages, contact VERITAS Customer Support.

U.S. and Canadian Customers: 1-800-342-0652

International Customers: +1 (650) 335-8555

Fax: (650) 335-8428

Electronic mail: support@veritas.com

For additional information about VERITAS and VERITAS products, visit the Web site at:

```
www.veritas.com
```

Licensing and Support From Sun Microsystems

When you buy the VERITAS File System through Sun Microsystems, you must also purchase a license kit from Sun for each package. For support and licensing information, refer directly to the license kits, *not* the contact information provided in the VERITAS File System documentation.

Conventions

The following table describes the typographic conventions used in this guide:

Typeface	Usage	Examples
courier	Computer output, user input, command names, files, and directories	`$ ls -a`
italics	Document titles, emphasis, variables replaced with a name or value	`$ cat` *filename* See the *User's Guide* for details.
Symbol	**Usage**	
#	Superuser prompt	
\	Continued input on the following line; you do not type this character	`# pkgrm VRTSqio \` `VRTSfsdoc VRTSvxfs`

Preinstallation Instructions

Before installing the VERITAS File System:

- Obtain a license key. See "Obtaining a License Key" on page 5 for details.

- Confirm that your system has enough free disk space to install VxFS. The following table lists the suggested minimum space for each VERITAS File System package.

Package	Contents	Size
VRTSvxfs (for Solaris 2.5.1 or 2.6)	VERITAS File System and man pages	3 MB
VRTSvxfs (for Solaris 7)	VERITAS File System and man pages	3.71 MB
VRTSfsdoc	VxFS Documentation	3.17 MB
VRTSqio	VERITAS Quick I/O™ for Databases	170 KB
VRTSqlog	VERITAS QuickLog™ (formerly VERITAS Accelerator *for NFS*)	1.61 MB

The following table shows approximate disk space usage by directory:

Package	/	/usr	/opt
VRTSvxfs (for Solaris 2.5.1 or 2.6)	730 KB	2.2 MB	0
VRTSvxfs (for Solaris 7)	1.46 MB	2.25 MB	0
VRTSfsdoc	0	0	3.06 MB
VRTSqio (*optional*)	40 KB	130 KB	0
VRTSqlog (*optional*)	1.34 MB	250 KB	0

If you are installing the documentation package, make sure the directory /opt exists and has write permissions.

Obtaining a License Key

The VERITAS File System is a licensed product. Before installing VxFS, you must obtain a license key issued by VERITAS Customer Support. To obtain an evaluation license key, contact your sales representative. If you have a VxFS evaluation license key, you must obtain a permanent license key when you purchase the product. The optional VERITAS Quick I/O package (`VRTSqio`) and QuickLog (`VRTSqlog`) require separate license keys.

If you purchase the VERITAS File System through Sun Microsystems, you must also buy a license kit from Sun for each system running VxFS. For information on licensing and support, refer to the license kits rather than the contact information provided in VERITAS File System documentation.

A License Key Request Form is included when you purchase the product. If you do not have a License Key Request Form, contact your sales channel. To obtain a license key, complete the License Key Request Form and send it to VERITAS by fax at (650) 335-8428. VERITAS Customer Support will send you a license key by fax or email.

Note: You must obtain your license key before installing or upgrading the VxFS packages. Be sure to record your license key somewhere other than the computer on which it is installed so that you can find it if the system becomes unbootable or requires reinstallation.

You must provide your system's `hostid` and machine type on the License Key Request Form. To determine the `hostid` of your system, run either of the following commands:

```
# /usr/sbin/sysdef -h
# hostid
```

To determine the machine type, run either of the following commands:

```
# /usr/sbin/prtconf | head
# uname -i
```

During installation, you are prompted for the license key. If the software is already installed and you are upgrading or replacing an evaluation license with a permanent license, follow the instructions that accompany the license key to replace the old license with the new one.

Note: Valid license keys for VxFS 2.3.*x* and earlier VxFS 3.*x* releases also work on VERITAS 3.3.2 File Systems.

If you have questions concerning licensing, contact VERITAS at one of the phone numbers listed in "Getting Help" on page 2.

Installing VxFS Software for the First Time

Note: Only a superuser can install and deinstall the VERITAS File System.

The VERITAS CD-ROM contains these VxFS packages:

- VRTSvxfs—VERITAS File System software and manual pages
- VRTSqio—device driver for VERITAS Quick I/O for Databases (optional)
- VRTSqlog—device driver for VERITAS QuickLog (optional)
- VRTSfsdoc—VERITAS File System documentation. During the installation, you are given the choice of installing PostScript, PDF, or both versions of the documents. If you do not want documents online, omit the VRTSfsdoc package.

Following the standard procedure for adding any new device driver, use the pkgadd utility to install VERITAS File System packages.

Note: During the installation, you are prompted for a license key. If you do not have a license key, see the section "Obtaining a License Key."

Loading the Software from CD

To load the software from CD-ROM:

1. Log in as superuser.

2. Place the VERITAS CD into a CD-ROM drive connected to your system.

3. If Solaris volume management software is running on your system, mount the CD-ROM and install the packages as described in the section "Mounting the CD With Solaris Volume Management." Otherwise, mount the CD and skip to the section "Mounting the CD at the Command Line."

Mounting the CD With Solaris Volume Management

When you insert the CD, Solaris volume management software automatically mounts it as /cdrom/*CD_name*. After the CD is mounted, enter this command to install the packages:

```
# pkgadd -d /cdrom/CD_name/OS_version/pkgs VRTSvxfs \
  VRTSfsdoc
```

If you are installing optional VxFS packages—Quick I/O (VRTSqio) or QuickLog (VRTSqlog), list them *after* the VRTSvxfs package in the pkgadd command line.

Mounting the CD at the Command Line

If the Solaris volume management software is not available to mount the CD automatically, you must mount it manually.

1. After inserting the CD-ROM, enter:

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

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

2. After the CD is mounted, enter this command to install the packages:

    ```
    # pkgadd -d /mnt/OS_version/pkgs VRTSvxfs VRTSfsdoc
    ```

    If you are installing optional VxFS packages—Quick I/O (VRTSqio) or QuickLog (VRTSqlog), list them *after* the VRTSvxfs package in the pkgadd command line.

3. Reboot the system.

Installation Output

VxFS 3.3.2 runs on Solaris 2.5.1, 2.6, and 7. If you try to install it on any other Solaris version, the pkgadd procedure will fail and display the error message:

```
Incompatible OS version: 5.x
This VxFS package is built for Solaris versions: x
```

The VRTSvxfs package contains binaries for Solaris 2.5.1, 2.6, and 7. Procedures built into this package determine the current OS version and install the appropriate VxFS binaries during the pkgadd process. On Solaris 7 systems, both the 32-bit and 64-bit VxFS drivers are installed. To install VRTSvxfs, enter:

```
# pkgadd -d /cdrom/CD_name/OS_version/pkgs VRTSvxfs
```

Text similar to the following displays during the installation procedure:

```
VERITAS File System

(sparc) 3.3.2 for Solaris 7 (32-bit/64-bit), 2.6 and 2.5.1

Copyright (c) 1991 - 1999 VERITAS SOFTWARE CORP. ALL RIGHTS
RESERVED. THIS SOFTWARE IS THE PROPERTY OF AND IS LICENSED BY
VERITAS SOFTWARE, AND/OR ITS SUPPLIERS.

Using </> as the package base directory.

## Processing package information.
## Processing system information.

 14 package pathnames are already properly installed.

## Verifying disk space requirements.
## Checking for conflicts with packages already installed.

The following files are already installed on the system and
are being used by another package:
   /usr/sbin/vxlicense
```

```
Do you want to install these conflicting files [y,n,?,q]
```

If you see this message, type `y` to continue with the installation.

```
## Checking for setuid/setgid programs.

The following files are being installed with setuid and/or setgid
permissions:

   /usr/lib/fs/vxfs/vxdump <setuid root setgid tty>
   /usr/lib/fs/vxfs/vxquota <setuid root>
   /usr/lib/fs/vxfs/vxrestore <setuid root setgid bin>

Do you want to install these as setuid/setgid files [y,n,?,q]
```

Type `y` to continue with the installation.

```
This package contains scripts which will be executed with
super-user permission during the process of installing this
package.

Do you want to continue with the installation
of <VRTSvxfs> [y,n,?]
```

Type `y` to continue. The package installs the files listed on your screen. Before using VxFS, you must create a license key file. Type:

```
# vxlicense -c
```

The system responds:

```
Please enter your key:
```

After you enter a valid key, the system displays text similar to:

```
vrts:vxlicense: INFO: Feature name: VXFS [80]
vrts:vxlicense: INFO: Number of licenses: 1 (non-floating)
vrts:vxlicense: INFO: Expiration date: No expiration date
vrts:vxlicense: INFO: Release Level: 22
vrts:vxlicense: INFO: Machine Class: 258193729

vxfs:vxlicense: INFO: Key successfully installed in

/etc/vx/elm/80.
```

Note: To license the optional packages, re-enter the `vxlicense -c` command and a valid license key. If you do not have a valid license key, see "Obtaining a License Key" on page 5.

Upgrading to VxFS Release 3.3.2 and Solaris 2.5.1, 2.6, or 7

If you are already running a previous release of VxFS, you can upgrade to VxFS Release 3.3.2.

Before You Upgrade

Note: If your system has a previous version of the VRTSvxfs package, you must deinstall it before installing the new version. You do not need to remove existing VERITAS File Systems, but all of them must remain unmounted throughout the upgrade process. See "Deinstalling the VxFS Software" on page 19 for more information.

The following table indicates which VxFS releases are supported on each Solaris release. Even though older versions of VxFS are supported, only current VxFS releases are available on the VERITAS CD.

	Solaris 2.5	Solaris 2.5.1	Solaris 2.6	Solaris 7
VxFS 3.3.2	Not Supported	Supported	Supported	Supported
VxFS 3.3/3.3.1	Not Supported	Supported	Supported	Not Supported
VxFS 3.2.x	Not Supported	Supported	Supported	Not Supported
VxFS 3.2	Not Supported	Not Supported	Supported	Not Supported
VxFS 2.3.x	Supported	Supported	Not Supported	Not Supported
VxFS 2.2.x	Supported	Supported	Not Supported	Not Supported
VxFS 2.2	Supported	Not Supported	Not Supported	Not Supported

1. Determine the current VxFS version and Solaris version you are running:

   ```
   # pkginfo -l VRTSvxfs

   # uname -a
   ```

2. Determine the final Solaris version you want to run with VxFS. For VxFS 3.3.2, this must be Solaris 2.5.1, 2.6, or 7.

Note: Be sure you have the correct supporting hardware for the Solaris version you are installing.

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3. Using the information from step 1, step 2, and the table, determine if you need to upgrade the operating system. If you need to upgrade the operating system, make sure there is enough space on your system (see "Preinstallation Instructions" on page 4 for VxFS space requirements).

4. If you have not already done so, obtain the necessary license keys (see "Obtaining a License Key" on page 5 for details).

5. Proceed to the appropriate section for instructions on how to upgrade VxFS and/or the operating system.

To perform this upgrade	Go to this section
VxFS and Solaris	"Upgrading VxFS and Solaris" on page 12.
VxFS Only	"Upgrading the VERITAS File System Only" on page 13.
Solaris Only	"Upgrading the Solaris Operating System Only" on page 13.

Upgrading VxFS and Solaris

1. Unmount all mounted VxFS file systems.

2. Load and mount the CD as described in "Loading the Software from CD." The CD becomes visible as the file system mounted on /*CD_path*. If the CD is mounted automatically, its path is /cdrom/*CD_name*; if mounted manually, the path is /mnt.

3. Remove all VxFS packages, starting with the optional packages:

   ```
   # pkgrm VRTSqio VRTSqlog VRTSfsdoc VRTSvxfs
   ```

4. VxFS file systems cannot mount without the VRTSvxfs package installed. If you have VxFS file systems specified in the /etc/vfstab file, remove them before rebooting.

5. Upgrade the operating system to Solaris 2.5.1, 2.6, or 7. Refer to the Solaris installation documentation for instructions on how to upgrade Solaris.

6. Add the VxFS packages:

   ```
   # pkgadd -d /cdrom/CD_name/OS_version/pkgs VRTSvxfs \
     VRTSfsdoc
   ```

   If you are installing optional VxFS packages—Quick I/O (VRTSqio) or QuickLog (VRTSqlog)—list them *after* the VRTSvxfs package in the pkgadd command line.

7. Undo the changes to /etc/vfstab done in step 4.

8. Reboot the system.

Upgrading the VERITAS File System Only

This section provides instructions for updating VxFS without updating Solaris. To upgrade VxFS only:

1. Unmount any mounted VERITAS file systems. You cannot remove the VRTSvxfs package if any VxFS file systems remain mounted.

2. Load and mount the CD as described in "Loading the Software from CD." The CD becomes visible as the file system mounted on /*CD_path*. If the CD is mounted automatically, its path is /cdrom/*CD_name*; if mounted manually, the path is /mnt.

3. Remove all VxFS packages, starting with the optional packages:

   ```
   # pkgrm VRTSqio VRTSqlog VRTSfsdoc VRTSvxfs
   ```

4. Add VxFS packages:

   ```
   # pkgadd -d /cdrom/CD_name/OS_version/pkgs VRTSvxfs \
     VRTSfsdoc
   ```

   If you are installing optional VxFS packages—Quick I/O (VRTSqio) or QuickLog (VRTSqlog)—list them *after* the VRTSvxfs package on the pkgadd command line.

5. Reboot the system.

Upgrading the Solaris Operating System Only

If VxFS 3.3.2 is already installed when you upgrade Solaris, you must deinstall and reinstall the VxFS 3.3.2 packages. To do this, follow the instructions in the section "Upgrading VxFS and Solaris" on page 12.

Adding the Quick I/O for Databases Package

If VxFS 3.3.2 is already installed and you purchase the Quick I/O feature separately, you can install VRTSqio:

```
# pkgadd -d /pathname VRTSqio
```

Output is similar to that described in "Installation Output" on page 8. Reboot your system to complete the package installation.

Adding the QuickLog Package

If VxFS 3.3.2 is already installed and you purchase the QuickLog feature separately, you can install VRTSqlog:

```
# pkgadd -d /pathname VRTSqlog
```

Output is similar to that described in "Installation Output" on page 8. Reboot your system to complete the package installation.

Upgrading the VxFS Disk Layout

VxFS currently supports three file system disk layouts:

• disk layout 1

• disk layout 2 (with quotas or without quotas)

• disk layout 4

Any new file system created using VxFS 3.3.2 has disk layout 4 by default. You can specify other disk layouts using mkfs:

```
# mkfs -F vxfs -o version=1 /devicename

# mkfs -F vxfs -o version=2 /devicename

# mkfs -F vxfs -o noquota, version=2 /devicename
```

For better performance, use disk layout 4 for all new file systems.

Use the `vxupgrade` command to upgrade an existing VxFS disk layout to disk layout 4 while the file system remains online:

```
# vxupgrade -n 4 /mount_point
```

See the `vxupgrade`(1M) and `fsadm`(1M) manual pages for more information on upgrading VxFS file systems.

Loading and Unloading the File System Module

On Solaris 2.5.1, 2.6, and 7, 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.

If you want to load the `vxfs` module manually, first load `vxfs`, then load `vxportal`. `vxportal` is the DMAPI kernel module:

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

To determine if the `vxfs` module successfully loaded, enter:

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

This provides information about the `vxfs` module. The first field in the output is the *vxfs_module_id* of the `vxfs` module.

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
```

Verifying VxFS Installation

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

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 `vxfs` is loaded, you will see an entry corresponding to `vxfs`. If the file system module is not loaded, follow the instructions in "Loading and Unloading the File System Module" to complete the process.

Utility Installation Verification

The VERITAS File System type-specific utilities are installed in two directories: `/etc/fs` and `/usr/lib/fs`. The `/usr/lib/fs/vxfs/bin` directory contains the advanced feature set provided with VxFS, and `/etc/fs/vxfs` contains the VERITAS `mount` command. Check whether the `vxfs` subdirectories are present:

```
# ls /etc/fs/vxfs
```

```
# ls /usr/lib/fs/vxfs
```

List these directories in your PATH environment variable to make the commands accessible.

Using VxFS

After installing VxFS, you can create a VERITAS File System on a disk slice or VERITAS Volume Manager™ (VxVM®) 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 VxFS guides and online manual pages. Refer to the *VERITAS File System Quick Start Guide* for examples of the most common VxFS operating procedures.

Using QuickLog With FirstWatch

- First install the following VERITAS software packages:

  ```
  VRTSvxfs
  VRTSvxvm
  VRTSqlog
  VRTSfw
  VRTSnfsfw
  ```

- Install QuickLog licences on each system in a failover configuration.

- Keep enough QuickLog devices available on each server (in a Symmetric configuration) or on the TAKEOVER server (in an Asymmetric configuration) to allow logging of the shared file systems on the TAKEOVER server. If the TAKEOVER server does not have enough QuickLog devices, some file systems are logged after transferring to the TAKEOVER server. When the file systems are later restored to their original server, `fsck` runs a full check on all the file systems that were not logged. You should be aware that `fsck` may involve a time-consuming process.

See the *VERITAS FirstWatch Installation and Configuration Guide* for information on installing FirstWatch. After the VERITAS Volume Manager and FirstWatch configuration is set up:

1. Install the QuickLog package if it is not already installed:

   ```
   # pkgadd -d /cdrom/CD_name/OS_version/pkgs VRTSvxfs \
     VRTSqlog
   ```

2. Install the FirstWatch script package (the FirstWatch package `VRTSfw` must already be installed):

   ```
   # pkgadd -d /cdrom/CD_name/OS_version/pkgs VRTSnfsfw
   ```

   This adds the files `/startup.d/S25VxLD` and `/takeover.d/S25VxLD` to the FirstWatch directory `/opt/VRTSfw/bin`. These are shell scripts invoked during FirstWatch operations that are required to operate QuickLog.

3. For all shared file systems awaiting the logging process though QuickLog, add the `vxldlog=` mount option to the FirstWatch environment variables `PRIMARY_MOUNT_OPTIONS` and `TAKEOVER_MOUNT_OPTIONS` in the file `/opt/VRTSfw/env/ha.env` on each machine:

   ```
   PRIMARY_MOUNT_OPTIONS="mount_point -o mount_options, \
   vxldlog=@ mount_point -o mount_options,vxldlog="; \
   export PRIMARY_MOUNT_OPTIONS
   ```

   ```
   TAKEOVER_MOUNT_OPTIONS="mount_point -o mount_options, \
   vxldlog=@ mount_point -o mount_options,vxldlog="; \
   export PRIMARY_MOUNT_OPTIONS
   ```

Note: These two variables *must* be set in `ha.env`. Unlike FirstWatch variables in `/etc/ha.conf`, variables in `ha.env` can only be listed once on each system. The @ symbol is used as a separator between each file system listed in the variable. See the file `/opt/VRTSfw/env/ha.env`, where `/opt/VRTSfw/env` is your base directory for FirstWatch (you may have installed FirstWatch in a directory other than this), for complete usage information.

For example, using `vol2` and `vol3` on server `alpha` adds the mount option `vxldlog=` to PRIMARY_MOUNT_OPTIONS:

```
PRIMARY_MOUNT_OPTIONS="/vol2 -o vxldlog=@/vol3 \
-o vxldlog="; export PRIMARY_MOUNT_OPTIONS
```

Using `vol2` and `vol3` on server `beta` adds the mount option `vxldlog=` to TAKEOVER_MOUNT_OPTIONS:

```
TAKEOVER_MOUNT_OPTIONS="/vol2 -o vxldlog=@/vol3 \
-o vxldlog="; export TAKEOVER_MOUNT_OPTIONS
```

Deinstalling the VxFS Software

You deinstall the VERITAS File System using the `pkgrm` command.

Note: The VxFS package cannot be removed if any mounted VxFS file systems exist. Unmount any VxFS file systems before removing the package. After you remove the VxFS package, VxFS file systems are not mountable or accessible until another VxFS package is installed.

To check if any VERITAS File Systems are mounted, enter:

```
# df -F vxfs
```

To remove the VxFS package, enter:

```
# pkgrm VRTSvxfs
```

If any of the optional VxFS packages are installed, specify them first in the `pkgrm` command. The system responds with a message similar to the following:

```
The following package is currently installed:
VRTSvxfs VERITAS Files System
(sparc) 3.3.2 for Solaris 7 (32-bit/64-bit), 2.6 and 2.5.1
Do you want to remove this package?
```

Type y to continue with 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]
```

Type y to continue with the removal.

```
## Verifying package dependencies
## Processing package information.
## Executing preremove script.
## Removing pathnames in class <2.7_64>
. . .
## Removing pathnames in class <2.7>
. . .
## Removing pathnames in class <all>
. . .
## Updating system information.
Removal of <VRTSvxfs> was successful.
```