



VERITAS® File System™

Installation Guide

Release 3.2.1

READ THIS BEFORE INSTALLING THE SOFTWARE!

Solaris
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Introduction

This document describes how to install and upgrade the VERITAS File System™ (referred to as VxFS or `vxfs`). Topics include:

- Pre-Installation Instructions
 - Getting Help
 - Obtaining a License Key
- Installing VxFS Software for the First Time
 - Loading the Software from CD-ROM
 - Installation Output
- Upgrading to VxFS Release 3.2.1 and Solaris 2.5.1 or 2.6
 - Before You Upgrade
 - To Upgrade VxFS and Solaris
 - Upgrading the Solaris Operating System Only
 - Adding the Quick I/O for Databases Module
 - Adding the Accelerator for NFS Module
 - Upgrading the VxFS Disk Layout
- Loading and Unloading the File System Modules
 - Loading/Unloading the VxFS Module
 - Loading/Unloading the Quick I/O and Accelerator Modules
- Verifying VxFS Installation
 - Kernel Installation Verification



- Administrative Command Installation Verification
- Using VxFS
- Using the Accelerator for NFS With FirstWatch
- Deinstalling the VxFS Software

Getting Help

For information about licenses or VERITAS[®] service packages, contact VERITAS Customer Support.

US Customers: 1-800-342-0652

International Customers: +1 (650) 335-8555

Fax: (650) 335-8428

You can also reach VERITAS Customer Support through electronic mail at:

support@veritas.com

Pre-Installation Instructions

Before installing the VERITAS File System:

- Obtain a license key. See the section entitled “Obtaining a License Key” for details.
- Confirm that the system on which you are installing VxFS has enough free disk space. The following table lists the VERITAS File System packages and the suggested *minimum* space for each. Values are given in 512-byte sectors:

Package	Contents	Size (sectors)
VRTSvxfs	VERITAS File System	8186
VRTSfsdoc	VxFS Documentation	12434
VRTSfdd	VERITAS Quick I/O™ for Databases	300
VRTSvxld	VERITAS Accelerator <i>for NFS</i>	3264



The following table shows the approximate disk space used by the VERITAS File System software and documentation packages (in 512-byte disk sectors):

Package	/	/usr	/opt
VRTSvxfs	2250	5936	0
VRTSfsdoc	0	0	12434
VRTSfdd (<i>optional</i>)	72	202	0
VRTSvxld (<i>optional</i>)	2749	515	0

- If you are installing the documentation package, the directory `/opt` must exist and have 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. If you already have an evaluation license key for the product, you must obtain a permanent license key when you purchase the product. The optional VERITAS Quick I/O package (VRTSfdd) and Accelerator *for NFS* (VRTSvxld) require separate license keys.

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(s) before installing or upgrading the VxFS packages. Be sure to record your license key(s) somewhere other than on the computer so that you can use 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. You can determine the `hostid` using the following command:

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



To determine the machine type, enter:

```
# /usr/sbin/prtconf | head
```

During installation, you will be 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 will work on VERITAS 3.2.1 File Systems.

If you have any questions concerning licensing, contact VERITAS at one of the phone numbers listed in the section “Getting Help.”

Installing VxFS Software for the First Time

Note: You must be superuser to install and deinstall the VERITAS File System.

The VERITAS CD-ROM contains the following VxFS packages:

- `VRTSvxfs`—VERITAS File System software and manual pages
- `VRTSfdd`—file device driver for VERITAS Quick I/O for Databases (optional)
- `VRTSvxld`—file device driver for VERITAS Accelerator *for NFS* (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 on line, you can omit the `VRTSfsdoc` package.

You install VERITAS File System packages with the `pkgadd` utility, using the standard method for adding any new device driver.

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-ROM

To load the software from CD-ROM:

1. Log in as superuser.
2. Place the VERITAS CD-ROM 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-ROM With Solaris Volume Management.” Otherwise, mount the CD-ROM and skip to the section “Mounting the CD-ROM at the Command Line.”

Mounting the CD-ROM With Solaris Volume Management

Once the CD-ROM is inserted, Solaris volume management software automatically mounts the CD-ROM as `/cdrom/CD_name`.

▼ After the CD-ROM is mounted, enter the following to install the packages:

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

If you are installing optional VxFS packages—Quick I/O (VRTSfdd) or Accelerator *for NFS* (VRTSvxld), list them *after* the VRTSvxfs package in the pkgadd command line.

Mounting the CD-ROM at the Command Line

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

▼ 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.



▼ After the CD-ROM is mounted, enter the following to install the packages:

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

If you are installing optional VxFS packages—Quick I/O (VRTSfdd) or Accelerator *for NFS* (VRTSvxld), list them *after* the VRTSvxfs package in the pkgadd command line.

Installation Output

VxFS 3.2.1 runs on Solaris 2.5.1 and Solaris 2.6. 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
You should be running on SunOS 5.5.1 or 5.6 to
install this package.
```

The VRTSvxfs package contains binaries for Solaris 2.5.1 and Solaris 2.6. Procedures built into this package determine the current OS version and install the appropriate VxFS binaries during the pkgadd process. 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) 3.2.1 Advanced for Solaris 2.5.1 and 2.6
# 1600 PLYMOUTH STREET, MOUNTAIN VIEW, CA 94043
#
```

```
Copyright (c) 1997 - 1991 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.
```

```
17 package pathnames are already properly installed.
```

```
## Verifying disk space requirements.
```

```
## Checking for conflicts with packages already installed.
```

```
## 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/vxrestore <setuid root setgid bin>
```



```
/usr/sbin/vxquota <setuid root>  
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 system displays a list of files and indicates whether the installation was successful.

Before using VxFS, you must create a license key file. Type:

```
vxfsserial -c
```

The system responds:

Please enter your key:

Upon entering a valid key, the system displays something similar to:

```
vxfs:vxfsserial: INFO: Feature name: VXFS [80]  
vxfs:vxfsserial: INFO: Number of licenses: 1 (non-floating)  
vxfs:vxfsserial: INFO: Expiration date: Sun Nov 02 00:00:00 1997  
(178.6 days from now)  
vxfs:vxfsserial: INFO: Release Level: 22  
vxfs:vxfsserial: INFO: Machine Class: All  
vxfs:vxfsserial: INFO: Key successfully installed in  
/etc/vx/elm/80.  
Installing kernel binaries for Solaris 2.6  
Installing dmapi driver module  
Installation of <VRTSvxfs> was successful.
```

Note: To license the optional packages, re-enter the `vxfsserial -c` command and a valid license key. If you do not have a valid license key, see “Obtaining a License Key.”



Upgrading to VxFS Release 3.2.1 and Solaris 2.5.1 or 2.6

If you are already running an earlier release of VxFS, you can upgrade to VxFS Release 3.2.1.

Before You Upgrade

Note: If your system has a previous version of `VRTSvxf`s installed, you must deinstall it before installing this version. You do not need to remove existing VERITAS File Systems during this process, but all VERITAS File Systems must be unmounted and remain unmounted during the upgrade process. See the section “Deinstalling the VxFS Software” for more information.

The following table indicates which VxFS releases are supported on each Solaris release. Note that while other versions of VxFS are still supported, only VxFS 3.2.1 is available on the VERITAS CD-ROM.

	Solaris 2.4	Solaris 2.5	Solaris 2.5.1	Solaris 2.6
VxFS 3.2.1	Not Supported	Not Supported	Supported	Supported
VxFS 3.2	Not Supported	Not Supported	Not Supported	Supported*
VxFS 2.3.x	Not Supported	Supported	Supported	Not Supported
VxFS 2.2.x	Not Supported	Supported	Supported	Not Supported
VxFS 2.2	Not Supported	Supported	Not Supported	Not Supported
VxFS 1.2.4/1.2.5	Supported	Not Supported	Not Supported	Not Supported
VxFS 1.2.2/1.2.3	Supported	Not Supported	Not Supported	Not Supported
*Recommended to upgrade to VxFS 3.2.1.				



1. Determine the current VxFS version and Solaris version you are running.
2. Determine the final Solaris version you want to run with VxFS. For VxFS 3.2.1, this must be Solaris 2.5.1 or 2.6.
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 you have enough space in the `/opt` directory (see “Pre-Installation Instructions” for VxFS space requirements).
4. If you have not already done so, obtain the necessary license key (see “Obtaining a License Key” 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	“To Upgrade VxFS and Solaris”
VxFS Only	“Upgrading the VERITAS File System Only”
Solaris Only	“Upgrading the Solaris Operating System Only”

To Upgrade VxFS and Solaris

1. Unmount any mounted VxFS file systems.
2. Load and mount the CD-ROM as described in “Loading the Software from CD-ROM.” It should then be visible as the file system mounted on `/CD_path`. If the CD-ROM is mounted automatically, its path should be `/cdrom/CD_name`; if mounted manually, the path should be `/mnt`.
3. Remove any VxFS packages (optional packages first):

```
# pkgrm VRTSfdd VRTSvxld VRTSvxfs VRTSfsdoc
```
4. Upgrade the operating system to Solaris 2.5.1 or 2.6. Refer to the Solaris installation documentation for instructions on how to upgrade Solaris.



5. Add the VxFS package(s):

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

If you are installing optional VxFS packages—Quick I/O (VRTSfdd) or Accelerator *for NFS* (VRTSvxld), list them *after* the VRTSvxfs package in the pkgadd command line.

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. The VRTSvxfs package cannot be removed if there are any mounted VxFS file systems.
2. Load and mount the CD-ROM as described in “Loading the Software from CD-ROM.” It should then be visible as the file system mounted on */CD_path*. If the CD-ROM is mounted automatically, its path should be */cdrom/CD_name*; if mounted manually, the path should be */mnt*.
3. Remove any VxFS packages:

```
# pkgrm VRTSvxfs VRTSfdd VRTSvxld VRTSfsdoc
```

4. Reboot the machine.

Note: On Solaris operating systems, loading kernel modules with similar symbol tables can cause a system crash. It’s a good idea to reboot the system after a pkgrm and before adding the VRTSvxfs or VRTSfdd packages.

5. Add the VxFS package(s):

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

If you are installing optional VxFS packages—Quick I/O (VRTSfdd) or Accelerator *for NFS* (VRTSvxld)—list them *after* the VRTSvxfs package in the pkgadd command line.



Upgrading the Solaris Operating System Only

If VxFS 3.2.1 is already installed when you upgrade Solaris, you must deinstall and reinstall the VxFS 3.2.1 package(s). To do this, follow the instructions in the section “To Upgrade VxFS and Solaris.”

Adding the Quick I/O for Databases Module

If VxFS 3.2.1 is already installed and you purchase the Quick I/O feature separately, you can install VRTSfdd:

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

Output is similar to that described in “Installation Output” on page 8.

Adding the Accelerator *for NFS* Module

If VxFS 3.2.1 is already installed and you purchase the Accelerator *for NFS* feature separately, you can install VRTSvxld:

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

Output is similar to that described in “Installation Output” on page 8.

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



Once VxFS Release 3.2.1 is installed on a system, new file systems are created using disk layout 4 by default, but you can specify other disk layouts using `mkfs`:

```
# mkfs -o version=1
# mkfs -o version=2
# mkfs -o noquota, version=2
```

Using disk layout 4 for new file systems is recommended.

Use the `vxupgrade` command to upgrade an existing VxFS disk layout to disk layout 4 while the file system remains on line (see the `vxupgrade(1M)` manual page for details on upgrading VxFS file systems).

Loading and Unloading the File System Modules

On Solaris 2.5.1 and 2.6, the VxFS file system, VERITAS Quick I/O, and the Accelerator drivers are loadable kernel modules. Modules are loaded after the VxFS and Quick I/O software is installed.

Loading/Unloading the VxFS Module

On Solaris 2.5.1 and 2.6, the VxFS file system is a loadable kernel module. The `vxfs` module is normally loaded on the first reference to a VxFS file system; when a user tries to mount a VxFS file system, the `vxfs` module automatically loads (if it was not already loaded).

If you need to load the `vxfs` module manually, first load `vxfs`, then load `vxportal`:

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

To check if the `vxfs` module is successfully loaded, enter:

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

This should provide information about the `vxfs` module. The first field in the output is the `vxfs_module_id` for the `vxfs` module.



The module can be unloaded by typing:

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

The `modunload` command will fail if there is a mounted VxFS file system. To check if any VxFS file systems are mounted, enter:

```
# df -F vxfs
```

Loading/Unloading the Quick I/O and Accelerator Modules

The `fdd` and `vxld` modules are normally loaded on the first reference to a VxFS file system; when you try to mount a VxFS file system, the modules automatically load (if not already loaded). The following commands show how to load and unload the `fdd` module manually (substitute `vxld` to load and unload the Accelerator):

```
# modload /kernel/drv/fdd
```

To check if the `fdd` module is successfully loaded, enter:

```
# modinfo | grep fdd
```

This provides information about the `fdd` module. The first field in the output is the *module_id* for the `fdd` module. To unload the module, enter:

```
# modunload -i module_id:
```

The `modunload` command fails if there is a mounted VxFS file system.

Verifying VxFS Installation

The VERITAS File System package consists of a kernel component and administrative commands. The following sections cover verification of each component.



Kernel Installation Verification

To make sure that the file system driver is loaded, enter:

```
# modinfo | grep vxfs
```

The `modinfo` command displays information about all the modules loaded on the system. If `vxfs` is loaded, it will show an entry corresponding to `vxfs`. If the file system module is not loaded, follow the instructions in “Loading and Unloading the File System Modules” to load it.

Administrative Command Installation Verification

The VERITAS File System type-specific utilities are found in two directories: `/etc/fs` and `/usr/lib/fs`. `cd` to these directories and check that the following subdirectories are present:

- `/etc/fs/vxfs`
- `/usr/lib/fs/vxfs`

The `/usr/lib/fs/vxfs/bin` directory contains the advanced feature set provided with VxFS.

Using VxFS

Once you have installed 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. The file system can later be unmounted with `umount`. A file system can be automatically mounted at system boot time by adding an entry for it in the `/etc/vfstab` file.

The VERITAS-specific commands are described in the VxFS guides and manual pages. Refer to the *VERITAS File System Quick Start Guide* for examples of the most common VxFS operating procedures.



Using the Accelerator *for NFS* With FirstWatch

To use the Accelerator with FirstWatch:

- You must have the following VERITAS software packages installed:

```
VRTSvxfs
VRTSvxvm
VRTSvxld
VRTSfw
VRTSnfsfw
```

- You must have Accelerator licences installed on each system in a failover configuration.
- Keep enough Accelerator devices available on each server (in a Symmetric configuration) or on the TAKEOVER server (in an Asymmetric configuration) to allow the shared file systems to be accelerated on the TAKEOVER server. If there are not enough Accelerator devices available on the TAKEOVER server, some file systems will not be Accelerated after transferring to the TAKEOVER server. When they are later restored to their original server, a full `fsck` would be run on all the file systems that were not accelerated, which could be a lengthy 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 Accelerator package if it's not already installed:

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

2. Then 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, and are required to operate the Accelerator.



3. For *all* shared file systems to be accelerated, add the FirstWatch mount options `PRIMARY_MOUNT_OPTIONS` and `TAKEOVER_MOUNT_OPTIONS` to 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 at (@) 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 the mount option `"vxldlog="` would be added to `PRIMARY_MOUNT_OPTIONS`:

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

while for `vol2` and `vol3` on server beta the mount option `"vxldlog="` would be added to `TAKEOVER_MOUNT_OPTIONS`:

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



Deinstalling the VxFS Software

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

Note: The VxFS package cannot be removed if there are any mounted VxFS file systems. You must unmount any VxFS file systems before removing the package. After the VxFS package is removed, any VxFS file systems will be unmountable and therefore inaccessible 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, you can also specify them 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) 3.2.1 Advanced for Solaris 2.5.1 and 2.6
Do you want to remove this package [y,n,?,q]
```

Type `y` to continue with the removal of the package.

```
## 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 package removal.

```
## Verifying package dependencies
## Processing package information.
## Executing preremove script.
## Removing pathnames in class <sysadm>
## Removing pathnames in class <none>
. . .
## Updating system information.
Removal of <VRTSvxfs> was successful.
```