VERITAS File System™ 3.5

Installation Guide

Solaris

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VERITAS

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VERITAS Software Corporation
350 Ellis Street
Mountain View, CA 94043
USA
Phone 650–527–8000
Fax 650–527–2908
http://www.veritas.com

VERITAS File System Installation

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

Getting Help

For assistance with any of the VERITAS products, contact VERITAS Technical Support:

- U.S. and Canadian Customers: 1-800-342-0652
- International: +1-650-527-8555
- Email: support@veritas.com

For license information:

- Phone: 1-925-931-2464
- Email: license@veritas.com
- Fax: 1-925-931-2487

For software updates:

- Email: swupdate@veritas.com

For information on purchasing VERITAS products:

- Phone: 1-800-258-UNIX (1-800-258-8649) or 1-650-527-8000
- Email: vx-sales@veritas.com

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

http://www.veritas.com

For software updates and additional technical support information, such as TechNotes, product alerts, and hardware compatibility lists, visit the VERITAS Technical Support website at:

http://support.veritas.com

Conventions

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

Symbol	Usage	Examples
%	C shell prompt	
$	Bourne/Korn shell prompt	
#	Superuser prompt (all shells)	
\	Continued input on the following line; you do not type this character	# **`mount -F vxfs`** \ **`/h/filesys`**
`[ ]`	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	Indicates an active hypertext link	In PDF and HTML files, click on links to move to the specified location

Preinstallation Instructions

Before installing the VERITAS File System:

- Review the *VERITAS File System Release Notes*, `vxfs_notes.pdf`. A hard copy of the release notes is included with the product, and is on the VERITAS software disc under the `file_system/release_notes` directory.

Note There are multiple CDs in the product distribution from VERITAS. VxFS is on *VERITAS Storage Solutions 3.5 for Solaris* Disc 1.

  Because product release notes are not installed by any packages, VERITAS recommends that you copy them from the CD to the `/opt/VRTSfsdoc` directory so that they are available for future reference.

- In the *VERITAS File System Release Notes*, review the information on VRTSexplorer and installing the `VRTSspt` package. `VRTSspt` is a group of tools for troubleshooting a system and collecting information on its configuration. The tools can gather VxFS metadata information and establish various benchmarks to measure file system performance. The tools are not required for operation of any VERITAS product, and they may adversely impact system performance if not used correctly. VERITAS provides these tools to analyze systems if you suspect that there are performance problems, and should be used only under the direction of a VERITAS Technical Support Engineer.
- Obtain a license key (see "Product Licensing" on page 5 for details).
- Ensure that the directory `/opt` exists and has write permissions for `root`.
- Confirm that your system has enough free disk space to install VxFS. The following table shows the approximate disk space usage by directory for the VERITAS File System packages:

Directory:	/	/usr	/opt
Size:	1.5 MB	2.25 MB	3.5 MB

Product Licensing

The VERITAS File System is a licensed product. Before you install VxFS, obtain a license key from VERITAS. If you have a temporary license key, you must obtain a permanent license key when you purchase the product. A License Key Request Form (LKRF) is included in the product package. The LKRF has all the information required to establish a user account on the VERITAS vLicense™ website and generate your license key. If you do not receive a License Key Request Form, contact your sales representative, or send an email with your sales order number to license@veritas.com.

To obtain a product license, use the vLicense website (see below), or complete the License Key Request Form, including your system's host ID and model type. Sign and date the completed form and fax it to VERITAS. You will receive a license key by email within a few business days. Retain the License Key Request Form for your records.

Using the VERITAS vLicense Website to Obtain a License

You can access the vLicense website at:

http://www.veritas.com/vlicense

To obtain a license from the website, provide the following information shown on the License Key Request Form:

- Your customer number
- Your order number
- Your serial number

To determine the host ID of your system, enter:

```
# hostid
```

To determine the machine type, enter:

```
# uname -i
```

After receiving a license key, record the number somewhere other than on the system where it is installed so that you can access it if the system becomes inoperable or the product requires reinstallation.

During the installation procedure, you must enter a license key. If you are replacing a temporary license with a permanent license, follow the instructions that accompany the license key to replace the old license with the new one.

The VERITAS licensing commands are provided in the software package `VRTSvlic`. The `VRTSvlic` package must be installed for the licensing process to work.

If you have any questions concerning licensing, contact VERITAS at the license information numbers listed under "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 the following file system packages in the `file_system/pkgs` directory:

- `VRTSvxfs`—VERITAS File System software and manual pages.
- `VRTSfsdoc`—VERITAS File System documentation in PDF format. If you do not want documents online, omit installing the `VRTSfsdoc` package.
- `VRTSvlic`—VERITAS products licensing facility. This package must be installed to activate all VxFS licensable features.

The file system-related packages listed below are also in the `file_system/pkgs` directory, but are installed by other VERITAS products, or when installing VxFS using the VERITAS Installation Menu (see the *VERITAS File System Release Notes*). These packages, which support the VERITAS Enterprise Administrator (VEA) GUI, may require patches to operate on some OS versions. See the *VERITAS Volume Manager Installagion Guide* for complete installation instructions.

- `VRTSfspro`—VERITAS File System Management Services Provider
- `VRTSob`—VERITAS Enterprise Administrator Service
- `VRTSobgui`—VERITAS Enterprise Administrator

VERITAS Installation Menu

You can install VxFS using the `pkgadd` utility as described in the following sections. Alternatively, the VERITAS products CD has an automated installation and licensing procedure that lets you install packages using an Installation Menu instead of installing from the command line. The *Product License And Installation Guide*, included with the VERITAS product CD, provides complete information on using the Installation Menu. Review the *Product License And Installation Guide* before installing VxFS.

Note The VERITAS Installation Menu is not available on the CD when you purchase the VERITAS File System through Sun Microsystems.

Loading the Software from CD

To load the software from CD-ROM:

1. Log in as superuser.
2. Place the VERITAS software disc into a CD-ROM drive connected to your system.

Note There are multiple CDs in the product distribution from VERITAS. VxFS is on *VERITAS Storage Solutions 3.5 for Solaris* Disc 1. If you purchase VxFS from Sun Microsystems, there is only one CD.

3. If Solaris volume management software is running on your system, when you insert the CD it automatically mounts as `/cdrom/cdrom0`.
4. If Solaris volume management software is not available to mount the CD automatically, you must mount it manually. After inserting the CD, enter:

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

   where `c0t6d0s2` is the default address for the CD-ROM drive.
5. If you are installing VxFS for the first time, you can install the product using the VERITAS Installation Menu. To start the Installation Menu, enter:

   ```
   # /cdrom/cdrom0/installer
   ```

   The installer guides you through the procedure. See the *Product License And Installation Guide* included in the CD package for more information.

VRTSvxfs Installation

VxFS 3.5 runs on Solaris 2.6, 7, 8, or 9. If you try to install it on any other Solaris version, the `pkgadd` procedure will fail and display an error message.

The `VRTSvxfs` package contains binaries for all four of these Solaris OS versions. Procedures built into this package determine the current OS version and install the appropriate VxFS binaries during the `pkgadd` process. On Solaris 7, 8, and 9 systems, both the 32-bit and 64-bit VxFS drivers are installed.

If you are upgrading VxFS from a previous version, go to "Upgrading to VxFS Release 3.5 and Solaris 2.6, 7, 8, or 9" on page 11.

1. To install `VRTSvxfs`, install the VERITAS license package and the VERITAS file system packages in the order shown (the `VRTSfsdoc` package is optional):

   ```
   # pkgadd -d /cdrom/cdrom0/file_system/pkgs VRTSvlic \
   VRTSvxfs VRTSfsdoc
   ```

   Text similar to the following displays during the installation procedure:

   ```
   VERITAS File System
   (sparc) 3.5,REV=GA07
   Copyright (c) 1991 - 2002 VERITAS SOFTWARE CORP. ALL RIGHTS
   RESERVED. THIS SOFTWARE IS THE PROPERTY OF AND IS LICENSED BY
   VERITAS SOFTWARE, AND/OR ITS SUPPLIERS.

   ## Executing checkinstall script.
   Using </> as the package base directory.
   ## Processing package information.
   ## Processing system information.
    37 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]
   ```

2. If you see the above 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:

  /opt/VRTSvxfs/sbin/qioadmin <setuid root>
  /opt/VRTSvxfs/sbin/qiomkfile <setuid root>
  /opt/VRTSvxfs/sbin/vxdump <setuid root setgid tty>
  /opt/VRTSvxfs/sbin/vxquota <setuid root>
  /opt/VRTSvxfs/sbin/vxrestore <setuid root setgid bin>

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

3. Type **y** to install these files as `setuid/setgid` files and 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,?]
```

4. Type **y** to continue. The package installs the files listed on your screen and ends with:

```
Installation of <VRTSvxfs> was successful.
```

5. VxFS commands are installed in the `/opt/VRTS/bin` directory, and the online manual pages are installed in the `/opt/VRTS/man` directory. Be sure to add the command directory to your PATH, and the manual page directory to your MANPATH environment variables (see "Command Installation Verification" on page 17 for information on other VxFS command path names).

6. Before rebooting the system and using VxFS, you must enter a license key. First, enter the license installation command:

```
# vxlicinst
```


7. The system responds with a prompt for the license key. Enter a valid key as in the following example:

```
VERITAS License Manager vxlicinst utility version 3.00.006
Copyright (C) VERITAS Software Corp 2002. All Rights reserved.

Please enter your key: ABCD-EFGH-IJKL-MNOP-QRST-UVWX-YZ9

License key installed successfully for VERITAS File System
```

Note See "Loading and Unloading the File System Module" on page 16 for information on starting VxFS without having to do a reboot.

8. Reboot the system.

```
# reboot
```

9. The installation procedure modifies the `/etc/system` file by adding the following lines:

```
* vxfs_START -- do not remove the following lines:
*
* VxFS requires a stack size greater than the default 8K.
* The following values allow the kernel stack size
* for all threads to be increased to 16K.
*
set lwp_default_stksize=0x4000
* vxfs_END
```

The original `/etc/system` file is copied to `/etc/fs/vxfs/system.preinstall`. The modifications are removed during a `pkgrm`.

Upgrading to VxFS Release 3.5 and Solaris 2.6, 7, 8, or 9

If you are already running a previous release of VxFS, you can upgrade to VxFS Release 3.5.

Before You Upgrade

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 VxFS file systems must be unmounted before doing the upgrade. Also, if any VxFS file systems are mounted with the `qlog` option, they must be QuickLog disabled before installing VxFS 3.5. See "Deinstalling the VxFS Software" on page 18 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 the current VxFS release is available on the VERITAS software CD.

	Solaris 2.6	Solaris 7	Solaris 8	Solaris 9
VxFS 3.5	Supported	Supported	Supported	Supported
VxFS 3.4	Supported	Supported	Supported	Supported
VxFS 3.3.3	Supported	Supported	Supported	Supported
VxFS 3.3.2	Supported	Supported		
VxFS 3.3/3.3.1	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 3.5, this must be Solaris 2.6, 7, 8, or 9.

3. Using the information from step 1, step 2, and the table under "Before You Upgrade" on page 11, 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 "Product Licensing" 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 13
VxFS only	"Upgrading the VERITAS File System Only" on page 14
Solaris only	"Upgrading the Solaris Operating System Only" on page 15

Upgrading VxFS and Solaris

1. Unmount all mounted VxFS file systems.

2. Remove the VxFS packages, starting with the optional package. Do not remove the license packages `VRTSvlic` or `VRTSlic` if there are other VERITAS products installed.

   ```
   # pkgrm VRTSfsdoc VRTSvxfs
   ```

Note If the `VRTSqio` package is installed, remove it also.

3. If you have VxFS file systems specified in the `/etc/vfstab` file, comment them out before rebooting.

4. Upgrade the operating system to Solaris 2.6, 7, 8, or 9. Refer to the Solaris installation documentation for instructions on how to upgrade Solaris.

5. Load and mount the CD as described in "Loading the Software from CD" on page 7.

6. Add the VxFS packages:

   ```
   # pkgadd -d /cdrom/cdrom0/file_system/pkgs VRTSvlic \
   VRTSvxfs VRTSfsdoc
   ```

7. Undo the changes to `/etc/vfstab` done in step 3.

8. VxFS commands are installed in the `/opt/VRTS/bin` directory, and the online manual pages are installed in the `/opt/VRTS/man` directory. Be sure to add the command directory to your PATH, and the manual page directory to your MANPATH environment variables (see "Command Installation Verification" on page 17 for information on other VxFS command path names).

Note See "Loading and Unloading the File System Module" on page 16 for information on starting VxFS without having to do a reboot.

9. Reboot the system to mount any VxFS file systems.

   ```
   # reboot
   ```

   Continue with "Upgrading the VxFS Disk Layout" on page 15.

Upgrading the VERITAS File System Only

To upgrade VxFS only:

1. Unmount any mounted VERITAS file systems.

2. Load and mount the CD as described in "Loading the Software from CD" on page 7. Remove the VxFS packages, starting with the optional package. Do not remove the license packages `VRTSvlic` or `VRTSlic` if there are other VERITAS products installed.

   ```
   # pkgrm VRTSfsdoc VRTSvxfs
   ```

Note If the `VRTSqio` package is installed, remove it also.

3. Add VxFS packages:

   ```
   # pkgadd -d /cdrom/cdrom0/file_system/pkgs VRTSvlic \
   VRTSvxfs VRTSfsdoc
   ```

4. VxFS commands are installed in the `/opt/VRTS/bin` directory, and the online manual pages are installed in the `/opt/VRTS/man` directory. Be sure to add the command directory to your PATH, and the manual page directory to your MANPATH environment variables (see "Command Installation Verification" on page 17 for information on other VxFS path names).

Note See "Loading and Unloading the File System Module" on page 16 for information on starting VxFS without having to do a reboot.

5. Reboot the system.

   ```
   # reboot
   ```

   Continue with "Upgrading the VxFS Disk Layout" on page 15.

Upgrading the Solaris Operating System Only

If VxFS 3.5 is already installed when you upgrade Solaris, you must deinstall and reinstall the VxFS 3.5 packages. To do this, follow the instructions in the section "Upgrading VxFS and Solaris" on page 13.

Upgrading the VxFS Disk Layout

VxFS 3.5 allows mounting of four file system disk layouts:

- Disk layout Version 1
- Disk layout Version 2 (with quotas or without quotas)
- Disk layout Version 4
- Disk layout Version 5

However, making new file systems with disk layout Version 1 or Version 2 is not allowed under VxFS 3.5. Any new file system created using VxFS 3.5 has disk layout Version 5 by default. You can specify the Version 4 disk layout using the `mkfs` command:

```
# mkfs -F vxfs -o version=4 /devicename
```

For better performance and enhanced functionality, use disk layout Version 5 for all new file systems.

Use the `vxupgrade` command to upgrade an existing VxFS disk layout to disk layout Version 5 while the file system remains online:

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

You can also use the `vxfsconvert` command to upgrade file systems while they are offline. See the `vxfsconvert`(1M), `vxupgrade`(1M), and `fsadm`(1M) manual pages for more information on upgrading VxFS file systems.

Loading and Unloading the File System Module

On Solaris 2.6, 7, 8, and 9, 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 load `vxportal`. `vxportal` is a pseudo device driver that enables VxFS commands to issue ioctls to the VxFS module 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 QuickLog or VERITAS Quick I/O features, you can load their kernel modules:

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

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 the `vxfs` module 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" on page 16 to complete the process.

Command Installation Verification

The VERITAS File System commands are installed in four directories:

`/etc/fs/vxfs`	Contains the VERITAS `mount` command and QuickLog commands required to mount file systems.
`/usr/lib/fs/vxfs/bin`	Contains the VxFS type-specific switch-out commands.
`/opt/VRTSvxfs/sbin`	Contains the VERITAS-specific commands.
`/opt/VRTS/bin`	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
# ls /opt/VRTSvxfs/sbin
# ls /opt/VRTS/bin
```

You need to add only the symbolic link directory at the end of your PATH environment variable to make all VERITAS product commands accessible:

```
PATH=$PATH:/opt/VRTS/bin; export PATH
```


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 -F vxfs` command. Before you can use this file system, you must mount it with the `mount -F vxfs` 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 Quick Start Reference appendix of the *VERITAS File System Administrator's Guide* for examples of the most common VxFS operating procedures.

Deinstalling the VxFS Software

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

Note The VxFS package cannot be removed if there are any mounted VxFS file systems. For this reason, it is recommended that you not make `/opt` a VxFS file system.

Unmount all VxFS file systems before removing the package. After you remove the VxFS package, VxFS file systems are not mountable or accessible until another VxFS package is installed. It is advisable to backup VxFS file systems before installing a new VxFS package. If VxFS will not be installed again, all VxFS file systems must be converted to a new file system type.

1. Check if any VERITAS File Systems or Storage Checkpoints are mounted:

   ```
   # df -F vxfs
   ```

2. Disable QuickLog logging on any file systems mounted with the `qlog` option:

   ```
   # qlogdisable qlogdev mount_point
   ```

3. Unmount and remove any Storage Checkpoints:

   ```
   # umount /checkpoint_name
   # fsckptadm remove checkpoint_name /mount_point
   ```

   Then unmount any mounted file systems.

4. To remove the VxFS package, enter:

   ```
   # pkgrm VRTSvxfs
   ```

   If the optional `VRTSfsdoc` package is installed, specify it first in the `pkgrm` command. The system responds with a message similar to the following:

   ```
   The following package is currently installed:
     VRTSvxfs        VERITAS File System
     (sparc) 3.5,REV=GA02

   Do you want to remove this package? y
   ```

5. 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]
   ```

6. Type **y** to continue with the removal.

   ```
   ## Verifying package dependencies
   ## Processing package information.
   ## Executing preremove script.
   ## Removing pathnames in class <s28b64>
   . . .
   ## Removing pathnames in class <s28>
   . . .
   ## Removing pathnames in class <man>
   . . .
   ## Removing pathnames in class <all>
   . . .
   ## Updating system information.
   Removal of <VRTSvxfs> was successful.
   ```

7. Remove any VxFS file system entries from the `/etc/vfstab` file.