VERITAS™

VERITAS File System™ 4.0

Release Notes

Solaris

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Contents

VERITAS File System Release Notes

This guide provides information on VERITAS File System™ (VxFS) release 4.0. The 4.0 release of VxFS operates on the following Solaris operating systems:

- Solaris 7 (32-bit and 64-bit)
- Solaris 8 (32-bit and 64-bit)
- Solaris 9 (32-bit and 64-bit)

VERITAS Cluster File System (CFS), the clustering functionality of VxFS, is supported only on Solaris 8 and Solaris 9 (see "Using Cluster File Systems" on page 10 for more information). Review this entire document before installing VxFS.

New Features

VxFS Release 4.0 has the following new features and changes.

Note Not all of the new features are available in the Sun Microsystems distribution of VERITAS products. See "New Features Not Available in Sun Microsystems Distribution of VERITAS Products" on page 7.

▼ Cross-Platform Data Sharing (CDS)

Cross-platform data sharing allows data to be serially shared among heterogeneous systems where each system has direct access to the physical devices that hold the data. This feature can be used only in conjunction with VERITAS Volume Manager. See the *VERITAS Volume Manager Cross-Platform Data Sharing Administrator's Guide* for more information.

Note The CDS feature cannot be used until VxFS 4.0 is released on other platforms.

▼ Multi-Volume Support (MVS)

The multi-volume support feature allows several volumes to be represented by a single logical object. All I/O to and from an underlying logical volume is directed by way of *volume sets*. This feature can be used only in conjunction with VERITAS Volume Manager.

There are two new VxFS commands associated with this feature:

fsapadm	VxFS allocation policy administration utility.
fsvoladm	VxFS device administration utility.

Multi-volume file systems include the following functions in the MVS application programming interface (API):

vxfs_ap_assign_ckpt	vxfs_ap_assign_file	vxfs_ap_assign_fs	vxfs_ap_define
vxfs_ap_enforce_file	vxfs_ap_enumerate	vxfs_ap_remove	vxfs_ap_query
vxfs_ap_query_ckpt	vxfs_ap_query_file	vxfs_ap_query_fs	vxfs_vol_add
vxfs_vol_deencapsulate	vxfs_vol_encapsulate	vxfs_vol_enumerate	vxfs_vol_remove
vxfs_vol_resize	vxfs_vol_stat		

▼ Large File Systems and Large File Support

The 4.0 release is the first VxFS release to support a new disk layout (Version 6) that enables the creation of files and file systems up to 8 exabytes (2^{63}) in size. File systems created on VxFS 4.0 will by default use the Version 6 disk layout. File systems larger than 1TB can be created only on 64-bit kernels and must be created on VERITAS Volume Manager™ volumes. The maximum file system size on a 32-bit kernel is still one terabyte. An eight terabyte file system requires a 2K block size, a 16 TB file system requires a 4K block size, and a 32 TB or larger file system requires an 8K block size. File systems over 32 terabytes are called *extra large* file systems and require a license to create.

An online conversion utility, `vxupgrade`, is provided to upgrade existing disk layouts to Version 6 on mounted file systems.

VxFS has been tested on file systems up to 9.5 TB with physical storage. Using a virtual disk driver that emulates large devices, file systems up to 80 TB have been tested.

▼ Quality of Storage Service (QoSS)

The Quality of Storage Service (QoSS) option is built on the multi-volume support technology introduced in this release. Using QoSS, you can map more than one device to a single file system. You can then configure policies that automatically relocate files from one device to another, or relocate files by running file relocation commands. Having multiple devices lets you determine where files are located, which can improve performance for applications that access specific types of files. QoSS is managed using the VERITAS Enterprise Administrator (VEA) GUI, or the `fssweep` and `fsmove` commands. QoSS functionality is a separately licensable feature that is available with the `VRTSfppm` package.

There are two new commands associated with this feature:

fsmove	Relocates files to a destination component volume.
fssweep	Traverses the directory structure of one or more file systems.

▼ Storage Checkpoint Quotas

Usage limits can now be set on Storage Checkpoints. The following keywords were added to the `fsckptadm` command to administer Storage Checkpoints quota functionality:

getquotalimit	Displays current quota limits, current usage, and flags set.
setquotalimit	Sets the hard limit and soft limits for Storage Checkpoint quotas.
quotaon quotaoff	Turns Storage Checkpoint quotas on and off.

▼ Storage Checkpoint File System Restore

Storage Checkpoints can be used by backup and restore applications to restore either individual files or an entire file system. Restoring from Storage Checkpoints can recover data from incorrectly modified files, but typically cannot be used to recover from hardware damage or other file system integrity problems. File system restoration can be done using the `fsckpt_restore`(1M) administrative command.

There is one new command associated with this feature:

fsckpt_restore	VxFS Storage Checkpoint restore utility.

▼ File Change Log

Caution File Change Log is currently not supported, and VERITAS strongly cautions against using it in a production environment. Though FCL is not 100 percent complete, it can be used to begin developing new applications. FCL will be fully operational in the next VERITAS File System release. For more information, see TechNote 265313, available at: http://support.veritas.com/docs/265313.

The VxFS File Change Log (FCL) tracks changes to files and directories in a file system. The File Change Log can be used by applications such as backup products, webcrawlers, search and indexing engines, and replication software that typically scan an entire file system searching for modifications since a previous scan.

There is one new command associated with this feature:

fcladm	VxFS File Change Log administration utility.

There are three new tunable parameters associated with this feature:

fcl_keeptime	Specifies the minimum amount of time that the VxFS File Change Log (FCL) keeps records in the log.
fcl_maxalloc	Specifies the maximum amount of space that can be allocated to the FCL.
fcl_winterval	Specifies the interval that must elapse before the FCL records subsequent writes to a file.

See the `vxtunefs`(1M) online manual page for more information on tunable parameters.

The File Change Log feature includes the following function in the application programming interface (API):

vxfs_fcl_sync	Sets a synchronization point in the VxFS File Change Log.

FCL functionality is a separately licensable feature.

▼ Reverse Name Lookup

The reverse path name lookup feature obtains the full path name of a file or directory by providing an inode number as an argument to the `vxlsino` administrative command. Reverse path name lookup can be useful in a variety of applications, such as for clients of the VxFS File Change Log feature, in backup and restore utilities, and in replication products.

There is one new command associated with this feature:

vxlsino	VxFS reverse path name lookup utility.

The reverse name lookup feature includes the following function in the application programming interface (API):

vxfs_inotopath	Returns path names for a given inode number.

▼ Intent Log Resize

With the Version 6 disk layout, the VxFS intent log can be increased or decreased using the `log` option of the `fsadm` command. Dynamically changing the intent log size can improve system performance. The maximum intent log size is now two gigabytes. See the *VERITAS File System Administrator's Guide* and the `mkfs_vxfs`(1M) and `fsadm_vxfs`(1M) manual pages for more information on intent log size.

▼ Named Data Streams

Traditional UNIX files have an inode identifier and a single stream of file data. Using named data streams, the inode is retained, but can now be associated with multiple data streams. In VxFS 4.0, the original data stream is accessed in the same way as in previous releases, but other data streams are referenced through a new directory inode associated with the file. The directory inode points to the new inodes, one per stream. The directory containing the named streams is not directly visible to the user.

Named data streams enable greater search and indexing capabilities, are supported on the latest versions of NFS, and Solaris 9 commands such as `tar`, `cpio`, and `df` recognize named data streams.

VxFS named data stream functionality is available only through the following application programming interface (API) functions:

vxfs_nattr_link	Links to a named data stream.
vxfs_nattr_open	Open a named data stream.
vxfs_nattr_rename	Renames a named data stream.
vxfs_nattr_unlink	Removes a named data stream.

▼ VERITAS Product Name Change

VERITAS products previously sold under the name of VERITAS Foundation Suite are now available under the name VERITAS Storage Foundation. See "Getting Help" on page 21 for contact information to purchase VERITAS products.

▼ Other VxFS Enhancements

VERITAS QuickLog is now a standard feature when VxFS is purchased as part of a VERITAS Storage Foundation product. The QuickLog feature is not supported with the Version 6 disk layout.

The `fsadm` command now allows fragmentation reporting and defragmentation operations on an individual file or directory, or on Storage Checkpoints.

Disk layout versions prior to Version 4 cannot be mounted. Use the `vxfsconvert` command to convert them to a disk layout version that can be mounted.

The `vxupgrade` command now upgrades only Version 4 and Version 5 disk layouts. Disk layout versions prior to Version 4 cannot be mounted.

The `largefiles` option is now the default file size option for the `mount` command and `mkfs` command.

The `delaylog` option is now the default intent logging mount option. The change of the default mount option from `log` to `delaylog` does not increase the risk of data loss, but allows VxFS to cache data to improve performance. See the *VERITAS File System Administrator's Guide* for more information.

The default Storage Checkpoint creation mode is now removable.

Operation of the intent log replay was improved to increase the speed of recovery after a file system failure.

The `histlog` function was implemented in the `fsdb_vxfs` command. The history log records structural changes to the file system to aid in product support.

Two new tunable parameters, `inode_aging_count` and `inode_aging_size`, for use with the Storage Checkpoint API, were added to the `vxtunefs` command. See the `vxtunefs`(1M) manual page for more information.

More VxFS functions can be performed from the VERITAS Enterprise Administrator GUI (see the *VERITAS Volume Manager User's Guide – VERITAS Enterprise Administrator* for more information).

The `vxfsu_get_ioffsets` library call was renamed `vxfs_get_ioffsets`.

New Features Not Available in Sun Microsystems Distribution of VERITAS Products

The following new features are not available in the Sun Microsystems distribution of VERITAS products:

- Cross-Platform Data Sharing
- Multi-Volume Support
- Quality of Storage Service
- Storage Checkpoints
- Storage Checkpoint Rollback
- File Change Log
- Reverse Name Lookup
- Intent Log Resize

VERITAS File System Licensed Features

The following is a list of VERITAS File System features that require a license in addition to a VxFS license. These extended VxFS features are licensed only with VERITAS Storage Foundation products and are not available individually. See "Getting Help" on page 21 for contact information to purchase VERITAS products.

VxFS Extended Feature	License Key Feature Name
File Change Log	File Change Log
Cross-Platform Data Sharing	Cross-Platform Data Sharing
Extra Large File Systems	Extra-Big File Systems
Multi-Volume File Systems	Multi-Volume Support
Quality of Storage Service (QoSS)	Quality of Storage Service
Storage Checkpoints	VXCKPT
Quick I/O for Databases	VXFDD
QuickLog	QLOG
Cluster File System	VXCFS

After VERITAS File System packages are installed, you can view the licensed features using the `vxlicrep` command. If all the extended features were licensed, the output of the `vxlicrep` would look similar to the following:

```
# vxlicrep
VXFS                                = Enabled
VXFDD                               = Enabled
QLOG                                = Enabled
VXCKPT                              = Enabled
VXCFS                               = Enabled

CPU Count                           = Not Restricted
Platform                            = Solaris
Version                             = 4.0
File Change Log                     = Enabled
Cross-platform Data Sharing         = Enabled
Extra-Big File Systems              = Enabled
Multi-Volume Support                = Enabled
Quality of Storage Service          = Enabled
```

End of Product Support

The VxFS 4.0 release does not support the creation or mounting of file systems using the Version 1 or Version 2 disk layouts. VxFS 4.0 still provides the capability to upgrade Version 1 or Version 2 disk layouts using the `vxfsconvert` utility, but this is the last major release to do so. VERITAS recommends that you upgrade all older disk layouts.

The next major release will be the last to support the VxFS Version 4 and Version 5 disk layouts. VERITAS recommends that you upgrade file systems using these older disk layouts to Version 6. See "Compatibility With Previous Versions of VxFS" on page 10 for more information on upgrading.

This is the last release to support the VxFS QuickLog feature in its current format. The QuickLog feature is not available with the Version 6 disk layout introduced in the VxFS 4.0 release. The multi-volume support feature replaces most of the functionality provided by QuickLog. See the *VERITAS File System Administrator's Guide* for information on migrating QuickLog devices to the multi-volume support function.

This is the last release to support shared (cluster) mounts on VxFS disk layout Version 5 cluster file systems. Upgrade all current cluster file system disk layouts to Version 6 to enable new VERITAS File System features and to support upgrades in future releases.

Using VERITAS Quick I/O

The VERITAS File System package, `VRTSvxfs`, includes the VERITAS Quick I/O for Databases feature. This feature is described in the *VERITAS File System Administrator's Guide*. Quick I/O is intended for operation only with VERITAS Storage Foundation for Databases products. See "Getting Help" on page 21 for contact information on VERITAS products.

Using Cluster File Systems

Storage Foundation Cluster File System (SFCFS) is the file system clustering functionality of VxFS. SFCFS is a separately licensable feature of VxFS that requires several other VERITAS products to enable communication services and provide shared disk storage resources. The VERITAS Cluster Server™ and VERITAS Volume Manager™ are packaged with VxFS to provide a complete clustering environment. There is also a high availability version, Storage Foundation Cluster File System HA. See "Getting Help" on page 21 for contact information on these products.

Compatibility With Previous Versions of VxFS

VxFS 4.0 file systems employ disk layout Version 6. With the 4.0 release, you can no longer create or mount Version 1 or Version 2 disk layout file systems. VxFS 4.0 is the last major release to support disk layout Version 4 and Version 5. VERITAS recommends upgrading any previously installed VxFS file system to the Version 6 disk layout available with VxFS 4.0.

Before or after installing VxFS 4.0, you can upgrade the disk layout on mounted file systems using the `vxupgrade` command (see the `vxupgrade`(1M) manual page for details), or `vxfsconvert` (see the `vxfsconvert`(1M) manual page) to upgrade the disk layout of unmounted file systems post installation.

See the *VERITAS File System Installation Guide* for more information on upgrading previous file system disk layout versions.

Required Solaris Patches

You must have the following Solaris patches, or their later versions, installed.

Solaris 7:

No patches required.

Solaris 8:

108528-14 (requires patches 108987-09, 111293-04, 111310-01, 111111-03, and 112396-02)

108901-04 (not required if patch 108528-24 or later is installed)

Add the patches in the following order or they will not install correctly:

112396-02

108987-09

111293-04

111310-01

111111-03

108528-14

108901-04

Solaris 9:

No patches required.

If you have not already installed the patches listed above, go to the http://sunsolve.sun.com website to download them. After installing the appropriate patches, reboot.

DISCLAIMER: Patch requirements and versions are determined at the time of product release. For the most current patch version and information, contact your vendor.

Installing and Upgrading VERITAS File System

See the *VERITAS File System Installation Guide* for instructions on how to install or upgrade the product. The required software packages are on the VERITAS software disc in the directory `file_system/pkgs`. Do not go to the individual product directories on the disc or try to install or upgrade the individual components.

Note When you purchase the VERTIAS File System or VERITAS Volume Manager through Sun Microsystems, there is no `file_system` or `volume_manager` directory. The `pkgs`, `patches`, `docs`, `release_notes`, and other directories are at the top level of the CD. See the *VERITAS File System Installation Guide* for more information.

Packages Installed with VxFS

`VRTSvxfs`	VERITAS File System software and manual pages
`VRTSfsman`	VERITAS File System online 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.
`VRTSperl`	VERITAS Perl 5.8.0 Redistribution
`VRTSfppm`	VERITAS File Placement Policy Manager
`VRTSap`	VERITAS Action Provider
`VRTStep`	VERITAS Task Exec Provider

`VRTSvxfs` is the required VxFS binary package.

`VRTSfsdoc` and `VRTSfsman` are the optional VxFS documentation and manual page packages.

`VRTSvlic` is the required licensing package for all VERITAS products. `VRTSvlic` may already be available on your system if you have installed another VERITAS 4.0 product.

`VRTSperl` is the Perl language package required to execute VERITAS 4.0 installation scripts.

`VRTSfppm` is the VERITAS File Placement Policy Manager package. This package is required to support the Quality of Storage Service (QoSS) feature.

VRTSap is the rules engine add-on for the VERITAS Enterprise Administrator GUI. Installing VRTSap enables SNMP trap and email notification when an alert is generated.

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.

The file system-related packages listed below are also in the file_system/pkgs directory. These package are installed when VxFS is installed using the VERITAS Installation Menu (see "VERITAS Installation Menu" on page 14).

VRTSfspro	VERITAS File System Management Services Provider
VRTSob	VERITAS Enterprise Administrator Service
VRTSobgui	VERITAS Enterprise Administrator
VRTSspt	VERITAS Software Support Tools

VRTSfspro, VRTSob, and VRTSobgui are part of the VERITAS Enterprise Administrator (VEA) GUI. These packages are typically used in conjunction with the VERITAS Volume Manger, or VERITAS Storage Foundation products, and are not required for VxFS to operate. These packages may require patches. See the *VERITAS Volume Manager Installation Guide* for more installation information.

VRTSspt contains various tools to help VERITAS Technical Support analyze and diagnose problems with software product operation (see "The VRTSexplorer Diagnostic Program" on page 23).

Note Some of these packages are not available when you purchase the VERITAS File System through Sun Microsystems.

VERITAS Installation Menu

VERITAS products distributed by VERITAS have an automated installation and licensing procedure that lets you install packages using an Installation Menu, or invoke installation scripts from the command line. Alternatively, you can install VxFS using the `pkgadd` command. See the *VERITAS File System Installation Guide* for instructions on how to install the VxFS packages.

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

VERITAS Licensing

VxFS is a licensed product; you must obtain a license key before installing it. License keys valid for VxFS 2.3.*x* and 3.*x* file systems are also valid for VERITAS 4.0 File Systems, but the old licenses do not support features introduced in VxFS 4.0. For information on obtaining a license key, see the *VERITAS File System Installation Guide*.

Documentation

The following documents accompany this VxFS release as Adobe Portable Document Format (PDF) files:

- *VERITAS File System Installation Guide*
- *VERITAS File System Administrator's Guide*

The `VRTSfsman` package contains manual pages for VxFS commands and utilities.

The *VERITAS File System Release Notes* are provided on the VERITAS software disc in the file `vxfs_notes.pdf` under the `file_system/release_notes` directory. Because product release notes are not installed by any packages, VERITAS recommends that you copy them from the VERITAS software disc to the `/opt/VRTS/doc` directory so that they are available on your system for future reference.

Displaying Documentation Online

The VERITAS File System guides are provided on the VERITAS Documentation disc as PDF files and in a searchable HTML-based format. The *VERITAS File System Installation Guide* is provided on the VERITAS software product disc under the `file_system/docs` directory as a PDF file. To view or print PDF documents, you need the Adobe Acrobat Reader. The following two documents comprise the VxFS documentation set:

- *VERITAS File System Installation Guide*

  After installing the `VRTSfsdoc` package, you can access this guide in the following location: `/opt/VRTS/docs/vxfs_ig.pdf`.

- *VERITAS File System Administrator's Guide*

  After installing the `VRTSfsdoc` package, you can access this guide in the following location `/opt/VRTS/docs/vxfs_ag.pdf`.

See the *VERITAS File System Installation Guide* for `VRTSfsdoc` package installation instructions.

Note The VERITAS Documentation disc is not available when you purchase the VERITAS File System through Sun Microsystems.

Online Manual Pages

This release includes the online manual pages in the `VRTSfsman` package (see the *VERITAS File System Administrator's Guide* for a complete list of VxFS manual pages).

The online manual pages are installed in the appropriate directories under `/opt/VRTS/man` (add this to your MANPATH environment variable), but this does not automatically update the windex database. To ensure that new VxFS manual pages display correctly, update the windex database after installing `VRTSvxfs`. See the `catman`(1M) manual page for more information.

Storage Foundation Cluster File System Documentation

There is a separate documentation package named `VRTScfsdc` for the Storage Foundation Cluster File System. The `VRTScfsdc` documentation package contains the *VERITAS Storage Foundation Cluster File System Installation and Configuration Guide* that includes cluster administration information.

The online manual pages available with the VERITAS File System are also available with the Storage Foundation Cluster File System. There is a section in each VxFS manual page detailing any cluster functionality issues associated with that command (see "Using Cluster File Systems" on page 10).

Software Issues in VxFS

▼ Stack Size Change

When installed on Solaris 7, Solaris 8, and Solaris 9, VxFS changes the default stack size to 24K for 64–bit systems. In 32–bit mode, VxFS can operate with a stack size of 16K. The stack size is designated in the Solaris configuration file `/etc/system`.

▼ Storage Checkpoints Do Not Operate With HSM Products

Storage Checkpoints cannot be created on a file system where the VERITAS Storage Migrator™ is active, or with other hierarchical storage management (HSM) products that use the DMAPI interface.

▼ VxFS Incompatible With Some HSM Applications

VxFS does not operate with VERITAS Storage Migrator versions 4.5 and earlier. A patch for VERITAS Storage Migrator 4.5 is available from VERITAS support on the VERITAS Customer Support website:

http://support.veritas.com/docs/258566.htm

Other HSM applications may also require a patch. Contact your HSM vendor for product-specific information.

▼ The ustat Command Returns an Error for VxFS File Systems Larger than One Terabyte

The `ustat` command returns an EOVERFLOW error for VxFS files systems larger than one terabyte because the variable used to store file system size overflows. See the `ustat`(2) manual page.

▼ Commands Must be Large-File Aware to Operate Correctly on File Systems Larger than One Terabyte

For utilities to operate correctly on large-file systems, they must be large file aware. This applies even if commands are invoked on small files in a large file system. See the information regarding disk layout in the *VERITAS File System Administrator's Guide*.

▼ Inode Limitation on File Systems Without Large File Support

For a file system to have more than 8 million inodes, you must create it using the `largefiles` option of `mkfs` (the `fsadm` utility can also be used to set the `largefiles` flag on the file system). See the `mkfs_vxfs`(1M) and `fsadm_vxfs`(1M) manual pages for details. The `largefiles` option is enabled by default on VxFS 4.0. In previous VxFS releases, `nolargefiles` was the default mount option.

▼ Large Files Should Be Mounted Only on Systems With Sufficient Memory

When a file system is mounted, VxFS keeps certain data structures in the kernel. As the size of the file system increases, the amount of data structures stored by VxFS also increases. The file system typically keeps approximately 128 bytes per allocation unit (32,768 file system blocks). This translates to a usage of 512K per 1 TB for an 8K block size file system (4 MB per 1 TB for a 1K block size file system). Therefore, large file systems must be mounted only on systems that have sufficient memory. The memory requirements for mounting large file systems are shown in the tables below.

Memory Usage for a File System With a 1K Block Size

File System Size	128 GB	1 TB	8 TB	64 TB	256 TB
Memory Usage	1 MB	4 MB	32 MB	N/A	N/A

Memory Usage for a File System With a 2K Block Size

File System Size	128 GB	1 TB	8 TB	64 TB	256 TB
Memory Usage	512K	2 MB	16 MB	128 MB	N/A

Memory Usage for a File System With a 4K Block Size

File System Size	128 GB	1 TB	8 TB	64 TB	256 TB
Memory Usage	256K	1 MB	8 MB	64 MB	N/A

Memory Usage for a File System With an 8K Block Size

File System Size	128 GB	1 TB	8 TB	64 TB	256 TB
Memory Usage	128K	512K	4 MB	32 MB	128 MB

While performing a full `fsck`, the system keeps certain data structures in the core for validating the space usage and inode usage. The space needed depends on the number of inodes and the number of blocks in the file system. The `fsck` command needs approximately 16 MB per 1 TB for an 8K block size file system (128 MB per 1 TB for a 1K block size file system) and 32 MB per million inodes. Sufficient memory and swap space should be configured on the system before running a full `fsck` on a large file-enabled system. If the system is booted through a 32-bit kernel, a full `fsck` of file systems that have a large number of blocks or large number of inodes may fail, as the total address space available for a 32-bit process is limited.

A replay `fsck` does not need a significant amount of memory and does not have these issues.

▼ Quick I/O Files Cannot Be Sparse Files

If you try to convert a sparse file to a Quick I/O file, the Oracle instance can fail if Oracle tries to write into an unallocated block. Specifically, datafiles used by the Oracle8i and Oracle9i temporary tablespace may be sparse files, so do not convert these to Quick I/O files. See the *VERITAS Database Edition for Oracle Database Administrator's Guide* for more information.

▼ Some Disk Quota Operations Do Not Function on NFS

When VxFS file systems are exported via NFS, quotas on the file system apply to users when accessing the file system from NFS clients. However, neither the Solaris nor the VxFS quota commands on the NFS client can be used to query or edit quotas. The VxFS quota commands can be used on the server to query or edit quotas.

▼ Non-Standard Command Behavior When Using Access Control Lists (ACLs)

The output of the `ls -l` command on VxFS file systems shows mask/CLASS_OBJ in place of group permissions if ACLs are in use on a file or a directory. You can determine the effective group permissions by using the `getfacl` command.

The `chmod` command changes mask/CLASS_OBJ instead of the group permissions if ACLs are in use on a file or a directory. GROUP_OBJ is not changed by `chmod`, and because effective group permissions are determined by GROUP_OBJ and CLASS_OBJ, the default group may not receive the permissions specified by `chmod`. Because `ls -l` shows mask only (which is changed by `chmod`), it only appears that the group permissions are changed as specified in `chmod`. On files with ACLs, use the `setfacl` command to manipulate permissions. On Solaris 9, the `ls` command displays these permissions the same way on UFS and VxFS.

See the following manual pages for ACL-related information: `aclcheck`(3), `aclsort`(3), `chmod`(1), `getfacl`(1), ls(1), `setfacl`(1), and `umask`(1).

▼ Files and Directories

To maximize VxFS performance, do not exceed 100,000 files in the same directory. Use multiple directories instead.

▼ 100% Full File System Cannot Be Resized

In some circumstances, the `fsadm` and `fsvoladm` commands cannot resize a 100% full file system due to lack of space for updating structural information. Check VxFS file systems on a regular basis and increase their size if they approach 100% capacity. This problem can also occur if the file system is very busy. Free up space or reduce activity on the file system and try the resize again.

▼ Data Integrity Issues With Disks and Disk Arrays With Write-Back Caches

Disk drives configured to use a write-back cache, or disk arrays configured with a volatile write-back cache, can exhibit data integrity problems. The problems occur after a power failure, SCSI bus reset, or other event in which the disk has cached data, but has not yet written it to non-volatile storage. Contact your disk drive or disk array manufacturer to determine whether your system disk drives use a write-back cache, and if the configuration can be changed to disable write-back caching.

▼ Disable QuickLog Device Logging Before Upgrading to Disk Layout Version 5

Because of the VxFS Version 5 disk layout change, you must disable QuickLog logging on any file systems mounted with the `mount qlog=` option before upgrading from disk layout Version 4. See the *VERITAS File System Installation Guide* for information on upgrading from older disk layout versions.

Note QuickLog does not operate on the Version 6 disk layout introduced in VxFS 4.0.

▼ Display Problem Using the Online Help

Selecting a hyperlink from the last item in a list of items in the online help may result in the new display starting before the beginning of the expected text. It may then be necessary to scroll through the displayed text to find the information.

▼ JumpStart Enterprise Toolkit Not Supported

The JumpStart Enterprise Toolkit is not supported in this release, but will be supported in the next release.

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: 1-650-527-0300
- Email: license@veritas.com
- Fax: 1-650-527-0952

For software updates:

- Email: swupdate@veritas.com

For information on purchasing VERITAS products:

- Phone: 1-800-327-2232
- Email: sales.mail@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 Web site at:

http://support.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 TechNotes 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.

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 feature. For support and licensing information, refer directly to the license kits, not the contact information provided above and in the VERITAS File System documentation.

The VRTSexplorer Diagnostic Program

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 software disc. For more information about the VRTSexplorer program, consult the README file located in the support directory.

Downloading VRTSexplorer from the Web

1. Use a web browser or the ftp program to download the VRTSexplorer program from the following URL:

   ftp://ftp.veritas.com/pub/support/vxexplore.tar.Z

   Save the file to a temporary directory, such as /tmp, as shown in the example session below.

2. Log in as root on the system that is experiencing the problem. Extract the contents of the downloaded file to the directory /tmp/VRTSexplorer:

   ```
   # cd /tmp
   # zcat vxexplore.tar.Z | tar xvf -
   ```

3. Run the VRTSexplorer program located in the VRTSexplorer directory:

   ```
   # /tmp/VRTSexplorer/VRTSexplorer
   ```

4. When VRTSexplorer prompts for a destination directory for the information that it collects, press Return to accept the default directory /tmp, or enter an alternative path name of your own choice. VRTSexplorer writes the results of its analysis to a compressed tar file named VRTSexplorer_*casenumber_hostname*.tar.Z in the specified directory.

5. Use the file upload facility of your web browser, or the ftp program, to transfer the VRTSexplorer output file to the VERITAS Customer Support anonymous FTP site:

   ftp://ftp.veritas.com/incoming

6. Telephone VERITAS Technical Support at the number listed under "Getting Help" on page 21. Tell them that you have run VRTSexplorer and provide the name of the file that you transferred to the FTP site.

   Alternatively, if you have already been assigned a call ID number by Customer Support, send email to support@veritas.com and include your case ID number in the subject line.

Installing VRTSexplorer from the VERITAS Software Disc

The VRTSspt package is included on the VERITAS software disc under the /support directory. To load the software from the software disc:

1. Log in as superuser.

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

3. If Solaris volume management software is running on your system, when you insert the VERITAS software disc it is automatically mounted as /cdrom/cdrom0.

4. If Solaris volume management software is not available to mount the VERITAS software disc automatically, you must mount it manually. After inserting the disc, enter:

   ```
   # mount -F hsfs -o ro /dev/dsk/c0t6d0s2 /cdrom/cdrom0
   ```

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

5. Move to the support directory and install the VRTSspt package:

   ```
   # cd /cdrom/cdrom0/support
   # pkgadd -d . VRTSspt
   ```

6. The program is installed in the /opt/VRTSspt directory and takes approximately 500 KB of disk space. To run the program, enter:.

   ```
   # /opt/VRTSspt/VRTSexplorer/VRTSexplorer
   ```

7. Use the file upload facility of your web browser, or the ftp program, to transfer the VRTSexplorer output file to the VERITAS Customer Support anonymous FTP site:

   ```
   ftp://ftp.veritas.com/incoming
   ```

8. Telephone VERITAS Customer Support at the number listed under "Getting Help" on page 21. Tell them that you have run VRTSexplorer and provide the name of the file that you transferred to the FTP site.

   Alternatively, if you have already been assigned a call ID number by Customer Support, send email to support@veritas.com and include your case ID number in the subject line.

Removing the VRTSspt Package

To remove the VRTSspt package, enter:

```
# pkgrm VRTSspt
```