VERITAS File System 4.1 Release Notes

HP-UX 11i v2

Fourth Edition

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1. VERITAS File System 4.1 Release Notes

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Preface

The document provides information on VERITAS File System 4.1. This version of VxFS operates only on the HP-UX 11i v2 September 2004 (or later) release installed.

Conventions

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

Table 1

Typeface	Usage	Examples
`monospace`	Computer output, file contents, 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.
italic	New terms, book titles, emphasis, variables to be replaced by a name or value	See the *VERITAS File System 4.1 Release Notes* for details.
monospace *(bold and italic)*	Variables to be replaced by a name or value in user input	`# `**`mount -F `***`fstype`* *`mount_point`*

Symbol	Usage	Examples
`%`	C shell prompt	Not applicable
`$`	Bourne/Korn/Bash shell prompt	Not applicable

Table 1   **(Continued)**

Typeface	Usage	Examples
#	Superuser prompt (all shells)	Not applicable
\	Continued input on the following line	# **mount -F vxfs ** **/h/filesys**
[]	In a command synopsis, brackets indicate an optional argument	ls [-a]
|	In a command synopsis, a vertical bar separates mutually exclusive arguments	mount [suid | nosuid]

Getting Help

For license information (U.S. and Canadian Customers) contact:

- Phone: 650-960-5111
- Email: hplicense@mayfield.hp.com

For license information (Europe) contact:

- Phone :+33.(0)4.76.14.15.29
- Email: codeword_europe@hp-france-gen1.om.hp.com

For the latest patch information contact:

- http://itrc.hp.com

For Technical Support contact:

- http://welcome.hp.com/country/us/en/support.html

1 VERITAS File System 4.1 Release Notes

This document provides information on VERITAS File System Release 4.1. HP recommends you review the entire document before installing Base-VXFS 4.1 SD-Bundle. The following topics are discussed in this guide:

New Features and Changes

VxFS 4.1 has the following new features and changes:

- **Applications using `statvfsdev(3C)` interface need to relink with new LIBC**

  The applications which use statvfsdev(3C) interface on a device name, need to relink with the new LIBC to be able to understand disk layout Version 6, supported by VxFS 4.1. If the applications are not relinked, they will not be able to recognize disk layout version 6 filesystem. However, they would continue to recognize disk layout Version 4 and 5 filesystem.

- **Large File Systems and Large File Support**

  This release is the first release to support a new disk layout (Version 6) that enables the creation of files and file systems up to 256 TB in size. File systems created on VxFS 4.1 will by default use the Version 6 disk layout. File systems larger than 1TB can be created

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only on 64-bit kernels and must be created on VERITAS Volume Manager volumes. The 64 TB file system requires a 4 K block size, and a 128 TB or larger file system requires an 8 K block size. File systems over 32 terabytes are called extra large file systems and to create them the user must have a license.

You can use the online conversion utility `vxupgrade`, to upgrade existing disk layouts to Version 6 on mounted file systems.

NOTE	In this release of Base-VXFS 4.1 file sizes can grow only up to 2 TB.

- **Reverse Path 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` command. Reverse path name lookup can be useful in a variety of applications, such as:

  — Clients of the VxFS 4.1

  — File Change Log feature

  — `backup` and `restore` utilities.

  — In replication products

  There is a new command associated with this feature:

  `vxlsino`   VxFS 4.1 reverse path name lookup utility.

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

  `vxfs_inotopath`   Returns path names for a given inode number.

  `vxfs_inotopath_gen`   Returns path names for a given inode number with a specific generation count.

- **Intent Log Resize**

  The `log` option of the `fsadm` command for Version 6 disk layout, can be used to resize the intent log. Dynamically changing the intent log size can improve system performance. The maximum intent log size is now 2 gigabytes. See the *VERITAS File System 4.1 Administrator's Guide* and the *mkfs_vxfs(1M)* and *fsadm_vxfs(1M)* manpages for more information on `intent log` size.

- **Named Data Streams**

  Traditional UNIX files have an inode identifier and a single stream of file data. Use named data streams to retain and asociate inodes with multiple data streams. In Base-VXFS 4.1, 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.

VxFS 4.1 named data stream functionality is available 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.

- **Other VxFS 4.1 Enhancements**

  — 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. You must use the vxfsconvert command to convert them to a disk layout version that can be mounted.

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

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

  — The delaylog option is the default intent logging mount option. Use the mount command delaylog option to cache data to improve performance. See the *VERITAS File System 4.1 Administrator's Guide* for more information.

  — You can remove the default storage checkpoint creation.

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

  — The histlog function has been 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, have been added to the vxtunefs command. See the *vxtunefs(1M)* manpage for more information.

More VxFS 4.1 functions can be performed from the VERITAS Enterprise Administrator GUI.

The vxfsu_get_ioffsets library call has been renamed vxfs_get_ioffsets.

- **VxFS Enhancement**

The `vx_ninode` and `vxfs_bc_bufhwm` can be dynamically tuned without rebooting the machine. The changes take effect immediaely, although they can be optionally made to take effect only after a reboot. See the *VERITAS File System 4.1 Administrator's Guide* for more information.

End of Product Support

The VxFS 4.1 release does not support the creation or mounting of file systems using the Version 3 disk layouts. VxFS 4.1 still provides the capability to upgrade to Version 3 disk layouts using the `vxfsconvert` utility. VERITAS recommends that you upgrade all older disk layouts.

The next major release will be the last to support the Version 4 and Version 5 disk layouts. HP recommends that you upgrade file systems using these older disk layouts to Version 6. See "Compatibility With Previous Versions of VxFS" on page 11 for more information on upgrading.

The QuickLog feature is not available in the VxFS 4.1 release. The multi-volume support feature replaces most of the functionality provided by QuickLog. See the *VERITAS File System 4.1 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 disk layout Version 5 cluster file systems. You must 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.

Unsupported Features

The following features are not supported in this release:

- VERITAS Quick I/O for Databases
- VERITAS QuickLog
- VERITAS FlashSnap
- Storage Checkpoints

- Cluster File Systems

- Moving VERITAS Volume Manager Volumes or VERITAS File Systems from HP-UX 11i Version 1 to HP-UX 11i Version 2 systems has not yet been tested and is not supported.

Compatibility With Previous Versions of VxFS

VxFS 4.1 file systems employ disk layout Version 6. With the VxFS 4.1 release, you can no longer create or mount Version 3 disk layout file systems. Base-VxFS 4.1 is the last major release to support disk layout Version 4 and Version 5. HP recommends upgrading any previously installed VxFS file system to Version 6 disk layout available with VxFS 4.1.

Before or after installing VxFS 4.1, 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.

You must read this guide for more information on upgrading from previous file system disk layout versions.

CAUTION	VxFS file systems must be cleanly unmounted before upgrading to the VERITAS File System 4.1 release from any previous release.

Patches Required

For a list of the required HP-UX patches, see the *VERITAS 4.1 Installation Guide*.

NOTE	If HP Logical Volume Manager (LVM) is used with disk layout Version 6 and Base-VXFS 4.1, the LVM patch PHCO_33308 needs to be installed. This patch provides the correct LIBC relink with LVM.

If LVM is used the user needs to install the following patches as a safeguard for potential data corruption.

- **LVM**

  The default disk layout of VxFS 4.1 is version 6. When reducing a volume, LVM checks on the volume to prevent part of the existing filesystem from getting lost. Likewise, when an LVM physical volume is created, LVM checks to make sure that it is not clobbering an existing filesystem. LVM does not recognize a VxFS 4.1 filesystem with disk layout version 6. To make LVM work with disk layout version 6, `PHCO_33308` needs to be installed.

- **swapon**

  `PHCO_33238` must be installed on the system for `swapon` command to enable VxFS 4.1 filesystem for paging.

Documentation

The *VERITAS File System 4.1 Administrator's Guide* and the *VERITAS File System 4.1 Release Notes* are available for download from `http://www.software.hp.com`. These documents are provided as PDF files. To view or print PDF documents, you need the Adobe Acrobat Reader.

Online Manpages

This release includes the following online manual pages:

Table 1-1   VERITAS Filesystem 4.1 Manpages

Section 1M	Description
extendfs_vxfs	Extend the size of VxFS file system.
getext	Gets extent attributes for a VxFS file system.
setext	Sets extent attributes on a file in a VxFS file system.
df_vxfs	Reports the number of free disk blocks and inodes for a VxFS file system.

Table 1-1   **VERITAS Filesystem 4.1 Manpages (Continued)**

ff_vxfs	Lists file names and inode information for a VxFS file system.
fsadm_vxfs	Resize or defragment a VxFS file system.
fscat_vxfs	Cats a VxFS file system.
fsck_vxfs	Checks and repairs a VxFS file system.
fsdb_vxfs	VxFS file system debugger.
fstyp_vxfs	Returns the type of file system on a specified disk partition.
mkfs_vxfs	Constructs a VxFS file system.
mount_vxfs	Mounts a VxFS file system.
ncheck_vxfs	Generates path names from inode numbers for a VxFS file system.
vxdump	Incremental file system dump.
vxfsconvert	Converts an unmounted file system to VxFS or upgrades a VxFS disk layout version.
vxfsstat	Displays file system statistics.
vxrestore	Restores a file system incrementally.
vxtunefs	Tunes a VxFS file system.
vxupgrade	Upgrades the disk layout of a mounted VxFS file system.
Section 4	**Description**
fs_vxfs	Format of a VxFS file system volume.
inode_vxfs	Format of a VxFS file system inode.
tunefstab	VxFS file system tuning parameters table.
Section 7	**Description**
vxfsio	VxFS file system control functions.
vxlsino	VxFS reverse path name lookup utility.
vxumount	Unmount a VxFS File System

Command Summary

This release includes the following commands:

Table 1-2   **VERITAS File System 4.1 Commands**

Command	Description
df	Reports the number of free disk blocks and inodes for a VxFS file system.
extendfs	Extend a VxFS file system size.
ff	Lists file names and inode information for a VxFS file system.
fsadm	Resize or defragment a VxFS file system.
fscat	Cats a VxFS file system.
fsck	Checks and repairs a VxFS file system.
fsdb	VxFS file system debugger.
fstyp	Returns the type of file system on a specified disk partition.
getext	Gets extent attributes for a VxFS file system.
mkfs	Constructs a VxFS file system.
mount	Mounts a VxFS file system.
ncheck	Generates path names from inode numbers for a VxFS file system.
newfs	Creates a new VxFS file system.
setext	Sets extent attributes on a file in a VxFS file system.
vxdump	Incremental file system dump.
vxedquota	Edits user quotas for a VxFS file system.
vxfsconvert	Converts an unmounted file system to VxFS or upgrades a VxFS disk layout version.
vxfsstat	Displays file system statistics.

Table 1-2   **VERITAS File System 4.1 Commands (Continued)**

Command	Description
vxlsino	VxFS reverse path name lookup utility.
vxrestore	Restores a file system incrementally.
vxtunefs	Tunes a VxFS file system.
vxupgrade	Upgrades the disk layout of a mounted VxFS file system.
vxumount	Unmount a VxFS File System

Software Issues in VxFS 4.1

- **Systems With Less Cache Memory Hang**

  VxFS 4.1 allocates a fixed amount of memory. You can change the amount of memory allocated using the tunables vx_ninode and vx_bc_bufhwm. After long hours of operation, low-memory systems (that is, systems having less physical RAM), may slow down or hang due to memory pressure. To alleviate this problem, lower the values of vx_ninode and vx_bc_bufhwm to limit VxFS 4.1 memory consumption. The vx_ninode and vxfs_bc_bufhwm can now be dynamically tuned without rebooting the machine.

NOTE   VxFS 4.1 consumes a fixed percentage of memory for storing the default values of tunables such as vx_ninode and vx_bc_bufhwm. For the default value value of vx_ninode VxFS consumes nearly 10% of total physical memory. If the system has 512 MB of memory, VxFS 4.1 will require up to 52 MB to store the VxFS 4.1 inode cache. Therefore it is necessary to tune the tunables according to the type of load on the system.

- **Tuning Down the Inode Cache**

  VxFS 4.1 file systems allocate and release inodes based on the file system load. Generally, larger inode caches help the file systems to perform better in case of a file server or web server load. The global dynamic tunable, vx_ninode, determines the maximum possible size of the VxFS 4.1 inode cache. If the default value of vx_ninode is set to zero, VxFS 4.1 automatically tunes the size of the inode cache at boot time, based on the size of the

physical memory on the system. On systems with a RAM size of less than or equal to 1 GB per CPU, you can manually tune down vx_ninode to a value not less than that of nfile (nfile is an HP-UX tunable that represents the maximum number of file descriptors).

- **Tuning Down the Buffer Cache**

  VxFS 4.1 implements a private buffer cache to use exclusively for metadata. The allocations to this buffer cache vary during system usage based on file system load and the maximum cache size specified in the global (static) tunable, vx_bc_bufhwm. If the value of vx_bc_bufhwm is set to zero, VxFS 4.1 automatically tunes the maximum size of the metadata buffer cache at boot time, based on the system memory size. On systems with a RAM size of 1 GB per CPU or less, you can manually tune down the value of vx_bc_bufhwm to a minimum of 6144 (6MB).

- **Full File System Cannot Be Resized**

  The fsadm command cannot resize a 100% full file system due to lack of space for updating structural information. You must check VxFS file systems on a regular basis and increase their size if they approach 100% capacity. If a file system is busy or too fragmented, the resize operation can also fail.

- **Data Integrity Issues with Disks and Disk Arrays with Write-back Caches**

  Data integrity problems occur in disk drives and disk arrays after power failure or SCSI bus reset. This problem occurs as the cached data has not been written to non-volatile. Contact your disk drive or disk array manufacturer to determine whether your disk drives use a write-back cache, and if the configuration can be changed to disable write-back caching.

- The command **fsadm** **Cannot Truncate a Directory**

  The fsadm command cannot truncate a directory if it has only one extent that is more than two blocks in length, even if all the directory entries are deleted.

- **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.

- **Some Fields Not Displayed by the fstyp Command**

  The fstyp -v option displays information on super-block. For the Version 4 and Version 5 disk layout, some information is no longer in the super-block, so fields such as nau, logstart, or logend display zeros. nau can be computed using the following formula:

  nau = (size + aulen - 1) / aulen

  fstyp -v displays the size and aulen fields. You can use mkfs -F vxfs -m

raw_device_file to display fields that are not part of super-block. See the *mkfs_vxfs(1M)* and *mkfs(1M)* manual pages for more information.

- **A Change in the Method of Computing CUT Values May Cause Misleading Error Messages to Display.**

    In this release, the method for computing the Current Usage Table (CUT) values for a Version 2 file system has changed.

    If a Version 2 file system is mounted on a system running Base-VXFS 4.1, and that file system is subsequently used on an earlier version of Base-VXFS 4.1, the following messages may display when performing a full fsck:

    vxfs fsck: incorrect CUT entry for filest 1, fix? (ynq)

    vxfs fsck: incorrect CUT entry for filest 999, fix? (ynq)

    This is expected and does not indicate file system corruption. Answer y to both questions. There is no need to perform a full fsck when moving such a file system to and from different versions of VxFS 4.1 unless the file system is dirty, in which case a full fsck is required.

- **Non-standard Command Behavior When Using Access Control Lists (ACLs)**

    The output of the ls -l command on VxFS 4.1 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. Use of chmod command is not advisable on files with ACLs. Instead, use the getfacl command to manipulate permissions.

    In the next release of VxFS, the behavior of both mask /CLASS_OBJ and GROUP_OBJ will change after executing the chmod command. Even in that case, using the getfacl command is advisable for manipulating permissions.

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

- **The newfs -R Command Allows Reserving Swap Space Larger Than the Device**

    The newfs -R command will reserve swap space greater than is available on the underlying device. This problem will be addressed in a future patch release from HP.

Product Licensing

The Base-VXFS 4.1 SD-Bundle includes all features that are part of the full VxFS. Users can enable the related features with existing VxFS 3.5 licenses. However you have reapply the VxFS 3.5 licences as follows:

```
# /sbin/fs/vxfs4.1/vxenablef -a
```