

Veritas Storage Foundation™ Release Notes

Linux for IBM System p

5.0



Veritas Storage Foundation Release Notes

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Storage Foundation 5.0

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Veritas Storage Foundation is a licensed product. See the *Veritas Storage Foundation Installation Guide* for license installation instructions.

Technical support

For technical assistance, visit

http://www.symantec.com/enterprise/support/assistance_care.jsp

and select phone or email support. Use the Knowledge Base search feature to access resources such as TechNotes, product alerts, software downloads, hardware compatibility lists, and our customer email notification service.

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Veritas Storage Foundation Release Notes

This document provides release information about the products in the Veritas Storage Foundation 5.0 Linux product line for the IBM System p™ platform featuring IBM POWER5™ technology:

- Veritas Storage Foundation (Basic, Standard, and Standard HA)
- Veritas Storage Foundation for Sybase (Standard)

Note: Veritas Storage Foundation QuickStart is not available in this release.

Each of these Symantec products is activated by a single license key. You must obtain a license key before installing the product. For information on obtaining a license key, see the *Veritas Storage Foundation Installation Guide*.

Note: For the latest information on updates, patches, and software issues regarding this release, see the following TechNote on the Symantec Technical Support website:

<http://support.veritas.com/docs/285834>

Review this entire document before installing your Veritas Storage Foundation product.

This document does not contain release information for Veritas Cluster Server (VCS).

See the *Veritas Cluster Server Release Notes*.

This release does not include the following products:

- Veritas Storage Foundation Enterprise
- Veritas Storage Foundation Enterprise HA
- Veritas Storage Foundation Standard for DB2
- Veritas Storage Foundation Enterprise for DB2
- Veritas Storage Foundation Enterprise HA for DB2
- Veritas Storage Foundation Standard for Oracle
- Veritas Storage Foundation Enterprise for Oracle
- Veritas Storage Foundation Enterprise HA for Oracle
- Veritas Storage Foundation Enterprise for Oracle RAC
- Veritas Storage Foundation Enterprise for Sybase
- Veritas Storage Foundation Enterprise HA for Sybase
- Veritas Storage Foundation Cluster File System
- Veritas Storage Foundation Cluster File System HA
- Veritas Volume Replicator

Support for these products will be provided in a future release on the IBM System p platform.

Storage Foundation product suites

The following table lists the Veritas products and optionally licensed features available with each Storage Foundation product suite.

Storage Foundation Version	Products and Features
Storage Foundation Basic	Veritas Volume Manager Veritas File System
Storage Foundation Standard	Veritas Volume Manager Veritas File System
Storage Foundation Standard HA	Veritas Volume Manager Veritas File System Veritas Cluster Server
Storage Foundation for Sybase Standard	Veritas Storage Foundation for Sybase Veritas Volume Manager Veritas File System Veritas Extension for Sybase Disk Manager Option

Product descriptions

Veritas Volume Manager

Veritas Volume Manager is a storage management tool that removes the physical limitations of disk storage so that you can configure, share, manage, and optimize storage I/O performance online without interrupting data availability. VxVM also provides easy-to-use, online storage management tools to reduce planned and unplanned downtime.

Veritas File System

Veritas File System provides high performance and online management capabilities to facilitate the creation and maintenance of file systems. File systems are a collection of directories organized into a structure that enable you to locate and store files.

The primary purposes of a file system are to:

- Provide shared access to data storage.
- Provide structured access to data.
- Control access to data.
- Provide a common, portable application interface.
- Enable the manageability of data storage.

Veritas Storage Foundation for Databases

Veritas Storage Foundation for Databases combine the strengths of the core Veritas products with database-specific enhancements to offer unrivaled performance, availability, and manageability for databases.

Note: Only the Veritas Storage Foundation for Sybase Standard product is available as a database edition in this release.

The database feature options are as follows.

Veritas Storage Checkpoint option

Veritas Storage Checkpoint technology lets you create a point-in-time image of a file system. Storage Checkpoints are treated like any other VxFS file system and can be created, mounted, unmounted, and removed.

This option is available with the Enterprise versions of Veritas Storage Foundation for DB2, Veritas Storage Foundation for Oracle, and Veritas Storage Foundation for Sybase.

Veritas Cluster Server

Veritas Cluster Server provides an open systems clustering solution that eliminates both planned and unplanned downtime, facilitates server consolidation and failover, and effectively manages a wide range of applications in heterogeneous environments.

System requirements

Supported Linux operating systems

The Veritas 5.0 release operates on the architectures and operating systems shown below. Veritas supports only those kernel binaries distributed by Red Hat and SUSE:

- Red Hat Enterprise Linux 4 (RHEL 4) with Update 3 or 4 (2.6.9-34, 42 kernels) on IBM System p servers (using IBM POWER5 processors). Later updates of RHEL4 are supported provided that Red Hat maintains kernel application binary interface (kABI) compatibility.
- SUSE Linux Enterprise Server 9 (SLES 9) with SP3 (2.6.5-7.244, 252, 276 kernels) on IBM System p servers (using IBM POWER5 processors).

Note: If your system is running an older version of either Red Hat Enterprise Linux or SUSE Linux Enterprise Server, you must upgrade it before attempting to install the Veritas Storage Foundation software. Consult the Red Hat or SUSE documentation for more information on upgrading your system.

Supported Linux operating system updates

Veritas products will operate on subsequent kernel and patch releases provided the operating systems maintain kernel ABI (application binary interface) compatibility.

Information about the latest supported Red Hat erratas and updates and SUSE service packs is available in the following TechNote. Read the following TechNote *before* installing any Veritas product.

<http://support.veritas.com/docs/285834>

Memory requirements

A minimum of 1 GB of memory is strongly recommended.

Supported Sybase versions

Sybase versions 12.5 and 15.0 are supported on Linux for IBM System p (ppc64).

Software and hardware requirements

The hardware compatibility list (HCL) contains the latest information about supported hardware and software and is updated regularly.

Note: Before installing or upgrading Veritas Volume Manager, review the current compatibility list to confirm the compatibility of your hardware and software.

The HCL is available at:

<http://support.veritas.com/docs/283161>

The hardware TechNote is available at:

<http://support.veritas.com/docs/283282>

If you do not find your hardware or software listed or if you have questions about the information in the compatibility list, contact Veritas Technical Services.

VxVM licenses

The following table shows the levels of licensing in Veritas Volume Manager and the features supported at each level:

VxVM License	Description of Supported Features
Full	Concatenation, spanning, volume resizing, multiple disk groups, co-existence with native volume manager, striping, mirroring, DRL logging for mirrors, striping plus mirroring, mirroring plus striping, RAID-5, RAID-5 logging, Smartsync, hot sparing, hot-relocation, online data migration, online relayout, volume snapshots, volume sets, Intelligent Storage Provisioning, FastResync with Instant Snapshots, Storage Expert, Device Discovery Layer (DDL), Dynamic Multipathing (DMP), and Veritas Enterprise Administrator (VEA).
Add-on Licenses	Features that augment the Full VxVM license such as clustering functionality (cluster-shareable disk groups and shared volumes) and Veritas Volume Replicator.

Note: You need a Full VxVM license to make effective use of add-on licenses to VxVM.

To see the license features that are enabled in VxVM, enter the following command:

```
# vxctl license
```

Importing VxVM disk groups and VxFS file systems

As this is the first release that supports IBM System p servers, no upgrade path is possible for such systems. It is possible to deport disk groups from releases of VxVM on other supported Linux systems, and to import these disk groups on VxVM 5.0 running on an IBM System p server. However, because of endian differences in byte order between the IBM POWER5 system architecture and the x86_32, x86_64 and some IA64 system architectures, it may not be possible for applications to access the data within volumes in these disk groups unless this data is converted.

See [“Upgrading VxFS disk layout versions”](#) on page 14.

See [“Upgrading VxVM disk group versions”](#) on page 14.

Upgrading VxFS disk layout versions

VxFS 5.0 file systems employ disk layout Version 7 by default. Veritas recommends upgrading any previously installed VxFS file system to the Version 7 disk layout to make use of the extended features available in the VxFS 5.0 release. You can do this only after installing VxFS 5.0.

Use the `vxupgrade` command to upgrade the disk layout on mounted file systems with Version 4 and 6 to Version 7.

See the `vxupgrade(1M)` manual page.

See the *Veritas Storage Foundation Installation Guide*.

Note: The `vxfsconvert` utility is not supported in this release on the IBM System p platform.

Upgrading VxVM disk group versions

All disk groups have a version number associated with them. Each VxVM release supports a specific set of disk group versions and can import and perform tasks on disk groups with those versions. Some new features and tasks work only on disk groups with the current disk group version, so you need to upgrade existing disk groups before you can perform the tasks.

The following table summarizes the disk group versions that correspond to each VxVM release on Linux from 3.2 to the present.

Veritas Volume Manager Release	Cluster Protocol Versions	Disk Group Version	Supported Disk Group Versions
3.5	n/a	90	90
4.0	50	110	90, 110
4.1	60	120	90, 110, 120
5.0	70	140	90, 110, 120, 140

If you want to take advantage of the new features in this release, you must upgrade the *Veritas Cluster Volume Manager* (CVM) protocol Version (70), and upgrade to the latest disk group version (140).

Use the following command to find the version of a disk group:

```
# vxdg list diskgroup
```

You can also determine the version by using the `vxprint(1M)` command with the `-l` option.

To upgrade a disk group to Version 140, use the following command:

```
# vxdg upgrade diskgroup
```

For shared disk groups, the latest disk group version is only supported by the latest cluster protocol version. To see the current cluster protocol version, type:

```
# vxdctl support
```

To upgrade the protocol version for the entire cluster, enter the following command on the master node:

```
# vxdctl upgrade
```

See the “Administering Cluster Functionality” chapter of the *Veritas Volume Manager Administrator’s Guide*.

Known issues

Veritas Storage Foundation known issues

The following sections contain information about known problems and issues in this release of Storage Foundation.

Software disc cannot be ejected during installation

During installation, if any of the products were configured and started, the software disc cannot be ejected. This may prevent installation from continuing in following circumstances:

- If the language pack disc needs be loaded so that the associated packages can be installed.
- A product was installed that did not require a system reboot to complete the installation.

This problem is not an issue if a product was installed or upgraded that required a system reboot to complete the installation.

To avoid this problem at install time

- 1 Specify the `-installonly` option to the `installer` script in addition to any other options.
- 2 Eject the software disc.
- 3 Run the `installer` script with the `-configure` option specified.

If a software disc cannot be ejected

- 1 Stop the event source daemon:

```
# /usr/sbin/vxddladm stop eventsource
```
- 2 Kill the `vxcached`, `vxrelocd` and `vxnotify` processes by using the `kill -9` command with their process IDs as reported by the `ps` command.
- 3 Eject the software disc.
- 4 Restart the VxVM daemon processes:

```
# /usr/sbin/vxddladm start eventsource  
# /etc/vx/bin/vxcached  
# /etc/vx/bin/vxrelocd
```

[622442]

Persistent network interface names on SUSE clusters

On SUSE systems, network interfaces can change their names following a reboot. To configure persistent network interface names, add a `PERSISTENT_NAME=ethX` entry to the `/etc/sysconfig/network/ifcfg-eth-id-mac_address` network interface configuration file for each interface on each node of the cluster, where `X` and `mac_address` correspond to the interface number and MAC address.

DBMS security issue

The Symantec Shared DBMS feature creates the following configuration files:

- `/etc/vxdbms/VERITAS_DBMS3_hostname/conf/databases.conf`
- `/etc/vxdbms/VERITAS_DBMS3_hostname/conf/databases1.conf`
- `/etc/vxdbms/VERITAS_DBMS3_hostname/conf/registration.dat`

These configuration files are created or modified by `vxdbms_start_db.pl`, `vxdbms_start-server.pl`, and `vxdbms_register.pl` respectively.

The files are writable by everyone if the file mode creation mask is insufficiently restrictive. Symantec strongly recommends that you restrict the default file mode creation permissions (using the `umask` command) for root and administrator accounts to avoid a potential security issue. Specifically, change the `group|world` write and execute permissions in the default `umask`. At its least restrictive, the default `umask` for root should be `022`. Symantec recommends setting to `077`.

Veritas Volume Manager known issues

The following sections contain information about known problems and issues in this release of VxVM.

Installation issues

Veritas Volume Manager fails to start on an unsupported kernel

If you attempt to install the Veritas software on an unsupported kernel, an error such as the following is displayed:

```
ERROR: No appropriate modules found. Error in loading module
"vxdump".
```

This message is also listed in the log file, `/etc/vx/.cpi_vm_rpm_msg`. You must upgrade your system to a supported kernel version.

Support for hardware RAID controllers

Veritas Volume Manager 5.0 for Linux does not currently support most hardware RAID controllers unless they present SCSI device interfaces (with names of the form `/dev/sdx`). The PERC (for example, on the Dell 1650), MegaRAID (for example, on the Dell 2650), and ServeRAID (for example, on x440 systems) controllers are supported. Compaq array controllers that require the Smart2 and CCISS drivers (which present device paths such as `/dev/ida/c#d#p#` and `/dev/cciss/c#d#p#`) are supported for normal use.

EFI disk support

Disks with an Extensible Firmware Interface (EFI) are supported for general-purpose usage. Such disks are usually formatted with a GUID Partition Table (GPT) that supports up to 128 partitions and disk sizes greater than 2TB.

The following features are *not* supported:

- Formatting of EFI disks as Cross-platform Data Sharing (CDS) compatible disks.
- Encapsulation of EFI root disks.

Avoiding overwriting of non-boot disks

To avoid the possibility of non-boot disks that contain portions of the operating system being overwritten by the VxVM initialization routines, use `vxdiskadm` option 17 selection 2 (suppress a path from VxVM's view) to hide such disks from VxVM.

Supported disk labels

VxVM can recognize and manipulate disks that have a `sun` or an `msdos` disk label. Root disk encapsulation is only supported for disks with `msdos` labels (see “[Rootability issues](#)” on page 19 for details).

Disks under devfs control

Veritas Volume Manager 5.0 for Linux does not support disks under `devfs` control.

Migration from LVM

The `vxvmconvert` utility is provided to help you migrate from Sistina LVM and LVM2 volumes to VxVM volumes. For more information, see Appendix B “Migrating from Sistina LVM to Veritas Volume Manager” in the *Veritas Volume Manager Administrator's Guide*. The version of LVM2 that can be used with the LVM converter is 2.00.33 or later.

Removing a disk from VxVM control

After evacuating any data, you can remove a disk from Veritas Volume Manager control by using the low-level `vxdiskunsetup` command to remove the VM metadata partition from the disk:

```
# /usr/lib/vxvm/bin/vxdiskunsetup sdX
```

Caution: This operation can result in data loss if used incorrectly. Ensure that you have evacuated or backed up any data on the disk.

Rootability issues

Encapsulation and mirroring of the root disk (rootability) is not supported in this release on the IBM System p platform.

Utility issues

LVM conversion fails or produces error messages under RHEL4

If the `vxvmconvert` command is run on a Red Hat Enterprise Linux 4 Update 3 system, it fails to convert an LVM volume with 5 or more extents to a VxVM volume. This is due to an underlying bug in the LVM `pvmove` command. The workaround is to upgrade the system to RHEL4 Update 4. [896683]

Global Device Naming

The Global Device Naming (GDN) option to the `vxddladm` command should only be used with the Storage Foundation Volume Server software. [608621]

Current naming scheme

There is no option in the `vxddladm` command to display the current naming scheme. The naming scheme that is in operation can be deduced from the output to the `vxdisk list` command. [611320]

vxdiskadm displays error V-5-1-9764 when excluding devices

The `vxdiskadm` operation displays error V-5-1-9764 if a vendor and product ID combination are specified to exclude devices from multipathing. This error is harmless and can be ignored. The error is not seen if controller or device names are specified instead. [587435]

Specifying an enclosure to the vxmpadm getportids command

The `enclosure` attribute should be used to specify an enclosure name to the `vxmpadm getportids` command, instead of the `enclr` attribute that is shown in the *Veritas Volume Manager Administrator's Guide* and the `vxmpadm(1M)` manual page.

Disk group is disabled if private region sizes differ

A disk group is disabled if the `vxvg init` command is used to create it from a set of disks that have pre-existing private regions that differ in size. This may occur if the disks previously belonged to disk groups in older releases of VxVM.

The workaround is to reinitialize the disks before creating the disk group (for example, by using the `vxdisk -f init` command), or to use the `vxvg adddisk` command to add the disks to the disk group after it has been created. [592180]

Maximum size of a VxVM volume

VxVM supports volume lengths up to 256TB. However, any 32-bit legacy applications that use system calls such as `seek`, `lseek`, `read` and `write` are limited to a maximum offset that is determined by the operating system. This value is usually $2^{31}-1$ bytes (1 byte less than 2 terabytes).

Resizing volumes with detached remote plexes

If a volume in a Remote Mirror configuration has detached plexes at a remote site, you can use the following procedure to resize it:

- 1 Turn off the `allsites` attribute for the volume:

```
# vxvol -g diskgroup set allsites=off volume
```
- 2 Remove the detached plexes:

```
# vxassist -g diskgroup remove mirror volume \  
plexnames=plex1,plex2,...
```
- 3 Use the `vxresize` command to resize the volume.

When the remote site comes back up:

- 1 Replace the removed plexes using storage at the remote site:

```
# vxassist -g diskgroup mirror volume nmirror=N \  
site:remote_site_name
```
- 2 Turn on the `allsites` attribute for the volume:

```
# vxvol -g diskgroup set allsites=on volume
```

NFS cannot handle minor numbers greater than 255

The NFS implementation in Linux does not support minor numbers greater than 255 unless a patch is applied (see the description of Red HAT Bugzilla Bug 143897 or SUSE Bugzilla Bug 64552 for details). Without the patch, volume devices with large minor numbers cannot be remotely mounted via NFS. The workaround is to use the `vxvg` command to change the base minor number of the disk group that contains the volumes, as shown here:

```
# vxvg -g diskgroup remminor 2
```

Resizing layered volumes during resynchronization

Due to the current implementation to handle the resize of layered volumes, it is recommended that you do not grow or shrink layered volumes (stripe-mirror, concat-mirror, and so on) during resynchronization. This limitation does not apply to ISP layered volumes.

Internally, Veritas Volume Manager converts the layout of layered volumes and updates the configuration database before it shrinks or grows their sizes. This causes any ongoing operation, such as the resynchronization, to fail.

If the system reboots before the `grow` or `shrink` of a layered volume completes, the volume is left with an intermediate layout. In such a case, use the `vxassist convert` to restore the volume to its original layout.

After a layered volume is resized, the volume names, the plex names, and the subdisk names associated with the subvolumes, are changed.

Interpreting output from `vxassist snapprint`

The output from the `vxassist snapprint` command for Persistent FastResync and Non-Persistent FastResync differs as follows:

- Persistent FastResync maintains separate tracking maps for the original volume and its snapshot volumes. The “%DIRTY” value output by `vxassist snapprint` shows information based only on what has been written to an individual volume.
- Non-Persistent FastResync keeps information about changed regions in the same map for both the original and its snapshot volumes. Even if writes are only made to the snapshot volume, `vxassist snapprint` shows the same “%DIRTY” value for the original volume.

Unsupported utilities

The `vxdiskconfig` and `vxsparecheck` utilities are not supported on the Linux platform.

Using `vx dg free` with a non-existent disk group name

Using `vx dg free` with a non-existent disk group name does not print an appropriate error message; it only prints a header. [11286]

Invalid region and partition configurations

The `vx disksetup` utility allows you to specify some region/partition configurations that are invalid. Specifically, overlapping private and public regions can be specified, but can cause failures or data corruption when the disk is actually used. You must check that the partitioning of the disk does not cause overlapping public and private partitions when the default partitioning is

overridden from the command line. This problem will be addressed in a future release. [13418]

Simultaneous creation of a mirror and a log using vxassist

The `vxassist` command does not add a mirror and a log when processing a command such as the following:

```
# vxassist mirror volume layout=log ...
```

The mirror is added, but the log is silently omitted. If a log and a mirror are to be added, add the mirror and the log in two separate `vxassist` invocations, as follows:

```
# vxassist mirror volume ...  
# vxassist addlog volume ...
```

This problem will be addressed in a future release. [13488]

Resizing a mirrored volume with plexes of different types

Resizing a mirrored volume with plexes of different types is not supported. This is documented in the `vxassist(1M)` and `vxresize(1M)` manual pages. [45668]

Relayout of a volume turns it into a layered volume

The `vxassist relayout` process can change a non-layered volume's layout to layered. For example, you might end up with a stripe-mirror volume instead of a mirror-stripe volume.

If the final layout is not what you intended, there are two solutions:

- If the task is not complete, stop the relayout and reverse it by using the following command:

```
# /usr/sbin/vxrelayout -g dg_name -t task_id reverse vol_name
```
- If the task has completed, you can relayout the volume back to the original layout.

[56184]

Specifying subdisk alignment when resizing a volume

When relayout is performed on a volume, Veritas Volume Manager does not grow subdisks such that they end on cylinder boundaries. If you subsequently increase the size of the volume, its subdisks are not grown using contiguous disk space unless you specify the attribute `layout=nodiskalign` to `vxassist`, as shown here:

```
# vxassist growby volume length layout=nodiskalign
```

Note: Specifying `layout=nodiskalign` permanently enforces this layout policy.

[57225]

Unsupported input to vxdiskadm

The `vxdiskadm` utility does not support all as input to `option 1`. To obtain a list of all devices, use the `vxconfigd` command. [85344]

Option delimiter for arguments with a leading dash

The special option “--” (two dashes) must be inserted before an argument that is not an option but that contains a leading dash. For example:

```
# vxresize -g diskgroup volume -- -size  
[89051]
```

Specifying /opt/VRTS/bin in the PATH

The path to Veritas binaries, `/opt/VRTS/bin`, should be specified at the end of the `PATH` environment variable. Otherwise, the VxFS versions of commands such as `mount` and `cp` are found instead of the standard system versions of these commands. [107758]

Relayout fails for a volume with snapshot plexes

The `SNAPATT`, `SNAPDONE`, `SNAPTMP` or `SNAPDIS` plex states are not supported for the relayout of volume configurations such as `stripe-mirror`. Relayout of such volumes fails if any of their plexes are in these states.

Workaround: For a plex in the `SNAPDONE` state, change the state of the plex to `ACTIVE` before performing the relayout:

```
# vxplex [-g diskgroup] convert state=ACTIVE plexname
```

For plexes in the `SNAPATT` or `SNAPTMP` states, either allow time for them to be synchronized and placed in the `SNAPDONE` state. You can then use the `vxplex convert` command to convert them to the `ACTIVE` state. Alternatively, you can use the `vxassist snapabort` command to remove the snapshot plexes. For snapshot plexes in the `SNAPDIS` state, dissociate and remove the plex from the volume using this command:

```
# vxplex [-g diskgroup] -o rm dis plexname
```

[126930]

Using vxvol and vxmend with layered volumes

The `vxvol` and `vxmend` commands do not handle layered volumes very well. When `vxmend` is executed on the top level volume to change the state of a volume, it is executed only on the top level volume; the change is not propagated to the lower level volumes. As a result, the volume states can become inconsistent and a subsequent `vxvol init` command might fail.

The `vxvol` command also exhibits the same problem. When a `vxvol init` command is executed on the top level volume, the change is not propagated to the volumes corresponding to its subvolumes.

Workaround: When executing the `vxvol` or `vxmend` command on a layered volume, first issue the command to the lower level volumes in a bottom-up fashion; then execute the command on the top-level volume.

In this example, a volume, `vol`, has two subvolumes, `vol-L01` and `vol-L02`. The state of the volumes is first set to `empty`, and then the initialization commands are executed:

```
# vxmend -o force -g mydg fix empty vol
# vxmend -o force -g mydg fix empty vol-L01
# vxmend -o force -g mydg fix empty vol-L02
# vxvol -g mydg init zero vol
# vxvol -g mydg init zero vol-L01
# vxvol -g mydg init zero vol-L02
```

[134932]

Warning message from vxassist when creating concatenated mirror volumes

You may see the following warning message when creating a concatenated mirror (`concat-mirror`) volume with the maximum size:

```
VxVM vxassist Warning V-5-1-364 dm:volume_name: No disk space
matches specification
```

As long as the volumes have been successfully created, you can safely ignore the message. [137344]

Device and DMP issues

Array paths remain disabled after re-enabling a switch port

The operating system may not restore the paths to a usable state after re-enabling a switch port. This problem has been seen with the Emulex HBA and the Emulex `lpfc` driver running on both Red Hat Enterprise Linux and SUSE Linux Enterprise Server systems.

The suggested workaround is to increase the SCSI timeout value to 60 seconds by running the “Adjusting Time-Out for Array Behavior” script (`set_target_timeout.sh`), which is available from the Emulex web site:

http://www.emulex.com/ts/downloads/linuxfc/linux_tools.html

[861508]

Fabric Monitoring

The Fabric Monitoring feature controls whether the Event Source daemon (`vxesd`) uses the Storage Networking Industry Association (SNIA) HBA API. This API allows DMP to improve the performance of failover by collecting information about the SAN topology and by monitoring fabric events. Note that the vendor-provided ASL must also support the use of the SNIA HBA API.

Fabric monitoring may be turned on or off by using the following `vxddladm` commands:

```
# vxddladm settune monitor_fabric=on
# vxddladm settune monitor_fabric=off
```

The current setting of `monitor_fabric` can be displayed by using the following command:

```
# vxddladm gettune monitor_fabric
```

The default setting of `monitor_fabric` is on. [784343]

Default I/O policy

The default I/O policy for Active/Active (A/A) arrays has been changed from `balanced` to `minimumq`. The default I/O policy for Asymmetric Active/Active (A/A-A) and Active/Passive (A/P) arrays has been changed from `singleactive` to `round-robin`.

QLogic HBA driver

The default API for the QLogic SNIA HBA that is supplied with Linux SUSE SP3 does not work correctly with DMP. You can download an updated driver from the QLogic website. [528448]

Re-initializing disks previously under VxVM control

If disks were previously under Veritas Volume Manager control and were used on the same host system, and the proper uninstallation procedures were *not* followed, the disk groups they represent are imported automatically after installation. If you no longer want to use these disk groups, use the `destroy` option of the `vxvg(1M)` command to remove them. Alternately, you can use `vxdiskunsetup(1M)` to remove the disks from Veritas Volume Manager control.

Caution: These operations can result in data loss. Ensure that you have evacuated or backed up any data on the disks.

Disk space required for configuration database

Disks with insufficient space (less than 65536 disk blocks) for VxVM to allocate an on-disk configuration database copy cannot be encapsulated. The database requires at least the same space as is allocated for other disks in the same disk group. This size defaults to 65536 blocks. To work around this, relocate the data on the last partition of the disk to a volume on a different disk, and free the space by reducing the partition size to 0.

The space for this database must be allocated from the beginning or the end of the disk.

Workaround: There is no workaround to the problem of insufficient space on a disk to store private VxVM information. VxVM requires at least a small region of private storage (65536 blocks) for proper disk identification.

Effect of disk errors on VxVM startup

Startup of VxVM can be severely impacted by disk errors that result in I/O operations taking a long time to fail.

Support for RAM disks and other devices

RAM disks and other devices with a sector size greater than 512 bytes cannot be used with VxVM. [130230]

Paths remain in disabled state

Paths that previously failed to Active/Active arrays, and which are now available again, may not be automatically re-enabled by the DMP restore daemon. Use the `vxdtl enable` command to re-enable such paths. [222849]

Overriding dependency on VRTSvxvm for old ASL packages

ASLs from previous releases have a dependency on the `VRTSvxvm` package. In the 5.0 release, the `VRTSvxvm` package has been split into the `VRTSvxvm-common` and `VRTSvxvm-platform` packages. To avoid an error message about a dependency on the `VRTSvxvm` package, specify the `--nodeps` option to the `rpm` command when installing such ASLs.

External disks are not visible after rebooting

If your external disks are not visible after a system reboot, it is likely that the driver for your host adapter is loaded after VxVM scans for attached storage at boot time. You are likely to experience this problem with QLogic and Emulex host adapters where the drivers are loaded by `kudzu` (on Red Hat) or `coldplug` (on SUSE) startup scripts.

Possible reasons for a host adapter to be loaded after VxVM startup include:

- The host adapter was added to a system after the operating system was installed.
- The host adapter driver was removed from the `initrd` (initial RAM disk) configuration.
- The host adapter was not detected correctly during installation.

If a host adapter driver is loaded after VxVM startup, scanning for the attached disks should make them visible to VxVM:

```
# vxdisk scandisks
```

The following command should now display the disks:

```
# vxdisk list
```

To allow VxVM to discover the attached storage at boot time, the host adapter driver must be loaded in the `initrd`. The procedures for doing this on Red Hat and SUSE systems are described below:

To add a host adapter driver to the `initrd` on a Red Hat system:

- 1 Use the `lsmod` command to identify the drivers for your host adapters:

```
# lsmod
```

Possible drivers include `qla2200` or `qla2300` for QLogic host adapters, or `lpfcdd` for Emulex host adapters.

- 2 Edit the module configuration file, `/etc/modprobe.conf`, and add an `alias` line for the host adapter to the end of the file, as shown in this example:

```
alias eth0 tg3
alias scsi_hostadapter mptbase
alias scsi_hostadapter1 mptscsih
alias scsi_hostadapter2 HBA_driver
```

where *HBA_driver* is the name of the host adapter driver.

- 3 If your system's root disk is encapsulated, use the following command to rebuild the `initrd` image:

```
# /usr/lib/vxvm/bin/vxinitrd /boot/VxVM_initrd.img `uname -r`
```

where the `uname -r` command is used to determine the version of the kernel for which the image is being created.

If your system's root disk is not encapsulated, use the following command to rebuild the `initrd` image:

```
# mkinitrd -f /boot/initrd-`uname -r`.img `uname -r`
```

- 4 Reboot the system:

```
# shutdown -now
```

When the system has rebooted, use the following command to check that the disks on the host adapter have been discovered by VxVM:

```
# vxdisk list
```

To add a host adapter driver to the `initrd` on a SUSE system:

- 1 Use the `lsmod` command to identify the drivers for your host adapters:

```
# lsmod
```

Possible drivers include `qla2200` or `qla2300` for QLogic host adapters, or `lpfcdd` for Emulex host adapters.

- 2 Edit the kernel configuration file, `/etc/sysconf/kernel`, and add the name of the host adapter driver to the list defined for the `INITRD_MODULES` parameter, as shown in this example:

```
INITRD_MODULES="aacraid HBA_driver reiserfs"
```

where *HBA_driver* is the name of the host adapter driver.

The name of the host adapter driver must come after the name of the driver that is used by the system's internal disks (`aacraid` in this example).

- 3 If your system's root disk is encapsulated, use the following command to rebuild the `initrd` image:

```
# /usr/lib/vxvm/bin/vxinitrd /boot/VxVM_initrd.img `uname -r`
```

where the `uname -r` command is used to determine the version of the kernel for which the image is being created.

If your system's root disk is not encapsulated, use the following command to rebuild the `initrd` image:

```
# mkinitrd
```

- 4 Reboot the system:

```
# shutdown -now
```

When the system has rebooted, use the following command to check that the disks on the host adapter have been discovered by VxVM:

```
# vxdisk list
```

Sporadic DMP error messages

Error messages such as the following may be displayed on the console when two or more paths are under heavy load:

```
SCSI error : <1 0 0 3> return code = 0x20000  
end_request: I/O error, dev sdr, sector 126320  
end_request: I/O error, dev sdr, sector 126328
```

The messages occur because DMP sets the `FAILFAST` flag on I/O requests. The Linux kernel is prevented from retrying an I/O request after it is delayed by a fabric event, and as a consequence, it reports this as a SCSI error. Such error messages can be ignored as this is the expected behavior, and DMP retries the I/O request on behalf of the kernel. [315361]

Hot-relocation issues

Data layout and performance after relocation

Hot-relocation does not guarantee the same layout of data or performance after relocation. It is therefore possible that a single subdisk that existed before relocation may be split into two or more subdisks on separate disks after relocation (if there is not enough contiguous space on a single disk to accommodate that subdisk). [14894]

Notification of disk information on disk failure

When a disk failure occurs, the hot-relocation feature notifies the system administrator of the failure and any relocation attempts through electronic mail messages. These messages typically include information about the device offset

and disk access name affected by the failure. However, if a disk fails completely or a disk is turned off, the disk access name and device offset information is not included in the mail messages. This is because VxVM no longer has access to this information. [14895]

Cluster Functionality Issues

Domain controller mode in CVM clusters

The slave nodes in a CVM cluster only have access to I/O objects. If non-I/O related information (for example, volume tags) are to be made available on a slave node, a command must be shipped to the Storage Agent on the master node for execution. The results are then communicated back to the slave node.

The domain controller mode of VEA allows all nodes of a CVM cluster to be placed in the same domain with a central authentication server. This allows commands to be executed on any node within the domain if the executing process has sufficient rights.

Provided domain controller mode is configured, non-I/O related information is accessible via VEA on any node in a CVM cluster.

However, even if domain controller mode is enabled in a CVM cluster, ISP commands must be run on the master node. ISP commands that are run on a slave node are not redirected to the Storage Agent on the master node. Such commands fail if they require access to non-I/O related information that is unavailable on a slave node. [603213]

Node rejoin causes I/O failures with A/PF arrays

A cluster node should not be rejoined to a cluster if both the primary and secondary paths are enabled to an A/PF array, but all the other nodes are using only the secondary paths. This is because the joining node does not have any knowledge of the cluster configuration before the join takes place, and it attempts to use the primary path for I/O. As a result, the other cluster nodes can experience I/O failures and leave the cluster.

Workaround:

- 1 Before joining the node to the cluster, disconnect the cable that corresponds to the primary path between the node and the A/PF array.
- 2 Check that the node has joined the cluster by using the following command:

```
# vxclustadm nidmap
```

The output from this command should show an entry for the node.
- 3 Reconnect the cable that corresponds to the primary path between the node and the array.

- 4 Use the following command to trigger cluster-wide failback:

```
# vxdisk scandisks
```

All the nodes should now be using the primary path. [579536]

Volume persists in SYNC state

If a node leaves the cluster while a plex is being attached to a volume, the volume can remain in the SYNC state indefinitely. To avoid this, after the plex attach completes, resynchronize the volume manually with the following command:

```
# vxvol -f resync volume
```

[20448]

Support for RAID-5 Volumes in cluster-shareable disk groups

VxVM does not currently support RAID-5 volumes in cluster-shareable disk groups. Creating or using RAID-5 volumes on shared disks may cause a system panic.

File systems supported in cluster-shareable disk groups

The use of file systems other than Veritas Storage Foundation Cluster File System (SFCFS) on volumes in cluster-shareable disk groups can cause system deadlocks.

Reliability of information about cluster-shareable disk groups

If the `vxconfigd` program is stopped on both the master and slave nodes and then restarted on the slaves first, VxVM output and VEA displays are not reliable until the `vxconfigd` program is started on the master and the slave is reconnected (which can take about 30 seconds). In particular, shared disk groups are marked “disabled” and no information about them is available during this time. The `vxconfigd` program must first be started on the master.

Error message when a node attempts to rejoin a cluster

When a node terminates from the cluster, open volume devices in shared disk groups on which I/O is not active are not removed until the volumes are closed. If this node later joins the cluster as the master while these volumes are still open, the presence of these volumes does not cause a problem. However, if the node tries to rejoin the cluster as a slave, this can fail with the following error message:

```
VxVM vxconfigd WARNING V-5-1-3031 Cannot assign minor number
```

This message is accompanied by the console message:

```
VxVM vxconfigd WARNING V-5-2192 minor number ### disk group  
group in use
```

Remote Mirror issues

Handling intermittently failing paths in a Campus Cluster

The `dmp_health_time` and `dmp_path_age` tunables control how DMP handles intermittently failing paths. The default values in VxVM 5.0 MP1 of `dmp_health_time` and `dmp_path_age` are 60 and 300 seconds respectively. The value of `dmp_health_time` represents the minimum time in seconds for which a path must stay healthy. If a path changes state between enabled and disabled on a shorter time scale than this, DMP marks the path as intermittently failing and disables I/O on the path. I/O is not re-enabled on an intermittently failing path until `dmp_path_age` seconds have elapsed without further outage. If the value of `dmp_health_time` is set to 0, DMP is prevented from detecting intermittently failing paths.

In remote mirror configurations, a site is reattached when its disks come back online. Recovery is then initiated for the plexes of a volume that are configured at that site. Depending on the configuration, recovery of the plexes can take a considerable time and consume considerable resources. To minimize the frequency of having to perform a site reattachment operation, it is recommended that you use the `vxdmpadm settune` command to configure a value smaller than 60 seconds for `dmp_health_time`, and a value larger than 300 seconds for `dmp_path_age`.

Setting site consistency on a volume

The `vxvol` command cannot be used to set site consistency on a volume unless sites and site consistency have first been set up for the disk group. [530484]

Adding a remote mirror

Adding a remote mirror to a new site for a site-consistent volume does not also create a DRL log plex or a DCO plex at that site. The workaround is to use the `vxassist addlog` command to add a DRL log plex, or the `vxsnap` command to add a version 20 DCO plex at the specified site (`site=sitename`). [533208]

Replacing a disk in a site-consistent disk group

If the `vxdiskadm` command is used to replace a disk in site-consistent disk group, the new disk is expected to be tagged with the same site name as the disk that is being replaced. If the sites do not match, `vxdiskadm` cannot complete the replacement without disabling site-consistency on the volume.

To avoid this, tag the replacement disk with same site name as the disk that is being replaced:

```
# vxdisk settag replacement_disk site=sitename
```

After tagging the replacement disk, you can use `vxdiskadm` to replace the failed disk. [536853]

Snapshot Issues

Space-optimized instant snapshots of large volumes

With the default size of the paging module (1.5MB), the creation of a space-optimized instant snapshot of a volume that is larger than 252MB fails. The workaround is to use the `vxtune` command to increase the amount of memory that is available to the paging module as shown here:

```
# vxtune volpagemod_max_memsz size
```

The value that should be used for `size` is determined by the region size and the number of volumes for which space-optimized instant snapshots are taken:

```
size_in_KB = 6 * (total_volume_size_in_GB) * (64/region_size_in_KB)
```

For example, a single 1TB volume requires around 6MB of paging memory if the region size is 64KB. If there were 10 such volumes, 60MB of paging memory would be required. [533799]

Mount operation can cause inconsistencies in snapshots

Inconsistencies can arise in point-in-time copies if any of the following snapshot operations are performed on a volume while a file system in the volume is being mounted: `vxassist snapshot`, `vxplex snapshot`, `vxsnap make`, `vxsnap refresh`, or `vxsnap restore`.

Using snapshots as root disks

It is recommended that you do not use snapshots of the root volume as a bootable volume. (A snapshot can be taken to preserve the data of the root volume, but the snapshot will not be bootable. The data from the snapshot would have to be restored to the original root volume before the system could be booted with the preserved data.)

Warning message when taking a snapshot of an SFCFS file system

When taking a snapshot of a volume containing an SFCFS file system, the following warning message may appear:

```
Plex plex detached from volume vol
```

Workaround: No action is required. This behavior is normal and is *not* the result of an error condition.

File system check of a snapshot

Normally, a file system would have no work to do when a snapshot is taken. However, if an SFCFS file system is not mounted, it is likely that the `fsck` of the snapshot will take longer than is usually necessary, depending on the I/O activity at the time of the snapshot.

Workaround: When taking a snapshot of an SFCFS file system, you should ensure that at least one of the volumes defined in the command line is mounted on the cluster master.

Intelligent storage provisioning issues

Number of columns in a RAID-5 ISP volume

If an ISP volume is created with the RAID-5 capability, the parameters `ncols` and `nmaxcols` refer only to the number of data columns, and do not include the parity column. For this reason, the actual number of columns that are created in such a volume is always one more than the number specified.

Creating application volumes

To create application volumes successfully, the appropriate licenses must be present on your system. Vendors of disk arrays may also provide capabilities that require special licenses for certain features of their hardware. [137185]

Miscellaneous issues

Disks with write-back caches

Disk drives configured to use a write-back cache, or disk arrays configured with volatile write-back cache, 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 the 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.

`man` command may display garbled output on Red Hat systems

The `man` command may display manual pages with garbled characters on Red Hat systems. To correct the problem, set the value of the `LC_ALL` environment variable in your shell to “C” as shown in this example:

```
# LC_ALL=C
# export LC_ALL
```

See incident 82099 on the Red Hat support website for more information.

Block 0 on a disk must not be overwritten

Since the disk label is stored in block 0 of a disk, block 0 must not be used (that is, no application should write any information in block 0). Special protection has been built into Veritas Volume Manager to protect block 0 from being overwritten.

Auto-import of disk groups

If a disk that failed while a disk group was imported returns to life after the group has been deported, the disk group is auto-imported the next time that the

system boots. This contradicts the normal rule that only disk groups that are (non-temporarily) imported at the time of a crash are auto-imported.

If it is important that a disk group *not* be auto-imported when the system is rebooted. It should be imported temporarily when the intention is to deport a disk group (for example, in HA configurations). Use the `-t` flag to `vx dg import`. [13741]

Volumes not started following a reboot

During very fast boots on a system with many volumes, `vxconfigd` may not be able to auto-import all of the disk groups by the time `vxrecover -s` is run to start the volumes. As a result, some volumes may not be started when an application starts after reboot.

Workaround: Check the volumes before starting the application or place a sleep (`sleep sec`) before the last invocation of `vxrecover`. [14450]

Forcibly starting a volume

The `vxrecover` command starts a volume only if it has at least one plex that is in the ACTIVE or CLEAN state and is not marked STALE, IOFAIL, REMOVED, or NODAREC. If such a plex is not found, VxVM assumes that the volume no longer contains valid up-to-date data, so the volume is not started automatically. A plex can be marked STALE or IOFAIL as a result of a disk failure or an I/O failure.

Workaround: Force the volume to start by entering the following command:

```
# vxvol -f start volume
```

Try to determine what caused the problem before you run this command. It is likely that the volume needs to be restored from backup, and it is also possible that the disk needs to be replaced. [14915]

Veritas Enterprise Administrator issues

Note: Refer to the *Veritas Storage Foundation Installation Guide* for information on how to set up and start the VEA server and client.

Remote Mirror (campus cluster)

There is no option to create site-based snapshots. [541104]

Volume tags not displayed

On Microsoft Windows systems, existing volume tags are not displayed when adding a new volume tag. [602953]

Search does not return any objects for non-Administrator users

A search that is performed by a user in a non-Administrator group should return an access-denied error and not an empty list of objects. The workaround is to add the user to the Administrator group. [840452]

Storage Agent dumps core if there are many LUNs

Configurations with more than 10240 LUNs can cause the Storage Agent to dump core in the directory `/var/vx/isis`. [584092]

Workaround

- 1 Rename the Device Discovery Layer (DDL) library file:

```
# mv /opt/VRTSddlpr/lib/ddl.so /opt/VRTSddlpr/lib/ddl.so.orig
```

This prevents the DDL provider from loading, but has the effect of making enclosure, path and controller objects no longer available in the VEA client GUI.

- 2 Restart the Storage Agent:

```
# /opt/VRTSobc/pal33/bin/vxpal -a StorageAgent
```

Minimum version of VxVM

To use the VEA client GUI to administer Veritas Volume Manager systems other than VxVM 5.0 systems on Linux, you must upgrade VxVM on the remote systems to the following releases:

Platform	Release
AIX	VxVM 3.2.2 or later
HP-UX	VxVM 3.5 Update 2 or later
Linux on x86	VxVM 3.2 Update 1 or later
Linux on IA64	VxVM 3.2 Update 6 or later
Solaris	VxVM 3.5 MP2 or later

Minimum version of VxFS

To use the VEA client GUI to administer VxFS file systems other than VxFS 5.0 file systems on Linux, you must upgrade VxFS on the remote systems to the following releases:

Platform	Release
AIX	Any
HP-UX	VxFS 3.5 or later
Linux	Any
Solaris	VxFS 3.5 or later

Disk group creation failure with duplicate disk ID

VEA fails to create a disk group with a duplicate disk ID, and gives no other options.

Using the online help

Selecting a hyper link from the last item in a list of items may result in the display of text prior to the required text. It may then be necessary to scroll through the displayed help text to find the desired text.

Starting a volume in VEA

Select **Actions > Recover Volume** to start a volume. There is no **Start Volume** action. [87907]

Disabling wizards

In VxVM releases prior to VxVM 4.0, you could disable the wizards for certain functions by deselecting the “Enable Wizard Mode.” In this release of VxVM, you can no longer disable wizards. [135667]

Entering comments in dialog boxes

Comments may only be entered using the ASCII character set, and not the character set that corresponds to the current locale. [147509]

Java exceptions in the annotate disks dialog

A Java exception may occur when selecting a disk category from the **Annotate Disks** dialog. Close the exception window and ignore the error. To avoid seeing the error, first select **Tools>Refresh** to update the displayed list of objects. [229438]

Veritas Volume Manager Web GUI issues

Mirroring volumes across targets

Attempting to mirror volumes across targets fails. Such operations are not supported on the Linux operating system platform. [573809]

Maximum volume size

The maximum size for a volume is shown as 0 gigabytes if less than 1 gigabyte of storage is available in the disk group. [573897]

All Active Alerts view

The **All Active Alerts** view shows an incorrect number of active alerts. [601167]

Incorrect error message when importing a disk group

An incorrect error message such as the following may be displayed when importing a disk group:

```
<!--td align="center" height="287" valign="midd
```

The workaround is to refresh the page. [607096]

Create disk group wizard

The create disk group wizard shows internal disks as being available for the creation of shared disk groups. [574717]

Solaris x64 hosts cannot be managed

The Web GUI cannot be used to manage Solaris x64 for Opteron hosts that are running the Storage Foundation 4.1 software. [615554]

Error when creating a volume set

An error such as the following may be seen when attempting to create a volume set that includes a newly created volume:

```
Error: 0xcfff0021 Facility: 0xffff Severity: 0x3 Error number:  
0x21 Object Not Found.
```

The workaround is to refresh the page. [615960]

Veritas File System known issues

The following sections contain information about known problems and issues in this release of VxFS.

Dynamic Storage Tiering

A point patch will be provided to address a problem with the Dynamic Storage Tiering (DST) feature. DST is not supported unless this point patch is installed.

See the following TechNote for information on the point patch:

<http://support.veritas.com/docs/285834>

[884116]

vxfsconvert utility

The `vxfsconvert` utility is not supported in this release on the IBM System p platform.

Block device support in Veritas File System

VxFS 5.0 supports the creation of VxFS file systems directly on both partitioned and non-partitioned block devices, such as SCSI or IDE disks, without requiring a VxVM volume. For example:

```
# mkfs -t vxfs /dev/sdc1
# mount -t vxfs /dev/sdc1 /mnt
# fsck -t vxfs /dev/sdc1
```

Similarly, all local mount features of VxFS, such as clones and file system snapshots, do not require the creation of a VxVM volume.

Size requirement for first volume in a volume set

The first volume (index 0) in a volume set must be larger than the sum of the total volume set size divided by 4000, the size of the VxFS intent log, and 1MB.

Nested non-shared mount

If you want to unmount all the file systems where the parent file system is disabled for any reason, you will need to force unmount on the parent first then by a regular unmount of the child.

Files and directories

To maximize VxFS performance for file systems with disk layout Version 6 or earlier, do not exceed 100,000 files in the same directory. Use multiple directories instead. This issue does not apply for disk layout Version 7, which supports large directories.

Ioctl's are not supported on the File Change Log file

Ioctl's are not supported on the File Change Log file. Therefore, running commands such as `fsapadm`, `setext`, `fiostat`, and `fsmap` on the FCL file is not supported since these commands use an internal ioctl to implement their functionality.

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 *Veritas File System Administrator's Guide*.

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.

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.

Non-standard command behavior when using access control lists

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`.

Cross-platform Data Sharing

Cross-platform Data Sharing (CDS) is not supported in this release.

HSM/DMAPI not supported

HSM/DMAPI is not supported in this release.

MetaDevices not supported

MetaDevices are not supported in this release.

On Red Hat systems, manual pages display garbled output

Manual pages invoked on Red Hat systems display garbled characters. To correct the problem, set the LC_ALL environment variable:

```
LC_ALL=C
```

See incident 82099 on the Red Hat support website for more information.

A VxFS File System can be corrupted if a full fsck is performed without -t vxfs

Performing a full `fsck` without specifying the `-t vxfs` option can corrupt a VxFS file system, because the default file system type used by `fsck` is `ext2`.

Swap files not supported

Swap files are not supported for VxFS on Linux. Do not create or use swap files on a VxFS file system.

df_vxfs(1M) manual page installation location

The VxFS manual pages are installed in the `/opt/VRTS/man` directory. The `df_vxfs(1M)` manual page is in the `/opt/VRTS/bin` directory. Both of these directories must be added to the `MANPATH` environment variable.

Limitations with generic mount(8) command

There are known limitations with the handling of mount options when the mounted file system is also bound using the `--bind` option of the generic `mount(8)` command. In this case, it is not possible to change the mount options of any bound instances, and the only way to change the mount options on the original mount point is to supply both the `-t vxfs` option and the block device with the `-o remount,options` option on the command line. However, any existing mount options are reset to their default values. Subsequent attempts to change mount options on the original mount point may fail until any existing bound instances are unmounted.

Reboot of node with VxFS File System on volume in shared disk group hangs

If a node in a cluster that has a VxFS file system on a volume in a shared disk group mounted outside of VCS control is rebooted, the reboot process hangs at `hastop` in `/etc/init.d/vcs`.

Do not use vxassist and fsadm_vxfs when resizing both the volume and the File System

Use the `vxresize` command when resizing both the volume and the file system. The `vxresize` command guarantees that the file system will shrink or grow along with the volume. Do not use the `vxassist` and `fsadm_vxfs` commands for this purpose.

See the `vxresize(1M)` manual page.

See the *Veritas Volume Manager Administrator's Guide*.

This is especially important with Linux 2.6 kernels, on which using the `vxassist` and `fsadm_vxfs` commands leaves the block device inode size in the VxFS layer incorrect.

Linux I/O scheduler for database workloads

Symantec recommends using the Linux `deadline` I/O scheduler for database workloads on both Red Hat and SUSE distributions.

To configure a system to use this scheduler, include the `elevator=deadline` parameter in the boot arguments of the GRUB or LILO configuration file. The location of the appropriate configuration file depends on the system's architecture and Linux distribution:

Configuration File	Architecture and Distribution
<code>/boot/grub/menu.lst</code>	RHEL4 and SLES9 x86_64

For the GRUB configuration files (x86 and x86_64), add the `elevator=deadline` parameter to the kernel command. For example, change:

```
title RHEL AS 4 smp
  root (hd1,1)
  kernel /boot/vmlinuz-2.6.9-11.ELsmp ro root=/dev/sdb2
  initrd /boot/initrd-2.6.9-11.ELsmp.img
```

To:

```
title RHEL AS 4 smp
  root (hd1,1)
  kernel /boot/vmlinuz-2.6.9-11.ELsmp ro root=/dev/sdb2
    elevator=deadline
  initrd /boot/initrd-2.6.9-11.ELsmp.img
```

A setting for the `elevator` parameter is always included by SUSE in its and GRUB configuration files. In this case, change the parameter from `elevator=cfq` to `elevator=deadline`.

Reboot the system once the appropriate file has been modified.

See the operating system documentation for more information on I/O schedulers.

Occasional failure of a full fsck

A full `fsck` may fail to repair a file system after repairing the link count on an inode. For example:

```
# fsck -t vxfs -o full /dev/vx/dsk/testdg/vol100 fsck 1.34
(25-Jul-2003)
UX:vxfs fsck.vxfs: WARNING: V-3-20836: file system had I/O
error(s)
on meta-data.

log replay in progress
pass0 - checking structural files
.
.
.
fileset 1000 primary-illist inode 13831 link count is 10 should
be 9
adjust? (ynq)y

file system check failure, aborting ...
```

If this occurs, restart the full `fsck` operation. The `fsck` command may need to be run several times for the repair to complete, with each instantiation repairing more of the file system.

VxFS Web GUI online help known issues

The following known issues were reported for this release:

- For the **Mount Storage Checkpoint** operation, you must select an existing Storage Checkpoint from the drop-down list. You cannot manually enter a Storage Checkpoint name.
- The **Creating a new file system on a volume set** task can only be performed on VxFS file systems.

fcl_keeptime cannot be set to the default value after being modified to a non-default value

After the value for *fcl_keeptime* has been modified to a non-default value through the `vxtunefs` command, you cannot reset the value back to the default value of 0.

Issue with full volume 0 on a multi-volume file system

Certain file system metadata that is only in the file system must be allocated from volume 0. If volume 0 is full, operations such as upgrading the file system's disk layout version and creating a Storage Checkpoint can fail. These operations can be retried after freeing space on volume 0.

du reports more blocks than an file's actual size

The `du -k` command sometimes reports more blocks than the actual data size after a file is created. Symantec recommends using other commands, such as `vxquota -v` or `ls -ls`, to obtain accurate file size information.

Software limitations

The following sections describe Veritas Storage Foundation software limitations that exist in this release.

Veritas Storage Foundation software limitations

Multiple Veritas products installed on the same system can cause problems when upgrading or uninstalling

If you have more than one Veritas product installed on the same system, uninstalling or upgrading any one of those products can cause the other products to stop operating correctly. This limitation applies to Veritas Storage Foundation, Veritas Storage Foundation for Databases, Veritas Storage Foundation Cluster File System, Veritas Volume Manager, Veritas Storage Foundation for Oracle RAC, and Veritas Cluster Server. Before uninstalling or upgrading such a system, call Customer Support for guidelines. [840486]

Veritas File System software limitations

Veritas File System Web GUI online help known issues

The following known issues were reported for this release:

- For the **Mount Storage Checkpoint** operation, you must select an existing Storage Checkpoint from the drop-down list. You cannot manually enter a Storage Checkpoint name.
- The **Creating a new file system on a volume set** task can only be performed on VxFS file systems.
- For the **Remount Storage Checkpoint** operation, the **More info** link on the second wizard page does not function properly for cluster file systems.
- For the **Unmount Storage Checkpoint** operation, the **More info** link on the second wizard page does not function properly for cluster file systems.

Quick I/O, ODM, mount -o cio, and the VX_CONCURRENT advisory are mutually exclusive

The VX_CONCURRENT advisory cannot be set on a file that is actively open by Quick I/O or ODM. A file that has the VX_CONCURRENT advisory set may not be concurrently opened by Quick I/O or ODM. Quick I/O and ODM access are not allowed for any files on a file system that is mounted with the `-o cio` mount option.

Volume management support

The Veritas File System (VxFS) is only supported on Veritas Volume Manager (VxVM) volumes.

sendfile support

The current version of VxFS does not support the `sendfile()` system call. In order to use Apache with VxFS, use the Apache configuration option `EnableSendFile Off`.

Security-enhanced Linux

VxFS includes Security-Enhanced Linux (SE Linux) support for evaluation purposes only. VxFS conforms to the requirements of the SE Linux API. However, security policy files are not available for the Veritas product stack.

Documentation

After the installation procedure is complete, documents are available online under the `/opt/VRTS/docs` directory. Documents are provided as Adobe Portable Document Format (PDF) files and in a searchable HTML-based format. To view or print PDF documents, you must have the Adobe Acrobat Reader installed.

Installing documentation and manual pages is optional.

Veritas documentation disc

The Veritas documentation disc provides searchable, HTML documentation for each product in this release. Printable PDF documents are also included on the disc.

All documentation is organized by product groups.

Release Notes and installation guides

Release notes and installation guides are not installed by any packages. Veritas recommends that you copy them from the software disc to the `/opt/VRTS/docs` directory on your system after product installation so that they are available for future reference.

Release notes for component products in all versions of the Veritas Storage Foundation are located under the `storage_foundation/release_notes` directory of the Veritas Storage Foundation disc or the `cluster_server/release_notes` directory of the Veritas Cluster Server disc.

Installation guides in all versions of the Veritas Storage Foundation are located under the `storage_foundation/docs` directory of the Veritas Storage Foundation disc or the `cluster_server/docs` directory of the Veritas Cluster Server disc.

It is important that you read the relevant component product release notes before installing any version of Veritas Storage Foundation:

- *Veritas Cluster Server Release Notes* (`vcs_notes.pdf`)

Veritas Storage Foundation guides

The following manuals, along with the online help, comprise the Veritas Storage Foundation documentation set:

Table 1-1 Guides in Veritas Storage Foundation Documentation Set

Guide Title	Filename
<i>Veritas Storage Foundation and High Availability Getting Started Guide</i>	getting_started.pdf
<i>Veritas Storage Foundation Release Notes (this document)</i>	sf_notes.pdf
<i>Veritas Storage Foundation Installation Guide</i>	sf_install.pdf
<i>Veritas Storage Foundation for DB2 Administrator's Guide</i>	sf_db2_admin.pdf
<i>Veritas Storage Foundation for Oracle Administrator's Guide</i>	sf_ora_admin.pdf
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<i>Veritas FlashSnap Point-In-Time Copy Solutions Administrator's Guide</i>	flashsnap_admin.pdf
<i>Veritas File System Administrator's Guide</i>	vxfs_admin.pdf
<i>Veritas File System Programmer's Reference Guide</i>	vxfs_ref.pdf

Veritas Cluster Server Documentation

The following Veritas Cluster Server documentation is available with all Veritas Storage Foundation HA product suites:

Table 1-2 Guides in Veritas Cluster Server Documentation Set

Guide Title	Filename
<i>Veritas Cluster Server Release Notes</i>	<code>vcs_notes.pdf</code>
<i>Veritas Cluster Server Installation Guide</i>	<code>vcs_install.pdf</code>
<i>Veritas Cluster Server User's Guide</i>	<code>vcs_users.pdf</code>
<i>Veritas Cluster Server Agent Developer's Guide</i>	<code>vcs_agent_dev.pdf</code>
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<i>VCS Enterprise Agent for DB2 Installation and Configuration Guide</i>	<code>vcs_db2_install.pdf</code>
<i>VCS Enterprise Agent for EMC SRDF Installation and Configuration Guide</i>	<code>vcs_srdf_install.pdf</code>
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TAO

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Digital Encryption Standard (DES) - MIT

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Expat XML Parsing Library

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MD5.h

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JavaTip87: Automate the Hourglass Cursor

Kyle Davis

Portions of this code taken from an article available as of 2/02/02 on the JavaWorld Internet site, entitled Javatip87: Automate the HourGlass Cursor" by Kyle Davis.

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