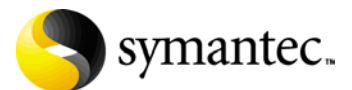


Veritas Storage Foundation™ Release Notes

Solaris x64 Platform Edition

5.0



Veritas Storage Foundation Release Notes

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Storage Foundation 5.0

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Licensing and registration

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://support.veritas.com> 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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Appendix A Third-party Legal Notices

Veritas Storage Foundation Release Notes

This document provides release information about the products in the Veritas Storage Foundation 5.0 Solaris (x64 Platform) product line:

- Veritas Storage Foundation (Basic, Standard, Standard HA, Enterprise, and Enterprise HA)
- Veritas Storage Foundation for Oracle (Standard, Enterprise, and HA Editions)
- Veritas Storage Foundation for Sybase (Standard, Enterprise, and HA Editions)
- Veritas Volume Manager (VxVM)
- Veritas File System (VxFS)

Note: Veritas Storage Foundation QuickStart and Veritas Storage Foundation for DB2 (Standard, Enterprise, and HA Editions) are not available in this release.

Each of these products is activated by a single license key. You must obtain a license key before installing the product.

See the *Veritas Storage Foundation Installation Guide*.

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

<http://entsupport.symantec.com/docs/286955>

The hardware compatibility list (HCL) is available at:

<http://entsupport.symantec.com/docs/287089>

The hardware TechNote is available at:

<http://entsupport.symantec.com/docs/283282>

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

This document does not contain release information for Veritas Volume Replicator (VVR) or Veritas Cluster Server (VCS).

See the *Veritas Volume Replicator Release Notes*.

See the *Veritas Cluster Server Release Notes*.

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 Optionally licensed features: Veritas Volume Replicator Option
Storage Foundation Standard HA	Veritas Volume Manager Veritas File System Veritas Cluster Server Optionally licensed features: Veritas Volume Replicator Option
Storage Foundation Enterprise	Veritas Volume Manager Veritas File System Veritas FlashSnap Option Optionally licensed features: Veritas Volume Replicator Option
Storage Foundation Enterprise HA	Veritas Volume Manager Veritas File System Veritas Cluster Server Veritas FlashSnap Option Optionally licensed features: Veritas Volume Replicator Option
Storage Foundation for Oracle Standard	Veritas Storage Foundation for Oracle Veritas Volume Manager Veritas File System Veritas Quick I/O Option Veritas Extension for Oracle Disk Manager Option

Storage Foundation Version	Products and Features
Storage Foundation for Oracle Enterprise	Veritas Storage Foundation for Oracle Veritas Volume Manager Veritas File System Veritas Flashsnap Option Veritas Quick I/O Option Veritas Extension for Oracle Disk Manager Option Veritas Storage Checkpoint Option Veritas Storage Mapping Option Optionally licensed features: Veritas Volume Replicator Option
Storage Foundation for Oracle Enterprise HA	Veritas Storage Foundation for Oracle Veritas Volume Manager Veritas File System Veritas Cluster Server Veritas FlashSnap Option Veritas Quick I/O Option Veritas Extension for Oracle Disk Manager Option Veritas Storage Checkpoint Option Veritas Storage Mapping Option Optionally licensed features: Veritas Volume Replicator Option
Storage Foundation for Sybase Standard	Veritas Storage Foundation for Sybase Veritas Volume Manager Veritas File System Veritas Quick I/O Option
Storage Foundation for Sybase Enterprise	Veritas Storage Foundation for Sybase Veritas Volume Manager Veritas File System Veritas Quick I/O Option Veritas FastResync Option Optionally licensed features: Veritas Volume Replicator Option

Storage Foundation Version	Products and Features
Storage Foundation for Sybase Enterprise HA	Veritas Storage Foundation for Sybase Veritas Volume Manager Veritas File System Veritas Cluster Server Veritas Quick I/O Option Veritas FastResync Option Optionally licensed features: Veritas Volume Replicator Option

Product and feature 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 Volume Manager 5.0 licenses

The following table shows the levels of licensing in Veritas Volume Manager 5.0 above the Basic license, and the features supported at each level:

VxVM License	Description of Supported Features
Full	Concatenation, spanning, rootability, 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, Intelligent Storage Provisioning, FastResync with Instant Snapshots, Storage Expert, Device discovery Layer, multipath DMP, and VEA.
Add-on Licenses	Features that augment the Full VxVM license.

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 5.0, enter the following command:

```
# vxdctl license
```

Cross-platform data sharing licensing

The ability to import a cross-platform data sharing (CDS) disk group on a platform that is different from the platform on which the disk group was last imported is controlled by a CDS license. CDS licenses are included as part of the Veritas Storage Foundation license.

The following output by the `vxlicrep` command is an example of a CDS enabling license:

```
License Key                = XXXX-XXXX-XXXX-XXXX-XXXX-XXXX
Product Name               = Veritas Storage Foundation
Standard
License Type               = DEMO_EXTENSION
OEM ID                     = 4095
Demo End Date              = Fri Mar 18 00:00:00 2005
                          (21.5 days from now).
Editions Product           = YES

Features :=
VxVM#Veritas Volume Manager = Enabled
CPU Count#Veritas Volume Manager = Not Restricted
VXFS#Veritas File System    = Enabled
CPU Count#Veritas File System = Not Restricted
QLOG#Veritas File System    = Enabled
PGR#Veritas Volume Manager  = Enabled
Veritas Foundation Suite    = Enabled

SPC Lite#Veritas SANPoint Control = Enabled
Storage Expert#Veritas Volume Manager = Enabled
Platform                    = un-used
Version                      = un-used

Product Name                = Veritas Volume Manager
License Type                 = DEMO
Demo End Date                =

Features :=
Dynamic Lun Expansion        = Enabled
Hardware assisted copy       = Enabled
Cross-platform Data Sharing = Enabled
PGR                           = Enabled
PGR_TRAINING                 = Enabled
VVS_CONFIG                   = Enabled
[...]
```

Photon licensing

VxVM automatically generates a Photon license when it detects an A5k array. In addition, VxVM 5.0 allows you to remove your Photon device for servicing for up to two weeks. To do this, when the current license is due to expire, VxVM automatically removes the old license, and re-issues a new Photon license with another two-week expiration date.

You can now remove your Photon device for servicing, without affecting other operations.

If you perform a license query during this time, you may see information displayed as follows:

```
License Key =  
XXXX-XXXX-XXXX-XXXX-XXXX-XXXX-XXXX-XXXX-XX  
Product Name = Veritas Volume Manager  
License Type = DEMO_NODE_LOCK  
OEM ID = 4090  
Demo End Date = Fri Aug 30 01:00:00 2002 <=====  
EXPIRATION DATE  
(13.6 days from now).  
Node Lock Type = (Hostid and Architecture ID)  
Features :=  
PHOTON                               = Enabled  
CPU Count                             = Not Restricted
```

Note: This message does not mean that your Photon array feature license will soon expire permanently. You will *not* lose the VxVM features associated with the license in 13.6 days time.

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 Oracle and Veritas Storage Foundation for Sybase combine the strengths of the core Veritas products with database-specific enhancements to offer unrivaled performance, availability, and manageability for databases. The database feature options are as follows.

Veritas FlashSnap option

The Veritas FlashSnap option, when applied to databases, lets you create, resynchronize, and reverse resynchronize volume snapshots for databases. The snapshots can be used on a second host. Also, database administrators can perform these tasks without root privileges.

This option is available with the Enterprise version of Veritas Storage Foundation for Oracle.

Veritas Quick I/O option

Veritas Quick I/O is a Veritas File System feature that improves the throughput for databases built on Veritas File Systems. Quick I/O delivers raw device performance to databases run on VxFS, providing the administrative advantages of using file systems without performance penalties. Veritas Cached Quick I/O further enhances database performance by leveraging large system memory to selectively buffer the frequently accessed data.

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

Veritas Extension for Oracle Disk Manager option

Veritas Extension for Oracle Disk Manager is a custom storage interface designed specifically for Oracle9i and 10g. Oracle Disk Manager improves the performance and manageability of system bandwidth through an improved API that contains advanced kernel support for file I/O.

This option is available with both the Standard and Enterprise versions of Veritas Storage Foundation for Oracle.

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 version of Veritas Storage Foundation for Oracle.

Veritas Storage Mapping option

Storage Mapping lets you map datafiles to physical devices and display storage object I/O statistics. Both storage object I/O statistics and the storage structure can be displayed for a specific file.

This option is available with the Enterprise version of Veritas Storage Foundation for Oracle.

In addition, with Veritas Storage Foundation for Oracle, mapping information showing which tablespaces reside on which physical disks can be obtained for a specified database.

Veritas Volume Replicator

Veritas Volume Replicator is data-replication software designed to contribute to an effective disaster recovery plan by maintaining an exact or consistent copy of application data at one or more remote locations.

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.

New features

The following new features have been incorporated into Veritas Storage Foundation, Veritas Volume Manager, Veritas File System, Veritas Storage Foundation for Oracle, and Veritas Storage Foundation for Sybase.

Note: For information about new features in VVR, see the *Veritas Volume Replicator Release Notes*. For information about new features in VCS, see the *Veritas Cluster Server Release Notes*.

Veritas Volume Manager

This release of Veritas Volume Manager includes the following new features and enhancements.

Root disk encapsulation and mirroring

Veritas Volume Manager can now place the root file system, `swap` device, and other file systems on the root disk under VxVM control through the process of encapsulation. The encapsulated volumes on the root disk can then be mirrored. This provides a complete redundancy and recovery capability in the event of disk failure.

On the x64 platform, root disk encapsulation is supported for Update 1 and later releases of the Solaris 10 OS, which include the GRUB boot loader.

Booting from fabric devices

In this release, you can boot the system from an encapsulated root disk that is connected to a Storage Area Network (SAN). Only those arrays that have been formally tested by Symantec are supported. Refer to the Hardware Compatibility List for the supported arrays.

Default private region size

The default size of the private region has been increased from 1 MB to 32 MB.

Note: You do not need to change the private region size of existing disk groups to the new default value.

Changed behavior of disk group import

In previous releases, the `vx dg import` command could not import a disk group if some disks in the disk group were unusable or inaccessible. In such cases, the `-f` option had to be specified to forcibly import the disk group. With this release, a disk group can be imported successfully if all the disks are accessible that were visible when the disk group was last imported successfully. As using the `-f` option to forcibly import an incomplete disk group counts as a successful import, the disk group can subsequently be imported without specifying this option. The changed behavior applies to both private and cluster-shared disk groups.

Faster startup time

The time taken to start the Veritas Volume Manager configuration daemon, `vxconfd`, to discover new devices, to initialize dynamic multipathing, and to import disk groups has been significantly reduced.

Faster cluster node joins

The time that nodes take to join a cluster has been reduced by allowing concurrent joins. This feature applies to Veritas Cluster Server (VCS) and to Sun Cluster environments.

Remote Mirror — robust campus cluster support

The Remote Mirror feature retains the current usage model for campus cluster support (also known as stretch cluster) where a disk group can span storage from multiple sites. Existing utilities such as `vx dg` and `vx disk` have been enhanced to achieve data set completeness, and to maintain site consistency. The preferred read policy for mirrors has been extended so that read requests are serviced locally if possible. The Remote Mirror feature also provides a mechanism to deal with disk group inconsistencies between storage at different sites, known as a serial split-brain scenario, and to perform fire-drill testing of site failure and recovery. In this release, up to three sites are supported in a Remote Mirror configuration.

Support for 32 cluster nodes

The clustering functionality of VxVM supports up to 32 nodes. Symantec has tested and qualified clustered volume configurations of up to 16 nodes at product release time. Support can be contacted for its approval and recommendations on clustered volume deployments larger than 16 nodes, based on the application workload.

For the latest information on clustered volume support, see the following TechNote:

<http://entsupport.symantec.com/docs/286955>

SCSI 3 PR enhancement in clusters

The keys for disabled paths are removed so that node joins are not obstructed. In addition, the time taken to register keys has been reduced.

File-level SmartSync

The SmartSync feature of VxVM has been extended to support Oracle Resilvering of files in Veritas File System.

Enhancements to Dynamic Multipathing

There are a number of enhancements to the Dynamic Multipathing (DMP) feature:

- **Faster failure detection and recovery by DMP**
DMP has been enhanced to allow the `vxddmpadm` command to be used to adjust the I/O error recovery and I/O throttling mechanisms on individual paths.
- **Changing DMP tunables**
The values of most DMP tunables can now be set by using the `vxddmpadm settune` command.
- **Retry period for Persistent Group Reservation (PGR)**
The maximum time period for which DMP retries the SCSI-3 Persistent Reserve operation with A/P arrays can now be tuned by using the `dmp_retry_timeout` parameter with the `vxddmpadm` command. The default value `dmp_retry_timeout` is 0 seconds. This parameter has no direct effect on I/O processing by DMP.

Disabling a switch port can trigger a fabric reconfiguration, which can take time to stabilize. During this period, attempting to register PGR keys through the secondary path to an array may fail with an error condition, such as unit attention or device reset, or the return of vendor-specific sense data. The retry period allows a fabric reconfiguration, which is usually a transient condition, to not be seen as an error by DMP.

To display the current value of `dmp_retry_timeout`, type:

```
# vxddmpadm gettune dmp_retry_timeout
```

To change the value of `dmp_retry_timeout`, type:

```
# vxddmpadm settune dmp_retry_timeout=value
```

Do not set the value of the retry period too high. This can delay the failover process, and result in I/O sluggishness or suppression of I/O activity during the retry period.

This parameter is not documented in the *Veritas Volume Manager Administrator's Guide* or in the `vxddmpadm(1M)` manual page.

Linked break-off snapshot volumes

A new variant of the third-mirror break-off snapshot type are linked break-off snapshot volumes, which use the `vxsnap addmir` command to link a specially prepared volume with the data volume. The volume that is used for the snapshot is prepared in the same way as for full-sized instant snapshots. However, unlike full-sized instant snapshots, this volume can be set up in a different disk group from the data volume. This makes linked break-off snapshots especially suitable for off-host processing applications where you may want to create the snapshot on storage with different characteristics from that used for the data volumes.

If you change the size of volume, any snapshots that are currently linked are also resized in the same operation.

Volume tags

Volumes may now be tagged with an arbitrary tag name and optional tag value. Multiple tags can be associated with a single volume. Such tags are used by features such as Remote Mirror (also known as campus cluster) and Dynamic Storage Tiering (DST).

Disk tags

Disks may now be tagged with an arbitrary tag name and optional tag value. Multiple tags can be associated with a single disk. Such tags are used by features such as Remote Mirror, Intelligent Storage Provisioning (ISP) and importing cloned disks.

Data migration

The `vxassist`, `vxevac` and `vxsd` commands have been enhanced to allow data to be migrated at the volume, disk or subdisk level respectively. Once the data migration is in the tentative state, it can either be committed or cancelled.

Raw I/O access to volume components of a volume set

A mechanism is provided to allow access to the raw device nodes of the component volumes of a volume set. This is intended to allow the component volumes to be backed up and restored individually.

Maximum number of component volumes in a volume set

The maximum number of component volumes in a volume set has been increased to 2048.

Importing cloned disks

Disks that have been duplicated outside the VxVM environment (usually using specialized hardware) are referred to as *cloned disks*. The `vxdisk` and `vxvg` commands have been enhanced to allow such cloned disks to be identified, tagged and more easily managed. For example, a subset of the disks in a disk group that are similarly tagged can be imported together in a single operation.

ISP enhancements

The following enhancements have been made to the Intelligent Storage Provisioning (ISP) feature:

- The `vxassist` command may be used instead of the `vxvoladm` command to create ISP volumes as well as non-ISP volumes. Any `vxassist` specification attributes are converted into equivalent ISP rules.
- Creation of a large number of volumes in a single operation, and retrieval of information have been speeded up.
- Annotation of storage devices may now be performed by assigning tags and optional tag values to disks and LUNs.
- The `vxassist printrules` or `vxvoladm printrules` commands may be used to display the raw set of ISP rules that were used to allocate storage to a volume.
- A specified number of volumes with a given intent can be created at the same time.
- Additional information retrieval commands are provided to support queries such as:
 - Given a template, return all template sets that refer to that template.
 - Given a template, list all the templates on which the specified template is dependent.
- The linked break-off snapshot volume feature allows ISP feature to support fast resynchronization (FastResync) with snapshot operations such as refresh and restore.
- Migration between non-ISP and ISP volumes.
- The ISP intent version number has been increased to 30.

Veritas File System

This release of Veritas File System includes the following new features.

Dynamic Storage Tiering

Dynamic Storage Tiering (DST) allows administrators of multi-volume VxFS file systems to manage the placement of files on individual volumes in a volume set by defining placement policies that control both initial file location and the circumstances under which existing files are relocated.

Improved availability

Improved availability allows you to mount a multi-volume file system even if the component data-only volume is missing or becomes unavailable. Any I/O error on a data-only volume will not affect access to non-data-only volumes. In addition, all VxFS operations that do not access the missing data-only volume will function normally. This helps guarantee the availability of some volumes even when other volumes within the file system are not available.

File-to-volume and volume-to-file mapping in multi-volume file system support

This release provides two new commands to support this feature:

- `fsmmap` This command reports the volume location of all data or indirect extents associated with a file in a multi-volume file system, and verifies that DST policies are working as requested.
- `fsvmap` This command determines which data file is resident on a given volume for a multi-volume file system. This command recovers only the affected files when an unprotected volume is permanently lost.

2K volumes in a volume set

The limit of number of volumes allowed in a volume set is now 2048, increased from 256.

File placement policy administration

The `fspadm` command administers the file placement policies of the DST feature, and replaces the functionality of the `fsrcadm`, `fsmove`, and `fssweep` commands.

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

Pattern-based allocation policies

Pattern tables can be assigned to directories or file systems. A pattern table contains patterns against which a file's name and creating process' UID and GID are matched as a file is created in a specified directory. The first successful match is used to set the allocation policies of the file.

Load balancing

An allocation policy with the `balance` allocation order can be defined and assigned to files that must have their allocations distributed at random between a set of specified volumes. The effect is that the distribution of extents between the volumes is mostly equal if none of the volumes are full or disabled.

Concurrent I/O mount option

The `mount` command now supports the `-o cio` option, which specifies that the file system be mounted for concurrent reads and writes. I/O on files in this file system behave as if they were accessed while the `VX_CONCURRENT` cache advisory was set on the files.

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

File system reorganization prevention

Some applications may require preventing extent and log reorganization. Such applications can disable file system reorganization using the `fsadm` command by creating the `/etc/fs/vxfs/vxfs_noreorg_config` file.

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

Veritas Storage Foundation for Databases

Veritas Storage Foundation for Oracle

This release of Veritas Storage Foundation for Oracle includes the following new features and enhancements.

Support for Oracle 10gR2

This release of Veritas Storage Foundation for Oracle offers support for Oracle 10gR2.

Database Dynamic Storage Tiering

Veritas Database Dynamic Storage Tiering (DBDST) enables you to manage your data so that less-frequently used data can be moved to slower, less expensive disks, allowing frequently-accessed data to be stored on the faster disks for quicker retrieval.

Improved task scheduler

The GUI for the task scheduler has been improved to permit more flexibility in scheduling tasks.

Modify clone initialization parameters

Clones can be created and started with modified initialization parameters to let clones use system resources in a different way than the primary database (for example, if the clone resides on a secondary host with different resources, or if it should use less resources if residing on the same host).

Table level mapping

A table name now can be used as input to the `dbed_analyzer` command (with a new `-o` option) to list the disk in which the table resides and the space it occupies on each disk.

Oracle Resilvering support

Veritas Extension for Oracle Disk Manager supports Oracle Resilvering. With Oracle Resilvering, the storage layer receives information from the Oracle database as to which regions or blocks of a mirrored datafile to resync after a system crash.

Enhanced CLI commands

The following Veritas Storage Foundation for Oracle CLI commands have been enhanced:

Command Name	Description
<code>dbed_clonedb</code>	New <code>-p pfile_modification_file</code> option has been added to specify modified initialization parameters (contained in <code>pfile_modification_file</code>) for the clone.
<code>dbed_vmclonedb</code>	New <code>-p pfile_modification_file</code> option has been added to specify modified initialization parameters (contained in <code>pfile_modification_file</code>) for the clone.
<code>dbed_analyzer</code>	New option <code>-o mode=table [-f file -t table]</code> lists the disk on which the specified table resides and how much space it consumes.

Veritas Storage Foundation for Sybase

This release of Veritas Storage Foundation for Sybase includes the following new features and enhancements.

Support for Sybase 15.0

This release of Veritas Storage Foundation for Sybase offers support for Sybase ASE 15.0.

Concurrent I/O

Veritas Concurrent I/O improves the performance of regular files on a VxFS file system without the need for extending namespaces and presenting the files as devices. This simplifies administrative tasks and allows relational databases, which do not have a sequential read/write requirement, to access files concurrently. To use CIO, add `cio` to the `mount` command or into the `vfstab` entry.

System requirements

Solaris operating system requirements

The Veritas Storage Foundation 5.0 product line operates on the Solaris 10 (64-bit) Operating System.

The Storage Foundation software verifies that the target system is running a required version of the Solaris operating system. Storage Foundation installation will fail if the product discovers an incorrect Solaris version.

Enabling the DMP feature

MPxIO is enabled by default on Solaris 10 for the Opteron platform. It must be turned off to enable multipathing through DMP. To disable MPxIO:

- 1 Set `mpxio_disable='yes'` in the `/kernel/drv/fp.conf` file
- 2 Perform a reconfiguration reboot:

```
#reboot -- -r
```

For information on Sun arrays, refer to the document available at

http://docs.sun.com/source/819-0139/ch_4_config_multi_SW.html#pgfid-1000566.

Solaris patch requirements

Solaris patches for Veritas Volume Manager

Some required system patches may already be present in your operating system. You should check to see if your system already contains the patches needed. Use the command `showrev -p` to display the patches included on your system. For example, to check for patch 118344-14, enter:

```
#showrev -p|grep 118344
```

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

If the patches shown in the required list are not already installed, go to the SunSolve website to download them. You need to install the appropriate patches and then reboot.

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

Operating system	Sun patch number or package name	Notes
Solaris 10	118344-14 or higher 118844-30 or higher 118855-36 or higher 119043-02 or higher 119131-33 or higher	

A5x00 devices

Whether or not you have A5x00 devices connected to your system, you must add the Solaris patches to this release of VxVM.

See the table in “[Solaris patches for Veritas Volume Manager](#)” on page 25.

If you have A5x00 devices attached to your system, you need this patch to use them; if you don’t have A5x00 devices attached to your system, VxVM uses the patches to discover whether such devices exist.

Claiming devices in the SENA category

A5x00 disk arrays are claimed by DMP under the SENA category only if the required libraries are present on the system at the time of VxVM installation.

Solaris patches for Veritas Enterprise Administrator

It is recommended that you install Sun Solaris Package `SUNw10of` if you plan to use the Veritas Enterprise Administrator client. `SUNw10of` is a package required by JRE 1.4. The package contains fonts that are needed to support various locales. For more information, see the Sun Microsystems Java website.

Note: The name of the Sun package should contain the number one (“1”), not the letter l, after the lower case “i.”

Oracle required patch

Mandatory patch required for Oracle Bug 4130116

If you are running Oracle versions 9.2.0.6 or 9.2.0.7, you must apply the Oracle patch for Oracle Bug 4130116. Contact Oracle to obtain this patch, and for details on how to apply it.

Veritas patches

If you install Veritas Storage Foundation using the installation script, patches are added for you. However, if you choose to install the product using `pkgadd`, you need to manually add the patches after installing.

You must have superuser (`root`) privileges to load the Veritas software.

To install Veritas patches manually

- 1 Make sure the same media disc you used to install Veritas Storage Foundation is in your DVD drive and mounted.
- 2 Copy all the patches from the `storage_foundation/patches` directory to the desired directory on your system.

```
# cd working_directory
# cp /cdrom/cdrom0/storage_foundation/patches/* .
```

- 3 Decompress and then extract the patches.

```
# /cdrom/cdrom0/storage_foundation/scripts \
/install/gunzip *.gz
# tar xvf patch_id1.tar
```

Repeat the `tar` command above for each patch archive.

- 4 Install the patches individually using the `patchadd` command.

```
# patchadd patch_number
```

It is recommended that you install all the patches.

- 5 Use the `showrev` command to verify patch installation.

```
# showrev -p | grep patch_number
```

Veritas Volume Manager and Veritas Enterprise Administrator patches

Please refer to the `patches` directory for information about the patches included in this release. You can find the `patches` directory at the same level as the `pkgs` and `scripts` directories on your software disc:

```
/cdrom/cdrom0/volume_manager/patches
```

Symantec highly recommends that you install all of the patches in this location on your system.

Software limitations

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

Veritas Volume Manager software limitations

Using the `vxcdsconvert` utility

The `vxcdsconvert` utility is used to make a disk or disk group compatible with the CDS feature. You must specify the `-o novolstop` option to this command on the Solaris x64 platform because the default disk layout is different from that on the Solaris SPARC platform.

Non-Global zone support

Veritas Volume Manager does not support non-global zones.

Veritas File System software limitations

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.

Unsupported non-global zone features

The following features are unsupported with non-global zones:

- Admin `ioctls`
- Administration commands
- Veritas Storage Migrator (VSM)
- Virtual File System (VFS)/Veritas Mapping Service (VxMS)
- Quick I/O and CQIO
- Storage Foundation Cluster File System (SFCFS)

Enabling ODM access

The following must be performed to enable ODM access from a non-global zone:

- 1 Install a license in a global zone by exporting the `/etc/vx/licenses/lic` directory to the non-global zone as an lofs. This is done by adding the following resource to a zone's configuration in addition to other resources in the zone:

```
# zonecfg -z zone1
add fs
set dir=/etc/vx/licenses/lic
set special=/etc/vx/licenses/lic
set type=lofs
end
```

- 2 Create an `odm` subdirectory under the `zonepath/non-global_zone/dev` directory. The `zonepath` for a given zone can be obtained using the `zonecfg` command.
- 3 Mount the `/dev/odm` directory in the non-global zone.

```
# mount -F odm /dev/odm /dev/odm
```

Note: The ODM is not automatically mounted after the zone is booted. Use the above command to mount the ODM after the zone is booted.

Mounting a VxFS file system in the non-global zone

To mount a VxFS file system in the non-global zone, add the `fs` resource type to the non-global zone:

```
# zonecfg -z zone1
add fs
set dir=/mnt1
set special=/mnt1
set type=lofs
end
```

The value of `dir` is a directory in the non-global zone, while the value of `special` is a directory in the global zone to be mounted in the non-global zone.

Accessing a file for concurrent I/O

A process can read from or write to a file concurrently with other processes. This implies that a process in a non-global zone can access the file concurrently with other processes in the non-global or global zone. An application must perform the following functions:

```
fd=open(filename, oflag)
ioctl(fd, VX_SETCACHE, VX_CONCURRENT)
write(fd, buff, numofbytes)
```

Mounting and creating Veritas File System disk layouts

Veritas Storage Foundation 5.0 (x64 Platform) allows you to mount and create the following file system disk layouts:

- Disk layout Version 7
- Disk layout Version 6

Disk layout Versions 1, 2, 3, 4, and 5 are not supported on a Solaris x64 system. This limitation is not documented in the *Veritas File System Administrator's Guide*.

Veritas Storage Foundation for Databases software limitations

Oracle and Sybase software limitations

No support for non-global zones

The Standard, Standard HA, Enterprise, and Enterprise HA versions of Veritas Storage Foundation for Oracle, and Veritas Storage Foundation for Sybase do not support non-global zones. [268530]

No support for Intelligent Storage Provisioning

The Standard, Standard HA, Enterprise, and Enterprise HA versions of Veritas Storage Foundation for Oracle, and Veritas Storage Foundation for Sybase do not support Intelligent Storage Provisioning (ISP).

Disk layouts Version 5 and earlier do not display Storage Checkpoint quotas in the GUI

In Veritas Storage Foundation for Oracle and VxFS disk layouts Version 5 and earlier do not display Storage Checkpoint quotas in the GUI. [34432 and 34433]

If you attempt to retrieve quota information for a Storage Checkpoint in Version 5 or earlier using the GUI, a message similar to the following displays:

```
DBED4646:ERROR: Unknown error code -30391108 (getquota) for
DBED
46464....
```

Veritas Storage Foundation for Oracle software limitations

Database Dynamic Storage Tiering limitations with non-English filenames and placement class names

Database Dynamic Storage Tiering (DBDST) does not work on non-English database filenames or non-English placement class names, due to limitations in VxFS Dynamic Storage Tiering and VxVM volume tags. VxFS Dynamic Storage Tiering does not support placement of non-English filenames. The VxVM volume tag feature does not support non-English volume tag names. [599164]

Differing locales produces unintelligible characters in GUI

The GUI does not support Oracle users having a different locale than the superuser's locale. The GUI will display unintelligible characters if the SFDB repository server starts with a locale that is different from the Oracle user locale (client). [605487]

Some features stop working after a Global Cluster failover

Some Storage Foundation for Oracle features do not work correctly after a Global Cluster (GCO) Failover. In 5.0, the Storage Foundation for Database (SFDB) repository and tools do not manage virtual hostnames correctly in a Global Cluster environment. The SFDB repository does not correctly adjust to the secondary host after the failover.

Features like Storage Checkpoint, Database FlashSnap, the scheduler, and Database Dynamic Storage Tiering (DBDST) will not function as normal after a failover. However, features such as Oracle Disk Manager (ODM), Quick I/O, and Concurrent I/O (CIO) will continue to work after a failover. This issue will be fixed after the next release. [563603]

Database Dynamic Storage Tiering class names limited to 29 characters

The `dbdst_admin -o rmcclass` command fails when attempting to remove a class name of 30 characters or more. The maximum class name length is 29 characters. [601746]

Selected utilities require setuid

Some Veritas Storage Foundation for Databases programs are setuid binaries because they are meant to be run as a database administrator and the APIs used are root access-only Symantec internal APIs. The affected binaries are used mainly for information query purposes. For these reasons, the following programs are setuid-enabled in Veritas Storage Foundation for Oracle:

- `/opt/VRTSdbed/.dba/dbed_analyzer`
- `/opt/VRTSdbed/.dba/vxckptplan`
- `/opt/VRTSdbcom/bin/vxstorage_stats`
- `/opt/VRTSdbcom/.dba/vxdbd_start`
- `/opt/VRTSdbcom/.dba/vxckpt_ismounted`

[643964]

Multiple archive log destinations with RAC

Multiple archive log locations are not supported in RAC configurations. [795617]

Repository hostnames are case insensitive

Because DNS host name lookup queries are by definition case insensitive, make sure the SFDB repository is running on a host with a name that is truly unique - regardless of case - within the local subnet. Errors may occur if the repository host name differs from another host name only by case. [859863]

RAC installation limitations

Installing Veritas Storage Foundation for Oracle on top of Veritas Storage Foundation for Oracle RAC is not supported. [563808]

Storage Checkpoint limitations

- You cannot create a clone database using a mounted Storage Checkpoint. [32726]
- You must run the `dbed_update` command after upgrading to Veritas Storage Foundation 5.0 for Oracle from a previous release. This will allow you to roll back to a Storage Checkpoint that was created prior to this release. [86431]
- If you create an Oracle instance using the `spfile` option, you must run the `dbed_update` command before you can successfully perform any Storage Checkpoint or Database FlashSnap functions.

Veritas Enterprise Administrator limitations

- Veritas Enterprise Administrator (VEA) does not display tablespace information when the `v$table` column names are changed using the SQL*Plus profile facility. [34446]
- VEA may display system fonts incorrectly. On a Japanese desktop, VEA may incorrectly display system fonts. Japanese characters may not be properly displayed when you select the non-default font for the VEA GUI.

Database FlashSnap limitations

- The Database FlashSnap feature does not support RAID-5 volumes. [34570]
- When cloning a database using Database FlashSnap, the Oracle database must have at least one mandatory archive destination, otherwise `dbed_vmchecksnap` results in this error message:

```
SFORA dbed_vmchecksnap ERROR V-81-5677 Could not find a mandatory, primary and valid archive destination for database PROD.
```

Please review the `LOG_ARCHIVE_DEST_n` parameters and check `v$archive_dest`.

This example shows how to establish a mandatory archive destination using SQL*Plus:

No longer supported

```
alter system set log_archive_dest_1 =
'LOCATION=/ora_mnt/oracle/oradata/PROD/archivelogs
MANDATORY [REOPEN]' [scope=both];
```

For more information about Oracle parameters for archiving redo logs, see your Oracle documentation. [270905]

- After running `dbed_vmsnap -o reverse_resync_commit`, your primary database is started using a pfile. If your original primary database used an spfile, you need to shut down the database and restart it using the spfile. Then, run `dbed_update` to update the repository.

Oracle Disk Manager limitations

- If you want to run Oracle 10g on a non-global zone and use Oracle Disk Manager, the Oracle version should be 10.1.0.3 or higher. To enable Oracle Disk Manager file access from non-global zones with Veritas File System, follow the procedure in “[Enabling ODM access](#)” on page 29.
- Because Oracle Disk Manager uses the Quick I/O driver to perform asynchronous I/O, do not turn off the Quick I/O mount option, which is the default.
- Using Oracle Disk Manager with Cached Quick I/O enabled is not supported and could cause your system to panic [34281]. To avoid a system panic, ensure the following:
 - If you are using Oracle Disk Manager, do not enable Cached Quick I/O on your file system.
 - If you are converting from Quick I/O to Oracle Disk Manager, make sure you disable Cached Quick I/O.

No longer supported

- With Veritas Storage Foundation 5.0, Oracle 8i is no longer supported. Any references to Oracle 8i in the *Veritas Storage Foundation for Oracle Administrator's Guide* should be disregarded.
- Veritas Storage Foundation 4.1 was the last release to support Oracle Disk Manager for raw devices.
- Veritas Storage Foundation 4.1 was the last release to support the text-based VxDBA menu interface.
- VxFS disk layout versions prior to Version 4 cannot be mounted. Use the `vxfsconvert` command to convert them to a disk layout version that can be mounted. See the *Upgrading VxFS Disk Layout Versions* section in the *Veritas Storage Foundation Installation Guide* for more information.

- VxFS disk layout Version 4 and 5 will no longer be supported in the next major release.
- Veritas Storage Foundation 4.1 was the last release to support the VxFS QuickLog feature.
- In Veritas Storage Foundation 4.1 for Oracle, snapshot plexes created by the `vxassist` command are not supported. A combination of snapshot plexes created by `vxassist` and `vxsnap` is also not supported.
- The `seconly` mount option might not be supported in the next release of Veritas Storage Foundation.
- The use of the `upgrade_start` and `upgrade_finish` scripts to upgrade VxVM will not be supported in the next major release.
- Veritas FlashSnap Agent for Symmetrix (VxFAS) will not be supported in the next major release.
- Quick I/O and Cached Quick I/O will no longer be supported in the next major release.

Fixed issues

Veritas Volume Manager fixed issues

The following issues have been fixed in this release of VxVM.

Incident	Description
140947	I/O policy settings were not persistent between reboots.
229538	Multiple enclosures of the same type generated unexpected enclosure-based names.
272263	Changing a disk's I/O policy could hang <code>vxconfigd</code> .
272309	Incomplete records in <code>/etc/vx/disk.info</code> could cause <code>vxconfigd</code> to dump core.
272626	The checksum of a RAID-5 volume and its snapshot did not agree under some circumstances.
272891	<code>vxnotify</code> did not receive events relating to the change of controller states in DMP.
273314	Setting DRL on a volume in the SYNC state could cause the volume to be recovered incorrectly.
273850	A system could not be booted from an encapsulated root disk in a DMX 1000 array.
506139	If the naming scheme was changed, the default arguments to <code>vxconfigd</code> were not preserved.
528677	Volume relayout is now supported for site-confined volumes and for site-consistent volumes.
540351	Reattaching a site when the disks were in the serial-split brain condition gave an error message.
540523	Under some circumstances, DMP nodes could be incorrectly enabled.
563524	Split, join and move operations failed on a source disk group that had any site-confined volumes.
584200	The <code>vxmake</code> command could not be used to recreate site records. This is now supported if the <code>-d</code> option is used to read from a description file.
601274	In a CVM cluster, DMP did not fail over to a secondary path when the primary paths were disconnected.

Incident	Description
605743	If a disk group were split from a source disk group, volumes in the split-off disk group did not retain their volume tags.
609199	When the <code>vxndmpadm disable</code> command was applied to a primary path on one node in a CVM cluster, the other nodes did not fail over to the secondary path.
611333, 622508	DMP could not obtain the correct serial number for a device if its LUN serial number contained a comma. This problem was seen on EMC Symmetrix arrays with more than 8096 LUNs.
614061, 614787	Adding cache volumes (used by space-optimized instant snapshots) to volume sets could cause data corruption and system panics.
617331, 631334	I/O was not restored on a path that was re-enabled after a failback or a non-disruptive upgrade (NDU) operation.
618317	A system crash could occur while bringing up cluster if I/O were performed on a unopened path.
621832	Immediately after installation, the <code>vxesd</code> daemon had the DVD mount point as its current working directory, which prevented the DVD from being unmounted.
643089	Relayout from <code>mirror-stripe</code> to <code>concat-mirror</code> did not work for site-consistent volumes.
645749	Growing a volume by a specified amount did not work for a site-consistent volume with more than 2 disks per site.
793159	Automatic reattachment of a remote site did not work correctly.
801445	The DMP feature to detect and respond to intermittently failing paths was turned off by default in the 5.0 release, and the values of the <code>dmp_health_time</code> and <code>dmp_path_age</code> tunables were both set to 0. This feature is now enabled by default in 5.0 MP1. The default values of <code>dmp_health_time</code> and <code>dmp_path_age</code> are 300 and 60 seconds respectively.
310784, Sun Bug ID 6230678	Encapsulating a boot file system that spanned two disks produced an error message.
311530, Sun Bug ID 6230031	Renaming an enclosure with a longer name caused <code>vxconfigd</code> to dump core.

Incident	Description
631174	The View Mapping button and the field to enter a file or directory name in the VEA were not completely visible when viewed in the Japanese locale. These objects appeared correctly if the window was made larger.
631206	In the French, Japanese or Simplified Chinese locales, the help for the Symantec Product Authentication Services is displayed in English. Entering the following commands displayed the correct help for the locale: <pre># cd /opt/VRTSat/bin/system_architecture # mv VxSS_Help.vxa VxSS_Help_en.vxa # mv VxSS_Help_lang.vxa VxSS_Help.vxa</pre> where lang is fr, ja or zh as appropriate for the locale.
615554	It was not possible to use the Web GUI to manage a Solaris x64 host that is running under Veritas Storage Foundation 4.1.

Veritas Enterprise Administrator fixed issues

The following issues have been fixed in this release of VEA.

Incident	Description
578688	The maximum size of the Alert and Task logs has been documented as 2MB.
596284	An Action pull-down menu item did not exist for the Layout View, the Disk View or the Volume View.
599060	Controller states were reported as “Not Healthy” when they are actually healthy, and “Healthy” when they were actually not healthy.
614761	The volume set creation wizard showed cache volumes in the “Available Volumes” list.
616661	When connecting to the central host, an “OutOfBoundException” error could occur.
618146	A Java exception error occurred in the Statistics View.

Veritas Web GUI fixed issues

The following issues have been fixed in this release of the Web GUI.

Incident	Description
564455	Removing a volume from a volume set returned a Java exception.
565072	Creating a file system on a disabled volume returned both success and failure messages.
566619	The Scan Disks By Controller View did not list the available controllers.
574410	Attempting to create a volume without an existing disk group produced a misleading error.
575262	Disabling a path to a SENA storage array produced an erroneous message.
576794	Ghost entries for disconnected disks in the All Disks View could not be removed by using the GUI.
596648	Messages about failures to import disk groups were not displayed by the Web GUI.
601157	The wizard could report that an ISP volume was created successfully when the command log showed that it was not.
605468	Forcibly removing a volume from a volume set displayed an erroneous message.
607026	At least one object had to be selected in the GUI before a disk could be initialized.
608573	Deleting a volume that had just been deleted produced a Java exception.
611894	Removing a disk from a disk group displayed an erroneous message.
615395	Attempting to delete an active cache volume failed with an error message that was incomplete.
619039	Messages about exceeding the Storage Foundation Basic soft limitations were not displayed by the Web GUI.
639751	Help for the Scan Disks by Controller page was missing.
805595, 807387	Migrating from Central mode to Standalone mode caused the Action Agent package (VRTSaa) to be removed.

Veritas File System fixed issues

The following issues have been fixed in this release of VxFS:

Incident	Description
498031	<code>qioadmin</code> file settings were not persistent after a reboot.
506593	<code>df</code> reported incorrect information on an unmounted block device.
526434	<code>vxrepquota</code> was missing a space between <code>hardlimit</code> and <code>timeleft</code> values.
526436	<code>open()</code> with <code>O_CREAT</code> and a long file name returned the <code>EIO</code> error.
568260	<code>vx_isnfs()</code> would sometimes cause a panic.
586928	<code>fcntl()</code> had poor performance in a clustered file system.
770917	Inode ownership issues detected in large directory related code paths have been fixed.
770953	<code>fsck</code> used to create the <code>lost+found</code> directory with the <code>rwrxrwxrwx</code> permissions if it decided to create one. Now, it creates the directory with the <code>rwxr-xr-x</code> permissions, which is consistent with the behavior of <code>mkfs</code> .
770964	<code>fsck</code> has been enhanced to replay file systems created with earlier log versions on volume sets.
771086	Fixed an <code>fsck</code> problem in which users could end up creating multiple <code>lost+found</code> directories when running the <code>fsck -o full</code> command and answering <code>fsck</code> questions interactively. Now, <code>fsck</code> creates only one. It also checks for multiple <code>lost+found</code> entries and removes duplicate directory entries.
771996	Enhanced VxFS to use less CPU when doing administrative tasks on the devices of multi-volume file systems.
772013	Enhanced the <code>fsck</code> command to enforce the <code>lost+found</code> file name in the root directory of the file system to be a directory file type.
777012	If the system crashed or there was a metadata I/O error, after the <code>fsadm</code> command reorganized the <code>lost+found</code> directory, running the <code>fsck -o full</code> command may not have been able to clean the file system with regard to names that needed to be added to the <code>lost+found</code> directory. The problem happened on single-volume and multi-volume file systems.
785649	A situation where <code>vxfsconvert</code> of a dusty file system loops forever in user-level code when an inode with pending truncation operation is encountered has been fixed.

Incident	Description
793022	<code>vxfs_nattr_open()</code> API interface has been fixed to shrink files, as appropriate, when invoked with <code>O_TRUNC</code> flag.
793030	<code>vxfsutil.h</code> uses <code>struct timeval</code> in one of the function declarations, but does not include <code>time.h</code> . This causes user applications to report warnings during compilation. This issue has been fixed by including <code>time.h</code> in <code>vxfsutil.h</code> .
795073	The increased CPU utilization when writing to a file system that is almost full due to more background processing threads than are actually required being enqueued has been fixed.

Veritas Storage Foundation for Databases fixed issues

Veritas Storage Foundation for Oracle fixed issues

The following issues have been fixed in this release of Veritas Storage Foundation for Oracle:

Incident	Description
269029	An ODM warning message is no longer produced if ODM is not enabled in Oracle home during a rescan.
534417	Previously, in some localized environments you could not use the VEA GUI. This has been fixed.
546921	Non-root users (such as Database Administrators) can now start the <code>vxdbc</code> process.
566275	The <code>dbed_vmclonedb -o restartdb</code> command now properly restarts the database.
567342	An unmounted checkpoint clone database no longer reappears in the Java GUI tree after rescanning.
604849	You need not run <code>dbed_update</code> from the command line before starting an Oracle database from the GUI. Previously, the tablespace folder was empty when starting the Oracle database from the GUI, unless first running <code>dbed_update</code> from the command line.
604858	In the datafile statistic wizard, if there are no statistics for a datafile, a warning message confirming that no statistics are available is now shown instead of showing only an empty table. Also, in the datafile statistic wizard, if a user does not select a statistic, the wizard now shows a warning message and will not advance to next page.

Incident	Description
605776	Previously, in the VEA GUI main window, the toolbar used the same hotkey of “V” for both View and View Mapping commands. Now View Mapping uses “M” as its hotkey.
607001	Repository changes resulting from executing SFDB Storage Checkpoint CLIs are no longer delayed in the SFDB GUI.
607082, 610519	A problem was fixed that sometimes caused Web GUI requests to produce the error message Error V-40-49408-54.
786989	The <code>qio_getdbfiles_ora</code> script now detects when an Oracle instance is in Standby mode.

Veritas Storage Foundation for Sybase fixed issues

The following are fixed issues in this release of Veritas Storage Foundation for Sybase:

Incident	Description
413352, 634093	The <code>qio_convertdbfiles -u</code> command now converts any QIO files back to native files, even if the <code>mkqio.dat</code> file contains a file that does not reside on a VxFS filesystem.
545985	The <code>qio_getdbfiles -d</code> command now properly lists information for specified database.
634095	Non-root users can now use the Storage Mapping feature, which was added to the 5.0 release of Veritas Storage Foundation for Sybase. After installation, the root user must run the following command to permit Sybase users to view storage mapping: <pre>/opt/VRTSobc/pal33/bin/veaconfig -c add_user -o host \ -r Operator -n user@host.unixpwd</pre> For example: <pre>/opt/VRTSobc/pal33/bin/veaconfig -c add_user \ -o rockfowl.veritas.com -r Operator \ -n sybase@rockfowl.veritas.com.unixpwd</pre>

Known issues

Veritas Storage Foundation known issues

License package not completely removed from non-global zones

Some files from the Veritas licensing package (`VRTSvlic`) may not be removed from a non-global zone that was created after `VRTSvlic` was originally installed. An error message is displayed if all files are not removed. If the error was encountered, after the package removal process ends, run the following command from the global zone to remove any remaining `VRTSvlic` files:

```
# rm -rf zonepath/root/var/sadm/pkg/VRTSvlic
```

If you are upgrading a product, and non-global zones are configured, instead of selecting the installer upgrade procedure (or running the script from the command line), perform the upgrade in steps: Uninstall the product, uninstall the infrastructure packages (`uninstallinfr` script), then reinstall the product.

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 use the `umask` command to restrict the default file mode creation permissions 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 the `umask` to `077`.

Veritas Volume Manager known issues

See the following sections for information about known problems and issues in this release of VxVM.

Installation and upgrade issues

ASL support for Sun StorEdge T3 and T3+ arrays

This release does not include the `libvxpurple.so` array support library (ASL) to support Sun StorEdge T3 and T3+ arrays. Any existing version of the `libvxpurple.so` ASL is removed when VxVM is upgraded to 5.0. Any T3 and T3+ arrays must be configured in autotrespass mode, and treated as JBODs of type A/P.

If an array is of type A/A-A, A/P or A/PF, and a suitable ASL is not available, the array must be claimed as an JBOD of type A/P. This is to prevent path delays and I/O failures arising. As JBODs are assumed to be type A/A by default, and neither T3 nor T3+ arrays are of this type, you must create appropriate JBOD entries for such arrays.

To configure a Sun StorEdge T3 or T3+ array as a JBOD of type A/P

- 1 Stop all applications, such as databases, from accessing VxVM volumes that are configured on the array, and unmount all VxFS file systems and checkpoints that are configured on the array.
- 2 Configure the T3 or T3+ array in autotrespass mode.
- 3 Add the array as a JBOD of type A/P:


```
# vxddladm addjbod vid=SUN pid=T300 policy=ap
```
- 4 If you have not already done so, upgrade the Storage Foundation or VxVM software to 5.0. Device discovery will be performed during the upgrade, and the array will be claimed as an A/P JBOD.

If you have already upgraded your system to 5.0, run the following command to perform device discovery:

```
# vxdctl enable
```

- 5 Verify that the array has been added with the policy set to APdisk:

```
# vxddladm listjbod
VID   PID      Opcode Page Code Page Offset SNO length Policy
=====
SUN   T300     18      -1      36      12      APdisk
```

- 6 Check that the correct devices are listed for the array:

```
# vxdisk list
DEVICE   TYPE          DISK   GROUP   STATUS
APdisk_0 auto:cdsdisk  -     -       online invalid
APdisk_1 auto:cdsdisk  -     -       online invalid
APdisk_2 auto:cdsdisk  -     -       online invalid
...
```

Initializing disks previously under VxVM control

If you are planning to initialize disks, check to see if any of the disks were previously under VxVM control. If so, and if they were used on the same host system, the disk groups they represent are imported automatically during the installation process if the proper removal procedures were *not* followed. An attempt during installation to initialize or encapsulate disks that were previously under VxVM control fails. After installation, if you no longer want to use those disk groups, use the destroy option of the `vxchg` command to remove those disk groups. Alternately, you can use `vxdiskunsetup` to remove the disks from VxVM control. Be aware that these options can result in data loss if used incorrectly.

Recognizing simple disks from earlier releases

In earlier releases of VxVM, some users minimized the allocation of disks to the disk group, `rootdg`, by associating `rootdg` with a small disk partition that was characterized as a simple disk. This procedure would have been achieved by using the command, `vxctl add disk`, which is no longer supported in VxVM 4.0 and later releases.

If you created one of these simple disks, you will need to carry out a procedure similar to the one described in the following example.

Assuming that the simple disk is defined to be on `c1t21d0s7`, you would see the following entry in `/etc/vx/volboot`:

```
disk c1t21d0s7 simple privoffset=1
```

After upgrading to VxVM 5.0, you must reboot the system. After rebooting, execute the command, `vxdisk list`, and you will see that `c1t21d0s7` is not listed. This is because `vxconfigd` now ignores disk entries in `/etc/vx/volboot`.

To retain access to data on a simple disk

- 1 Define a disk access record that will be created in `/etc/vx/darecs`
`vxdisk define c1t21d0s7 type=simple`
- 2 Request that `vxconfigd` should extract information from this disk:
`vxctl enable`
- 3 Discover the name of the disk's disk group:
`vxprint -th`
- 4 Enable access to the disk's disk group; `rootdg` in this example:
`vxvol -g rootdg startall`

[137838]

Interruption of an upgrade

If the installation software is interrupted on the local system during certain upgrade situations, Veritas Volume Manager configurations may be lost after a reboot. If this happens, the entire Veritas Volume Manager package must be reinstalled and a recover must be done manually by recreating the disks, disk groups, and volumes and restoring the data from backup. [13033]

“SIGHUP caught” message on the console

When running `vxinstall` on a system with a SENA array that is enabled with enclosure naming, you may see a message similar to the following:

```
newmac.veritas.com console login: Dec 31 00:00:00  
syseventd[59]: SIGHUP caught
```

You can safely ignore this message. [Sun Bug ID 4955989, i138955]

Misleading alerts generated on a system with the VAIL package installed

An alert with the text message “SymCLI command line tools are not installed properly” will be generated in each of the following two cases when SYMCLI is either absent or not installed properly on the host on which a VAIL package is installed.

Case 1. When host comes up after a reboot and SYMCLI is either absent or not installed properly.

Case 2. When a rescan of Symmetrix provider is initiated and SYMCLI is either found to be absent or found to be not installed properly but SYMCLI installation was proper before rescan of Symmetrix provider was initiated.

In either of Case 1 or Case 2 one should ignore the alert message on the host on which VAIL package is installed if there is no EMC Symmetrix array being managed on that host. [Sun Bug ID 6211778, 297830]

No support for remote package and patch installation

Veritas Volume Manager does not currently support remote package and patch installation across different architectures. For example, installation of a package from a SPARC system to a x86 system is not supported.

LiveUpgrade

LiveUpgrade does not currently work on a system that has its root disk encapsulated.

Utility issues

Reformatting a CDS disk can cause data corruption

On disks that are initialized by VxVM as CDS disks (the default format), the CDS information occupies the first sector of that disk, and there is no fdisk partition

information. Attempting to create an fdisk partition (for example, by using the fdisk or format commands) erases the CDS information, and can cause data corruption.

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]

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
```

Shrinking a swap volume

`vxassist` has no built-in protection to prevent you from shrinking the `swap` volume without first shrinking what the system sees as available swap space. If it is necessary to shrink the `swap` volume, the operation must be done in single

user mode and the system must be rebooted immediately. Failing to take these precautions can result in unknown system behavior or lock-up. [6154]

Adding a log and mirror to a volume

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. To add a log and a mirror, add them in two separate `vxassist` invocations, as follows:

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

[13488]

Replacement of the `old_layout` attribute

The `old_layout` attribute is no longer supported when the `vxdisksetup` command is used to make a disk into a VxVM controlled disk. Use the `noreserve` attribute instead. [121258]

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 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]

Growing or shrinking layered volumes

Due to the current implementation of a resize of layered volumes, it is recommended that you do not grow or shrink layered volumes (for example; `stripe-mirror`, `concat-mirror`) while resynchronization is ongoing. Note that this limitation does not apply to ISP layered volumes.

Internally, VxVM converts the layout of layered volumes and updates the configuration database before it does the actual resize. This causes any ongoing operation, such as a 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 this case, you have to use `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.

Startup script messages not seen on the console

With the introduction of SMF support in Solaris 10, startup script messages are no longer seen on the console.

These messages can be viewed (`cat` or `vi`) in SMF log files found at:

```
/var/svc/log
/etc/svc/volatile
```

The file names are based on the specific startup script:

```
#!/var/svc/log: ls
system-vxvm-vxvm-startup2:default.log
system-vxvm-vxvm-sysboot:default.log
```

Also, other startup messages can be found in:

```
#!/var/svc/log: ls
milestone-multi-user-server:default.log
milestone-multi-user:default.log
milestone-name-services:default.log
milestone-single-user:default.log
```

```
#!/etc/svc/volatile
```

```
system-vxvm-vxvm-startup2:default.log
system-vxvm-vxvm-sysboot:default.log
```

[269949]

Bad disk block warning

When `vxio` detects a bad disk block on a disk, it will display a warning message indicating that an uncorrectable write error has been encountered. [272176]

Do not specify a long device name in the `/etc/vx/disks.exclude` file

It is recommended that you do not edit the `/etc/vx/disks.exclude` file directly. Some scripts like `vxdiskadm` fail with an error message if a long device

name is specified in this file. You should instead use option 17 or 18 of the `vxdiskadm` command to suppress or unsuppress devices from VxVM's view. [Sun Bug ID 6228464, 311275]

Unable to boot system without bootdg link to the boot disk group

A system may fail to boot with the following errors:

```
ERROR: svc:/system/filesystem/root:default failed to mount /usr
(see 'svcs -x' for details)
[ system/filesystem/root:default failed fatally (see 'svcs -x'
for details) ]
Requesting System Maintenance Mode
(See /lib/svc/share/README for more information.)
Console login service(s) cannot run

Root password for system maintenance (control-d to bypass):
single-user privilege assigned to /dev/console.
Entering System Maintenance Mode

Feb 14 23:41:26 su: 'su root' succeeded for root on /dev/console
su: No shell /bin/ksh. Trying fallback shell /sbin/sh.
-sh: /bin/i386: not found
-sh: /usr/sbin/quota: not found
-sh: /bin/cat: not found
-sh: /bin/mail: not found
-sh: -o: bad option(s)
```

One possible cause for the error that the symbolic link between `bootdg` and the boot disk group under `/dev/vx/dsk` or `/dev/vx/rdsk` is missing.

The workaround for this error is as follows:

- 1 Make sure that your system does not have a link under `/dev/vx/dsk` and `/dev/vx/rdsk`

```
bootdg -> rootdg
```
- 2 Boot the system from an installation disk or from a network boot server.
- 3 Mount the root (`/`) file system on a suitable mount point. In this example `c0t0d0s0` is the slice that corresponds to the root file system on the boot disk.

```
# mount -F ufs -o nologging /dev/dsk/c0t0d0s0 /mnt
```
- 4 Create the link. This example assumes that the boot disk group is called `rootdg`:

```
# cd /mnt/dev/vx/dsk
# ln -s rootdg bootdg
# cd /mnt/dev/vx/rdsk
# ln -s rootdg bootdg
# cd
# umount /mnt
# init 0
```

5 Reboot the system.

[Sun Bug ID 6230224]

Disabling MPxIO in a SAN boot configuration can cause system to panic

Solaris 10 update 3 systems panic and fail to boot SAN boot device, when `mpxio_disable` is set to 'yes' in `/kernel/drv/fp.conf`. [Sun Bug ID CR 6525123, 6539777]

Sun cautions the user on disabling MPxIO on FC disks that have critical file systems needed for booting. Sun also recommends that you update to the following OS level and patches:

- Solaris 10 update 3
- Latest kernel level patch - 118855-36 or later
- Latest qlc driver patch - 119131-33 or later
- Patch 120993-01
- Latest firmware array

Workaround: Follow these steps when disabling MPxIO:

- 1 Disable `mpxio`. Refer to the Sun document available at http://docs.sun.com/source/819-0139/ch_4_config_multi_SW.html#pgfid-1000566.
- 2 Update the x86 boot archive:

```
# bootadm update-archive
```
- 3 Perform the reconfiguration reboot:

```
#touch /reconfigure
#shutdown -g0 -y -i6
```
- 4 Boot the failsafe OS.
- 5 Mount the boot disk's root filesystem on `/a`:

```
#mount <root device> /a
```
- 6 Edit `/a/etc/vfstab` to point to the correct root device

```
# vi /a/etc/vfstab
# /sbin/bootadm update-archive -R /a
# sync
# umount /a
```
- 7 Reboot the system:

```
# reboot
```

Patch Issues

Patch removal causes vxconfigd to dump core

If you use the `patchrm` command to remove the VxVM patch (122058-06), the `vxconfigd` daemon dumps core when it is restarted, and the following error message is displayed:

```
VxVM vxconfigd ERROR V-5-1-0 Bus error - core dumped.
```

The error can occur if:

- Any volume is open, such as if the root disk is encapsulated, or a file system on a VxVM volume is mounted.
- Any process is accessing VxVM drivers that cannot be unloaded. In this case, a workaround is to use the `pskill vx` and `ps -ef | grep -i vx` commands to make sure that all `vx*` processes other than `vxconfigd` are stopped before removing the VxVM patch.

The error is harmless, and the patch is removed correctly. VxVM functions normally if the system is rebooted. [796270]

Device issues

Converting a multipathed disk

Under Solaris 10 when converting a multipathed disk that is smaller than 1TB from a VTOC label to an EFI label, you must issue a `format -e` command for each path. For example, if a node has two paths, `c1t2d0s2` and `c2t2d0s2`, you need to apply the `format -e` command to each of the two paths. [269566]

Adding disks to VxVM volume on a Solaris x64 system

The default disk layout on the Solaris x64 platform differs from that on the Solaris SPARC platform as follows:

- On a Solaris SPARC system, the start of the Solaris partition, which may contain a primary boot executable and boot block in addition to the VTOC and any disk slices, is located in cylinder 0. The whole disk is accessed using the device `c#t#d#s2`.
- On a Solaris x64 system, an FDISK partition, which may contain a master boot record (MBR) is located in cylinder 0, and the start of the Solaris partition is located in cylinder 1. The device `c#t#d#s2` references the entire Solaris partition, but not the FDISK partition. The whole disk may be accessed using the device `c#t#d#p0`.

Before a disk with a `sun` partition label from a Solaris SPARC system can be used on a Solaris x64 system, it is necessary to use the `fdisk` command to rewrite its partition layout and VTOC, so destroying any data on the disk. However, a CDS

disk group can be imported on a Solaris x64 system without needing to run the `fdisk` command. The layout of the partition table for CDS disks is the same on all supported platforms, and does not include an FDISK partition, or a Solaris partition and VTOC.

As on the Solaris SPARC platform, you can use the Veritas Enterprise Administrator (VEA) GUI, the Web GUI, or the `vxdiskadm`, `vxdiskadd` or `vxdisk` commands to initialize a new disk with one of the following formats: `auto:cdsdisk`, `auto:simple`, `auto:sliced`, `nopriv`, `simple` or `sliced`.

Removing a disk from VxVM control

After removing a disk from its disk group, you can use the `vxdiskunsetup -C` command to clear the VxVM configuration on the disk:

```
# vxdiskunsetup -C daname
```

where *daname* is the disk access name, such as `c2t4d7`.

If the `vxdisk list` command shows that a disk is in the `error` state, use the following commands to reinitialize the disk with the default layout for a Solaris x64 system, and remove the disk from the VxVM configuration:

```
# fdisk -B -n /dev/rdisk/danamep0
# vxdisk rm danames2
# vxdisk scandisks
```

Note that the partition 0 device (for example, `c2t4d7p0`) is specified to the `fdisk` command, but the Solaris partition device (for example, `c2t4d7s2`) is specified to the `vxdisk rm` command.

The `vxdisk list` command should now show the disk's type as `auto:none` and its state as `online invalid`. If the disk is still not shown as being in the `online` state, use the following command to clear the first 512 blocks on the disk before rerunning the `fdisk` and `vxdisk` commands:

```
# dd if=/dev/zero of=/dev/rdisk/danamep0 count=512
```

Encapsulation of disks with insufficient space for a private region

Disks with insufficient space for the allocation of an on-disk database copy cannot be encapsulated. The database requires at least the same space as is allocated for other disks in the same disk group. The default required size is 32MB. 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 the database must be allocated from the beginning or the end of the disk, with the exception of the root disk. The root disk can be encapsulated by carving out space from the `swap` partition if there is no space at the beginning or at the end of the disk. This is done by creating a subdisk for the private partition in the space obtained from the `swap` partition.

Workaround:

The problem of insufficient space on a disk to store private VxVM information has no workaround. VxVM requires a small region of private storage for proper disk identification. The number of VxVM objects that can be configured in a disk group is almost directly proportional to the size of the private region. The default private region size is 32MB. If this size is overridden, it is recommended that it be made no smaller than 1MB.

Extensible Firmware Interface support

The Solaris 10 64-bit kernel Operating System provides support for disks larger than 1 terabyte. Disks of this size are formatted with the Extensible Firmware Interface (EFI) disk label rather than the VTOC disk label. EFI formatted disks are supported with Veritas Volume Manager on Solaris 10 only.

[303294, 834313, Sun Bug ID 6226760]

Stale device entries slow down Veritas Volume Manager

Under Solaris 10, stale device entries in the `/dev/[r]dsk` directories can cause the VxVM configuration daemon, `vxconfigd`, to consume a large amount of CPU time. Remove the stale entries by entering the following sequence of commands:

```
# devfsadm -C
# touch /reconfigure
# init 6
```

Newly added disks should be labeled

When new disks are added to a Solaris configuration, these disks should be labeled before they are used with VxVM. VxVM can discover unlabeled disks, but it cannot read their disk geometry, nor can it initialize them. A console message similar to the following is displayed for each unlabeled disk:

```
WARNING: /pci@1e,600000/SUNW,q1c@3,1/fp@0,0/ssd@w22110002ac0002
66,0 (ssd18): Corrupt label; wrong magic number
```

When VxVM discovers unlabeled disks, the disk configuration information is added to DMP. If DMP attempts to open the unlabeled device, the open fails, and the paths are disabled. If the system is subsequently rebooted with the unlabeled disks, DMP disabled path messages are also displayed for the unlabeled disks.

To prevent unnecessary delay occurring at boot time, it is recommended that you use the `format` command to label new disks before having VxVM discover and initialize them. [544797]

vxddladm addsupport command limitations

The `vxddladm addsupport` command could cause your system to hang when using a Sun SCSI Enclosure Service (SES) Driver. This situation can be caused by stale entries in `/dev/es`. A stale entry is a device link in `/dev/es`, for which no corresponding device is connected to the system.

In some circumstances, installing VxVM can cause a system to hang because the `vxddladm addsupport` command is also run.

If your system hangs, perform the following workaround:

- 1 Reboot the system.
- 2 Remove all entries, both stale and valid, from `/dev/es`.
- 3 Run the `devfsadm` command to recreate `/dev/es` with valid entries:

```
# devfsadm -C
```
- 4 Reinstall the Veritas software.
[115323, 140441]

Disk controller firmware upgrades

For a workaround to Sun Bug ID 4164338, use the procedure described in “Upgrading disk controller firmware” in the “Administering Dynamic Multipathing (DMP)” chapter of the *Veritas Volume Manager Administrator’s Guide*.

Event source daemon dies

If the host-side switch port is disabled and enabled on a Brocade switch, the event source daemon (`vxesd`) dies if the latest Solaris patches for the `SUNWfchba`, `SUNWfchbr` and `SUNWfchbx` packages have not been applied to the system. Install the latest recommended Patch Cluster. [534392]

Hitachi arrays in Active/Active mode

When Hitachi DF400, DF500, HDS9200, HDS9500 or HDS9700 arrays are configured as Active/Active mode arrays, performance is degraded. The correct ASL must be installed that allows these arrays to be claimed as A/PG-type arrays. [73154]

Relayout of volumes on the root disk

Do not run the `vxrelayout` and `vxassist` commands to relayout a volume that is part of root disk. This action may corrupt the layout of the root disk so that you cannot boot from it. On an encapsulated root disk, a relayout can cause an upgrade to fail. [103991]

Failure to add a disk from a T3 array

On a T3 array, VxVM may display the following failure when trying to add a disk (typically from `vxinstall` or `vxdisksetup`):

```
vxvm:vxdisk: ERROR: Device XXXX: online failed  
Device path not valid
```

This can happen in cases where the T3 disk was re-partitioned (or re-formatted) prior to one or more disks being added. [105173]

SFCFS with I/O fencing is not supported on HDS9200 arrays

If you attempt to boot a cluster with I/O fencing (PGR) enabled, HDS9200 disks will show up in error state on the slaves. This error does not appear if I/O fencing is disabled. [131926]

Disks in V480 and V880 internal disk enclosures

Fujitsu and Hitachi disks in V480 and V880 internal disk enclosures may not be automatically recognized as JBOD disks. This could potentially cause data corruption if multipathing is not configured correctly. After installing any Sun-qualified FC disks as FRU replacements, use the procedure described in “Adding Unsupported Disk Arrays to the DISKS Category” in the “Administering Disks” chapter of the *Veritas Volume Manager Administrator’s Guide* to add each such disk to the JBOD category. It is important that both the vendor ID and product ID are specified for each such disk to avoid conflicts with similar disks in other arrays. For Fujitsu disks, the number of characters in the serial number must also be specified. [Sun Bug ID 4900508, i133579]

Errors when using JNI cards

If the model number of your JNI card is one of FCE-1063, FCE2-1063, FCE-6410, FCE2-6410, or FCE2-6412, you may experience error messages of the form:

```
Oct 22 00:16:16 ds13un jnic: [ID 847178 kern.notice] jnic1: Memory
port parity error detected
Oct 22 00:16:16 ds13un jnic: [ID 229844 kern.notice] jnic1: Link
Down
Oct 22 00:16:16 ds13un jnic: [ID 744007 kern.notice] jnic1: Target0:
Port
0000EF (WWN 500060E802778702:500060E802778702) offline.
Oct 22 00:16:18 ds13un jnic: [ID 709123 kern.notice] jnic1: Link Up
Oct 22 00:16:18 ds13un jnic: [ID 236572 kern.notice] jnic1: Target0:
Port
0000EF (WWN 500060E802778702:500060E802778702) online.
Oct 22 00:16:18 ds13un jnic: [ID 229844 kern.notice] jni
Contact JNI support for more information.
```

Workaround: Add the following parameter to the JNI configuration file (`jnic.conf`):

```
FcEnableContextSwitch = 1;
```

Sun StorEdge Traffic Manager

The Sun StorEdge Traffic Manager (SSTM) boot support feature that is available through SAN 4.3 or later is not supported. Booting from fabric devices under SSTM or boot encapsulation of fabric devices under SSTM is also not supported. [Sun Bug ID 4912232, 4909641, 4912667].

Loss of disk space in 3510 arrays

If a 3510 array disk that is larger than 512GB is initialized to be a CDS disk, the value that is returned by a SCSI mode sense command for the number of sectors per track may be incorrect. This can cause the sector count to be miscalculated and some disk space to be lost. [272241]

Hitachi 9990 Genesis array

After installing the Storage Foundation software, errors such as the following may be displayed on the console.

```
d18b-root@[/usr/sbin]>d18b-root@[/usr/sbin]>get_geometry_info_c
ommon: solaris disk label adj. failed for
/dev/vx/rdmp//GENESIS0_6 (err 22)get_geometry_info_common:
solaris disk label adj. failed for /dev/vx/rdmp//GENESIS0_6 (err
22)get_geometry_info_common: solaris disk label adj. failed for
/dev/vx/rdmp//GENESIS0_6 (err 22)get_geometry_info_common:
solaris disk label adj. failed for /dev/vx/rdmp//GENESIS0_6 (err
22)get_geometry_info_common: solaris disk label adj. failed for
/dev/vx/rdmp//GENESIS0_6 (err 22)get_geometry_info_common:
solaris disk label adj. failed for dev/vx/rdmp//GENESIS0_6 (err
22)
```

This failure has been observed on the Hitachi 9990 (Genesis) arrays where the disk geometry data is being handled incorrectly by `vxconfigd`, resulting in the indicated message during `vxdtl enable` or `vxconfigd` startup. This message does not affect VxVM's use of the array. [Sun Bug ID 6221005, 301931, 308975]

S-VOL devices on HDS with TrueCopy enabled

When using HDS with True Copy enabled, the primary devices (P-VOL) and their mirrors (S-VOL devices) are both seen in `vxdisk list` output. The P-VOL devices are available for import but the S-VOL devices are not available for import. Do not try to use S-VOL devices even though they appear in the `vxdisk list` output. [300979]

USB devices not ignored.

Veritas Volume Manager does not ignore USB devices attached to your system, resulting in an error. When VxVM encounters an USB device, the status field for the device displays an error. View the device details to verify the error. This USB device should be ignored and cannot be used due to the error status.[803949]

```
#vxdisk list
DEVICE TYPE DISK GROUP STATUS
c2t0d0s2 auto - - error

# vxdisk list c2t0d0s2
Device: c2t0d0s2
devicetag: c2t0d0
type: auto
flags: online error private autoconfig
```

```
pubpaths: block=/dev/vx/dmp/c2t0d0s2 char=/dev/vx/rdmp/c2t0d0s2
guid: -
udid:AMI%5FVirtual%20Floppy%5FOTHER%5FDISKS%5Fvmgalaxy13%5F%2Fdev%2Frdsk%2Fc2t0d0s2
site: -
Multipathing information:
numpaths: 1
c2t0d0s2 state=enabled
```

Hot-relocation issues

Impact of hot-relocation on performance

Except for `rootvol` and `swapvol`, the hot-relocation feature 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]

Disk information in notification messages

When a disk failure occurs, the hot-relocation feature notifies the system administrator of the failure and any relocation attempts through electronic mail messages. The 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]

DMP issues

Fabric Monitoring

The new 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]

Handling intermittently failing paths

The `dmp_health_time` and `dmp_path_age` tunables control how DMP handles intermittently failing paths. The default values in VxVM 5.0 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.

The minimum configurable value of `dmp_path_age` is 0, which prevents DMP from detecting intermittently failing paths.

Disabling switch ports can cause I/O failures

Disabling the switch ports on the secondary paths to an A/P array can cause I/O failures on the primary path. This is because a fabric reconfiguration can take some time to stabilize depending on the complexity of the SAN fabric. Running the `vxdisk scandisks` command returns the primary paths to the enabled state. [607996]

Failure of mirroring with A/PF arrays

Mirroring a volume by using option 6 to the `vxdiskadm` command fails if the device discovery layer chooses a secondary path to a device in an A/PF array. There is no known workaround for this issue. [603164]

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`.

Disabling MPxIO

MPxIO is enabled by default, which may prevent DMP from providing multipathing support. To ensure that multipathing through DMP is enabled, MPxIO must be disabled. See [“Enabling the DMP feature”](#) on page 25.

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]

Delays in systems with DS4800 storage

In a cluster with a shared IBM System Storage DS4800 disk storage system that is under a very heavy I/O load, opening the primary paths of a LUN or joining a node may take a long time. For example, it can take up to 15 minutes for a node to join a single-node cluster where approximately 90 LUNS are present. This behavior occurs even if the node that is opening the LUN is not involved in the I/O activity, and even if it is not busy in any other way. [616166]

Failure to detach a bad plex

If the cluster detach policy is set to global, and a non-mirrored volume experiences a disk media failure, the disk is not shown as failed and the volume is not disabled. However, I/O requests fail. [521182]

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
```

[Sun Bug ID 4087612; 20448]

RAID-5 volumes

VxVM does not support RAID-5 volumes in cluster-shareable disk groups.

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 therefore be started on the master first.

Messages caused by open volume devices

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:

```
cannot assign minor #
```

This message is accompanied by the console message:

```
WARNING:minor number ### disk group group in use
```

Remote Mirror issues

Handling intermittently failing paths in a Campus Cluster

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 `vxddmpadm 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`.

Automatic site reattachment

A new automatic site reattachment daemon, `vxstited`, has been implemented to provide automatic reattachment of sites. `vxstited` uses the `vxnotify` mechanism to monitor storage coming back online on a site after a previous failure, and to restore redundancy of mirrors across sites.

If the hot-relocation daemon, `vxrelocd`, is running, `vxstited` attempts to reattach the site, and allows `vxrelocd` to try to use the available disks in the disk group to relocate the failed subdisks. If `vxrelocd` succeeds in relocating the failed subdisks, it starts the recovery of the plexes at the site. When all the plexes have been recovered, the plexes are put into the ACTIVE state, and the state of the site is set to ACTIVE.

If `vxrelocd` is not running, `vxstited` reattaches a site only when all the disks at that site become accessible. After reattachment succeeds, `vxstited` sets the site state to ACTIVE, and initiates recovery of the plexes. When all the plexes have been recovered, the plexes are put into the ACTIVE state.

Note: `vxstited` does not try to reattach a site that you have explicitly detached by using the `vxddg detachsite` command.

The automatic site reattachment feature is enabled by default. The `vxstited` daemon uses email to notify `root` of any attempts to reattach sites and to initiate recovery of plexes at those sites. To send mail to other users, add the user name to the line that starts `vxstited` in the `/lib/svc/method/vxvm-recover` startup script and run the `svcadm refresh vxvm/vxvm-recover` command.

If you do not want a site to be recovered automatically, kill the `vxstited` daemon, and prevent it from restarting. To kill the daemon, run the following command from the command line:

```
# ps -afe
```

Locate the process table entry for `vxstied`, and kill it by specifying its process ID:

```
# kill -9 PID
```

If there is no entry in the process table for `vxstied`, the automatic site reattachment feature is disabled.

To prevent the automatic site reattachment feature from being restarted, comment out the line that starts `vxstied` in the `/lib/svc/method/vxvm-recover` startup script and run the `svcadm refresh vxvm/vxvm-recover` command.

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 failed disk

It is not possible to replace a failed disk while its site is detached. You must first reattach the site and recover the disk group by running these commands:

```
# vxdg -g diskgroup reattachsite sitename  
# vxrecover -g diskgroup
```

The `vxdiskadm` command gives an error when replacing disk on which the `site` tag had been set. Before replacing such a failed disk, use the following commands to set the correct site name on the replacement disk:

```
# vxdisk -f init disk  
# vxdisk settag disk site=sitename
```

[536853, 536881]

Snapshot and snapback issues

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 a clustered file system

When taking a snapshot of a file system in an SFCFS cluster, the following warning message might appear:

```
vxio: WARNING: vxvm:vxio: 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 a CFS 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 a SFCFS file system, you should ensure that at least one of the volumes defined in the command line is mounted on the CVM master.

Mount operation can cause inconsistencies in snapshots

Inconsistencies can arise in point-in-time copies if a snapshot administration operation is performed on a volume while a file system in the volume is being mounted.

Space-optimized snapshot creation fails

Using the `vxsnap make` command to create a space-optimized snapshot of a volume can fail if a large amount of I/O is active on the volume. The following error is displayed:

```
VxVM vxassist ERROR V-5-1-10127 getting associations of subdisk  
subdisk: Record not in disk group
```

The command succeeds if I/O is suspended while the snapshot is created.
[606613]

Intelligent Storage Provisioning issues

Creating application volumes

To create application volumes successfully, the appropriate licenses must be present on your system. For example, you need a full Veritas Volume Manager license to use the instant snapshot feature. Vendors of disk arrays may also provide capabilities that require special licenses for certain features of their hardware. [Sun Bug ID 4948093, i137185]

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 number of columns that are created in such a volume is always one more than the number specified. [Sun Bug ID 4976891]

Error when using allocator type volumes

Using allocator type volumes may cause the Storage Agent to terminate.

Workaround: Restart the Storage Agent by executing the following command:

```
/opt/VRTSobc/pa133/bin/vxpal -a StorageAgent -x
```

[930615]

Localization issues

Upgrading language packages

You must uninstall the old version of the language packages before installing the Storage Foundation 5.0 language packages, `VRTSmulic` and `VRTSmuvmpl`.

[625958]

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 your disk drive or disk array manufacturer to determine whether your system disk drives use a write-back cache, and if the configuration can be changed to disable write-back-caching.

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 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, the disk group should be imported temporarily when the intention is to deport the 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 state of 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. In such cases, to force the volume to start, use the following command:

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

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

Failure of memory allocation

On machines with very small amounts of memory (32 megabytes or less), under heavy I/O stress conditions against high memory usage volumes (such as RAID-5 volumes), a situation occurs where the system can no longer allocate pages of physical memory.

Using long device paths with Sun Online:Backup

The Sun Online:Backup™ facility does not accept the long device path names for volumes. A limitation of Online: Backup is that it does not accept device paths longer than 24 characters.

Workaround: Use symbolic links to the longer `/dev/vx/dsk/volname` paths from a shorter path name.

Messages about Veritas Volume Replicator licenses

The following messages may get displayed on the console during a system reboot or during VxVM initialization when you are running `vxinstall`:

```
No VVR license installed on the system; vradmind not started  
No VVR license installed on the system; in.vxrsyncd not started
```

These messages are informational only, and can be safely ignored if you are not a Veritas Volume Replicator user.

Solaris Issues

Dynamic Tracing Function Boundary Tracing probes

Dynamic Tracing (DTrace) Function Boundary Tracing (FBT) probes are not supported with the `vxio` driver. This is because of a limitation in Solaris 10 that such probes cannot handle modules with a text size larger than 2MB. The following error message is generated on the console as a result of using DTrace FBT probes with the `vxio` driver:

```
fbt: WARNING: couldn't allocate FBT table for module vxio
```

These messages are harmless, and can be safely ignored.

Number of inodes required in the root file system

The default maximum number of inodes in a UFS file system depends on the size of the file system. Once a UFS file system has been created, you cannot change the number of inodes without re-creating the file system. On a system with a large number of LUNs, the root file system can run out of inodes. This causes errors to be seen both from the operating system and from Veritas Volume Manager. As a general rule, the number of inodes that DMP creates for every LUN is 16 times the number of separate paths to the device. For example, 8,000 LUNs connected over 2 paths would require 256,000 additional inodes. [538039]

Encapsulation of swap partitions

During encapsulation, VxVM does not consider a partition to be a swap partition unless its partition tag (as shown by `prtvtoc`) is `swap` or `3`. Any partition used as a swap partition but not tagged as such is encapsulated as a file system. In the `vfstab` file, a note is made that the partition has been encapsulated, but the `vfstab` entry *is not* translated, and thus, the partition is not added as a swap area as part of the boot process. All partitions that are to be used as swap devices must be marked with the `swap` tag to be properly encapsulated. [13388]

Protection of block 0 on disks

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

Definition of disk slice 2

On Solaris, slice 2 of a non-EFI disk is the full disk by default. When finding connected disks, VxVM checks slice 2 of a disk. Slice 2 on a disk must always be defined as the full disk slice with a tag of `0x05`.

Messages caused by long swap volume names

If multiple swap partitions are encapsulated on your disks, VxVM names them as `swapvol`, `swapvol1`, `swapvol2`, and so on. When the system is rebooted, the following error message is displayed:

```
/dev/vx/dsk/swapvol2 : Overlapping swap files are not allowed
```

However, the swap devices are correctly added with no ill effects on the system. To avoid seeing this message, shorten the names of swap volumes (other than `swapvol`) from `swapvol n` to `swap n` .

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.

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
```

Disk group creation failure with a duplicate disk ID

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

[Sun Bug ID 4923820]

Printing errors from VEA on Windows 2000 Service Pack 2

When a user tries to print the volume layout view from VEA, the print is not clear.

Workaround: Upgrade the printer device driver to 0.3.1282.1 and install Service Pack 3. Upgrade to the latest version of VEA and print again. [286476]

Non-ASCII characters not displayed correctly

VEA does not display non-ASCII characters correctly in the comment field and in other fields that accept input of non-ASCII characters, if the system LANG is set to a locale other than UTF-8. CLI still supports non-ASCII characters on VM objects' comment field and file system mount point for any language locale setting. [925201]

Veritas Volume Manager Web GUI issues

Internal disks are shown as available to shared disk groups

The Create Disk Group wizard shows internal disks as being available for the creation of a shared disk group. [574717]

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]

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]

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]

Operation result not displayed

The add map operation for allocator volume does not return the operation result, due to which the Web GUI framework displays a `no result` message on the result page.

Workaround: To check the status of the operation, look for text similar to the following in the log file `/var/vx/isis/command.log`.

```

Description: Add Log
Date: [Date of operation]
Command: /usr/sbin/vxvoladm -g [name of disk group] add log
[volume name] logtype=dco nlog=1
Output:
Exit Code:0

```

```

Description: fmr3 prepare
Date: [Date of operation]
Command: /usr/sbin/vxsnap -g [name of disk group] prepare
[volume name] regionsize=64k drl=yes
ndcomirs=1
Output:
Exit Code:0

```

The value associated with `Exit Code:` indicates the result of the operation. If it is zero then the operation was executed successfully. If it is a non-zero value, then the operation has failed. [971985]

Upgrading 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 from 2.0 forward:

VxVM Release	Cluster Protocol Versions	Disk Group Version	Supported Disk Group Versions
2.0	n/a	20	20
2.2	n/a	30	30
2.3	n/a	40	40
2.5	n/a	50	50
3.0	n/a	60	20-40, 60
3.1	n/a	70	20-70
3.1.1	10, 20	80	20-80
3.2	30	90	20-90
3.5	40	90	20-90
4.0	50	110	20-110
4.1	60	120	20-120

VxVM Release	Cluster Protocol Versions	Disk Group Version	Supported Disk Group Versions
5.0	70	140	20-140

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*.

Available controllers not shown

The Scan Disks By Controller View does not list the available controllers. [566619]

Veritas File System known issues

The following issues were reported for this release of Veritas File System.

API for manipulating disk quotas

VxFS now implements the quota Application Program Interface (API) documented in the Solaris `quotactl(7I)` manual page. Users who have written their own quota tools based on the `Q_QUOTACTL ioctl` can now use those tools on VxFS file systems. However, you cannot administer VxFS file system quotas using the `Q_QUOTACTL ioctl` from a client which mounts VxFS over NFS. This capability will not be available until a modification to the RPC quota daemon (enabling quotas on file systems other than UFS) is implemented on the Solaris operating system.

Stack size change

When installed on Solaris 10, VxFS changes the default stack size to 24K for 64-bit systems. The stack size is designated in the Solaris configuration file `/etc/system`.

The `ustat` command returns an error for VxFS file systems larger than one terabyte

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

Commands must be large-file aware to operate correctly on file systems larger than one terabyte

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

Inode limitation on file systems without large file support

For a file system to have more than 8 million inodes, you must create it using the `largefiles` option of `mkfs` (the `fsadm` utility can also be used to set the `largefiles` flag on the file system). See the `mkfs_vxfs(1M)` and `fsadm_vxfs(1M)` manual pages for details. The `largefiles` option is enabled by default on VxFS 4.1.

ioctls are not supported on the File Change Log file

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

Large file systems should be mounted only on systems with sufficient memory

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

have sufficient memory. The memory requirements for mounting large file systems are shown in the tables below.

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

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

Table 1-2 Memory Usage for a File System With a 2K Block Size

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

Table 1-3 Memory Usage for a File System With a 4K Block Size

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

Table 1-4 Memory Usage for a File System With an 8K Block Size

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

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

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

Quick I/O files cannot be sparse files

If you try to convert a sparse file to a Quick I/O file, the Oracle instance can fail if Oracle tries to write into an unallocated block.

Some disk quota operations do not function on NFS

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

Non-standard command behavior when using Access Control Lists

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

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

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

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.

JumpStart Enterprise Toolkit not supported

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

fsck may terminate when applied to unclean file systems from Veritas File System 4.1

Due to an incompatibility in the VxFS `fsck` utility between the 5.0 and 4.1 releases, `fsck` may terminate during intent log replay if run on older file systems. This only affects file systems that were previously running under VxFS 4.1 that are CVM-shared volumes or multi-volume file systems, and that were not cleanly unmounted prior to use in VxFS 5.0.

If you encounter this situation, perform a full `fsck` to bring the file system to a consistent, clean state that is ready to be mounted.

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

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.

File Change Log tunable setting for proper functioning of Dynamic Storage Tiering applications

If the active placement policy of a given file system uses I/O or access temperatures, after the policy becomes active by being assigned, you must tune the file system's `fcl_malloc` tunable with the following command:

```
# vxtunefs -o fcl_maxalloc=0 mount_point
```

However, if any applications other than DST use FCL, this setting may conflict with those applications.

Veritas Storage Foundation for Databases known issues

Veritas Storage Foundation for Oracle known issues

The following are known issues in this release of Veritas Storage Foundation for Oracle:

Cannot unmount single-host clone in HA environment after failover

In an HA environment, after successfully taking a snapshot and cloning the database on the same host where primary is running, if a node failover happens then `dbed_vmclonedb -o umount` does not work. [818522]

Workaround: Manually do the equivalent steps of the `dbed_vmclonedb -o umount` command, and then restart the clone database with `dbed_vmclonedb -o restartdb`:

- 1 Shut down the clone database.

For example if `clone_sid` is the SID for the clone:

```
# export ORACLE_SID=clone_sid
SQLPLUS> shutdown normal
```

- 2 Unmount the filesystem under the `relocate_path` directory.

For example, if `/clone` is the relocate path:

```
# umount /clone/oradata
# umount /clone/archdata
```

- 3 As the root user, deport the diskgroup:

```
# vxdg deport SNAP_PRODDg
```

- 4 On the node where the primary is running, restart the clone database using the `dbed_vmclonedb -o restartdb` command, as follows:

```
/opt/VRTS/bin/dbed_vmclonedb -S ORACLE_SID -g snap_dg \
-o restartdb,new_sid=new_sid,server_name=svr_name -f SNAPPLAN \
[-H ORACLE_HOME] [-r relocate_path]
```

For example, to restart the clone database on the same host as the primary database (a single-host configuration):

```
$ /opt/VRTS/bin/dbed_vmclonedb -S PROD -g SNAP_PRODDg \
-o restartdb,new_sid=NEWPROD,server_name=orasvr -f snap1 \
-r /clone
dbed_vmclonedb started at 2004-04-02 15:14:49
Mounting /clone/prod_db on /dev/vx/dsk/SNAP_PRODDg/SNAP_prod_db.
Oracle instance NEWPROD successfully started.
dbed_vmclonedb ended at 2004-04-02 15:15:19
```

Error message displayed after successfully creating a new repository

The following error message is displayed after using `sfua_db_config` to create a new repository:

```
Ping server failed -- Database server not found.
```

You can safely ignore the message. [830629]

Error message may be displayed when using the `sfua_db_config` command

The following error may be displayed after running the `sfua_db_config` command:

```
Failed to receive protocol zero byte.
```

If you receive this message, it can safely be ignored. [832173]

Graphical user interface does not change for daylight savings time

The Veritas Storage Foundation for Oracle graphical user interface (GUI) does not adjust the time for daylight savings time. While daylight savings time is in effect, the time will be off by one hour. [832421]

Problems uninstalling or upgrading Veritas Storage Foundation for Oracle when Veritas Storage Foundation Cluster File System is installed on the same system

If Veritas Storage Foundation for Oracle and Veritas Storage Foundation Cluster File System are installed on the same machine, do not use the installer to uninstall if you are planning to uninstall only one product.

You must uninstall the Veritas Storage Foundation for Oracle packages manually if you want to uninstall the product.

To uninstall the Veritas Storage Foundation for Oracle packages

- 1 Review the uninstallation requirements in the *Veritas Storage Foundation Installation Guide*.
- 2 Follow steps 1 through 5 in the uninstallation procedure in “Uninstalling Veritas Storage Foundation” in the *Veritas Storage Foundation Installation Guide*.
- 3 Remove the Veritas Storage Foundation for Oracle packages using the `pkgrm` command.

```
# pkgrm VRTSorgui VRTSdbed VRTSdbdoc VRTSdbcom
```
- 4 Verify the removal of the packages using the `pkginfo` command.

```
# pkginfo | grep VRTS
```

If Veritas Storage Foundation for Oracle and Veritas Storage Foundation Cluster File System are installed on the same machine and you are upgrading both products, use the installer to upgrade Veritas Storage Foundation Cluster File System first. Then, use the installer to upgrade Veritas Storage Foundation for Oracle.

If the second upgrade fails, remove the Veritas Storage Foundation for Oracle packages as described above, then run the installer to upgrade Veritas Storage Foundation for Oracle. [840486]

dbed_vmclonedb -p failed to create clonedb with modified pfile

If you are running the `dbed_vmclonedb -p` or the `dbed_clonedb -p` command, the pfile modification will fail if there is an unquoted or unescaped

special character in the primary instance's pfile. The following error will be displayed:

```
SFORA pfile_mod ERROR V-81-5781 Parse error in file
/oracle/dbs/<pfile_name>. line 6: .
```

```
SFORA dbed_vmclonedb WARNING V-81-5788 Pfile modification
failed. Clone instance <CLONE SID> may not start.
```

Workaround: To avoid this issue, make sure all special characters in the primary instance's pfile are either placed within quotes or escaped.

You can check the Oracle Reference Manual for a list of special characters that must be either placed within quotes or escaped when used as pfile parameter values. In some cases, Oracle will process a pfile correctly at startup even if a parameter value contains unquoted special characters. However, the pfile parser used by Veritas Storage Foundation for Oracle strictly enforces the pfile specification contained in the Oracle Reference Manual.

Note: The primary instance's pfile is saved at the time of snapshot creation. If you attempt to clone the database using that snapshot you will be using the saved pfile, not the current pfile. Therefore you must create a new snapshot in order to ensure that the clone will use an updated pfile.[853792]

ORAMAP-FMON sometimes does not start

ORAMAP-FMON might not start in Oracle 10gR2. To work around this issue, add the following entry to `init.ora` and try to start the ORAMAP:

```
_filemap_dir=$ORACLE_HOME/rdbms/filemap
```

Spaces in container path names

This release does not support spaces in container path names. [31604]

Tuning parameters lost by reverse resynchronization

After running Database FlashSnap reverse resynchronization commands, special tuning parameters such as CQIO and vxtunefs on the primary database will be lost. They will need to be reset manually. [41898]

Internet Explorer security setting required for VEA Web GUI

The security setting in the Internet Explorer browser must be set to medium or lower in order for VEA Web GUI run properly. [223589]

Removing a snapplan

If a snapplan is in a state where `dbed_vmchecksnap -o remove` will not remove it, you can remove it by first forcing a snapshot and then resyncing. After this,

use `dbed_vmchecksnap -o remove` to remove the snapplan entry from the repository. [276354]

Snapplans with the same name

If two snapplans are created with the same name but different paths, the error message `snapplan already exists` is displayed. [287057]

Column heading in `dbed_analyzer` output not localized

The column heading `TBSNAME` in the output for the `dbed_analyzer` command is not localized. If you are running in an environment other than English, note that `TBSNAME` means “Tablespace Name.” [301174]

Size of checkpoint object in the GUI

The checkpoint object in the GUI does not show the correct size (in blocks) for the checkpoint. This size is not updated even after rescanning checkpoints in the GUI. [412038]

Misaligned Storage Rollback database information in Japanese version

In the Japanese version of Veritas Storage Foundation for Oracle, database information under the Storage Rollback Administration menu is misaligned. [497035]

Starting checkpoint policies from the GUI

Checkpoint policies cannot be started from the GUI. [506088]

Cannot create an Oracle 10gR1 database on raw devices with ODM

An Oracle 10gR1 database cannot be created through ODM on a raw device, producing error message similar to the following:

```
ORA-00200: controlfile could not be created
```

After disabling ODM on the raw device, the database can be successfully created.

This is caused by an Oracle bug. For detailed workaround procedures, refer to the following TechNote on the Symantec Technical Support website:

<http://entsupport.symantec.com/docs/540461.htm>

[540461]

Recommendations for log file sizes

The default value for the maximum file size in Alert log and Task log is 1953 Kb each. Although these file sizes can be increased to a maximum of 8 digits (99999999), this maximum is not practical and could possibly cause problems. Make sure there is sufficient space available for the maximum log file sizes you set, and that the setting you use does not adversely affect performance. [578688]

Archive log destination when creating an online checkpoint

Creating an online checkpoint for a database that has only `DB_RECOVERY_FILE_DEST` set as an archive log destination causes a warning message to be printed from the checkpoint creation command. The message states that a clone cannot be created from this checkpoint. If `dbed_clone` is subsequently run using this checkpoint, database recovery will fail with an Oracle error.

Workaround: To successfully create a clone of a database from an online checkpoint, define a mandatory archive log destination that is not `DB_RECOVERY_FILE_DEST`. [589288]

VEA client crashes with Japanese UTF-8 input on Solaris 10 CDE desktop.

When the VEA client is running with the `ja_JP.UTF-8` locale on a Solaris 10 CDE desktop, changing to Japanese input several times may cause the VEA client to crash with the following Java error.

```
An unexpected error has been detected by HotSpot Virtual Machine:  
SIGSEGV (0xb) at pc=0xf882d840, pid=xxxxx, tid=xx
```

```
Problematic frame:  
C [xiiimp.so.2+0x1d840]
```

This is a Solaris issue with JRE1.5.

Workaround: To avoid this problem when using a CDE desktop with the `ja_JP.UTF-8` locale, from the CDE workspace menu, select either ATOK16 or Wnn6 for the Japanese input method, and log in again to the CDE session. [601693]

Veritas Database Dynamic Storage Tiering class names limited to 29 characters

The `dbdst_admin -o rmclass` command fails when attempting to remove a class name of 30 characters or more. The maximum class name length is 29 characters. [601746]

Must run `dbed_update` before starting an Oracle database from the GUI

The tablespaces folder is empty when starting the Oracle database from the GUI without running `dbed_update` from the command line. Rescanning from the GUI does not solve this issue.

Workaround: Run `dbed_update` from the command line before starting an Oracle database from the GUI. [604849]

Datafile statistic wizard lacks warning messages

In the datafile statistic wizard, if there are no statistics for datafile, an empty table is shown instead of a warning message confirming that no statistics are available.

Also, in the datafile statistic wizard, if a user does not select a statistic, the wizard should show a warning message and not go to the next page. Otherwise, the next page will throw an exception. [604858]

In RAC, must run `dbed_vmchecksnap` on VCS master node

For an SF Oracle RAC database, the `dbed_vmchecksnap` command must be run on the Veritas Cluster Server master node. Also, only online snapshots are supported, which means the database instance should be up and running on the master node where validation is performed. [605330]

VEA GUI “view” menu uses a duplicate “v” hotkey

In the VEA GUI main window, the toolbar uses the same hotkey of “v” for both `View` and `View Mapping` commands. [605776]

Symbolic links to Quick I/O files cause errors

If a database contains a symbolic link to Quick I/O files, Oracle 10g produces the following error:

```
ORA-27094: raw volume can not be used
```

To avoid this error, do not use symbolic links to Quick I/O files.

This issue applies to Oracle version 10.1.0.2. It has been reported to Oracle and will be fixed in a future Oracle release. [614508]

Do not install option 3 (SF Oracle RAC) without proper HA license or setup

When installing Storage Foundation for Oracle, if you do not have the proper HA license or setup, do not choose option 3 (Storage Foundation for Oracle RAC packages) when installing with the Veritas product installer.

This does not cause the installation to fail, but doing this causes VCS/GAB error messages to be written to the system log files, which can be confusing. [614685]

had must be running before unconfiguring SFDB repository

To use `sfua_db_config` to unconfigure the SFDB repository in a VCS environment, make sure the `had` process is running on the system where `sfua_db_config -o unconfig_cluster` is run.

If the `had` process is not running on that system, `sfua_db_config` will not remove the repository VCS service group `Sfua_Base`. [616387]

Must manually install VRTScsocw package

The VRTScsocw package is missing whenever installing Veritas Storage foundation for Oracle HA using option 1 (Required Veritas Storage Foundation for Oracle packages) or option 2 (All Veritas Storage Foundation for Oracle packages). To use the configuration wizard to set up the Oracle agent, this package must be installed manually from the dvd1 image mount point at: `cluster_server_agents/oracle_agent/pkgs`

Note: Whenever uninstalling this product, in some cases this package may not be removed by the product uninstaller. In this case, the package must be removed manually.

[622316]

Database FlashSnap archive log destinations

With Oracle Release 10g and above, Database FlashSnap clones do not support `DB_RECOVERY_FILE_DESTINATION` as the sole mandatory archive log destination. This issue will not be detected by FlashSnap validation with `dbed_vmchecksnap`, or by the snapshot command `dbed_vmsnap`. However, recovery will fail when attempting to clone a database using the snapshot. The following message may appear in the log file:

```
ORA-01195:online backup of file 1 needs more recovery to be consistent.
```

Workaround: Define a mandatory log archive destination that is not `DB_RECOVERY_FILE_DESTINATION` and set the `ARCHIVELOG_DEST` parameter of the snapplan to this value. [862092]

dbed_clonedb instance encounters ORA-600 error during startup on RAC when ODM is enabled

When ODM is enabled on RAC, the `dbed_clonedb` CLI will run successfully. However, the clonedb instance alert log sometimes shows an ORA-600 error.

Workaround: Restart the clone database using the `umount, restartdb` option of `dbed_clonedb` CLI.

For example:

```
dbed_clonedb -S clone_PROD -o umount
dbed_clonedb -S clone_PROD -o restartdb
```

[930966]

Veritas Storage Foundation for Sybase known issues

The following are known issues in this release of Veritas Storage Foundation for Sybase.

Problems uninstalling or upgrading Veritas Storage Foundation for Sybase when Veritas Storage Foundation Cluster File System is installed on the same system

If Veritas Storage Foundation for Sybase and Veritas Storage Foundation Cluster File System are installed on the same machine, do not use the installer to uninstall if you are planning to uninstall only one product.

You must uninstall the Veritas Storage Foundation for Sybase packages manually if you want to uninstall the product.

To uninstall the Veritas Storage Foundation for Sybase packages

- 1 Review the uninstallation requirements in the *Veritas Storage Foundation Installation Guide*.
- 2 Follow steps 1 through 5 in the uninstallation procedure in “Uninstalling Veritas Storage Foundation” in the *Veritas Storage Foundation Installation Guide*.
- 3 Remove the Veritas Storage Foundation for Sybase packages using the `pkgrm` command.

```
# pkgrm VRTSsybed VRTSdbdoc
```
- 4 Verify the removal of the packages using the `pkginfo` command.

```
# pkginfo | grep VRTS
```

If Veritas Storage Foundation for Sybase and Veritas Storage Foundation Cluster File System are installed on the same machine and you are upgrading both products, use the installer to upgrade Veritas Storage Foundation Cluster File System first. Then, use the installer to upgrade Veritas Storage Foundation for Sybase.

If the second upgrade fails, remove the Veritas Storage Foundation for Sybase packages as described above, then run the installer to upgrade Veritas Storage Foundation for Sybase. [840486]

Converting non-VxFS QIO files

If the `mkqio.dat` file contains any file that does not reside on a VxFS filesystem, the `qio_convertdbfiles -u` command will not convert any QIO files back to native files.

Workaround: Manually edit the `mkqio.dat` file and remove any non-VxFS file from the list. [413352]

Recommendations for log file sizes

The default value for the maximum file size in Alert log and Task log is 1953 Kb each. Although these can be increased to a maximum of 8 digits (99999999), this maximum is not practical and could possibly cause problems. Make sure there is

sufficient space available for the maximum log file sizes you set, and that the setting you use does not adversely affect performance. [578688]

SFDB commands may fail due to differing locales

If SFDB commands are executed with a locale that differs from the locale in use when the SFDB server was started, the commands may fail with the following message:

```
([Sybase][ODBC Driver][Adaptive Server Anywhere]Syntax error ).
```

Workaround: Execute the following commands to correct this issue.

```
/opt/VRTSdbcom/bin/sfua_db_config -o stopserver  
/opt/VRTSdbcom/bin/sfua_db_config -o startserver  
/opt/VRTSdbcom/bin/sfua_db_config -o startdb
```

[582069]

VEA client crashes with Japanese UTF-8 input on Solaris 10 CDE desktop.

When the VEA client is running with the `ja_JP.UTF-8` locale on a Solaris 10 CDE desktop, changing to Japanese input several times may cause the VEA client to crash with the following Java error.

```
An unexpected error has been detected by HotSpot Virtual Machine:  
SIGSEGV (0xb) at pc=0xf882d840, pid=xxxxx, tid=xx
```

```
Problematic frame:  
C [xiiimp.so.2+0x1d840]
```

This is a Solaris issue with JRE1.5.

Workaround: To avoid this problem when using a CDE desktop with the `ja_JP.UTF-8` locale, from the CDE workspace menu, select either ATOK16 or Wnn6 for the Japanese input method, and log in again to the CDE session.[601693]

shad must be running before unconfiguring SFDB repository

To use `sfua_db_config` to unconfigure the SFDB repository in a VCS environment, make sure the `had` process is running on the system where `sfua_db_config -o unconfig_cluster` is run.

If the `had` process is not running on that system, `sfua_db_config` will not remove the repository VCS service group `Sfua_Base`. [616387]

Available 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 of the 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 Volume Replicator Release Notes* (`vvr_notes.pdf`)
- *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:

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 Oracle Administrator's Guide</i>	sf_ora_admin.pdf
<i>Veritas Storage Foundation for Sybase Administrator's Guide</i>	sf_syb_admin.pdf
<i>Veritas Array Integration Layer Configuration Guide</i>	vail_config.pdf
<i>Veritas Volume Manager Administrator's Guide</i>	vxvm_admin.pdf
<i>Veritas Storage Foundation Intelligent Storage Provisioning Administrator's Guide</i>	sf_isp_admin.pdf
<i>Veritas Storage Foundation Intelligent Storage Provisioning Solutions Guide</i>	sf_isp_solutions.pdf
<i>Veritas Storage Foundation Cross-Platform Data Sharing Administrator's Guide</i>	sf_cds_admin.pdf
<i>Veritas Enterprise Administrator User's Guide</i>	veax6_users.pdf
<i>Veritas Volume Manager Troubleshooting Guide</i>	vxvm_tshoot.pdf
<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

Note: In this release, some of the above documents have new PDF file names.

Veritas Storage Foundation for Databases documentation changes

The 5.0 release introduces a new guide for the GUI, the *Veritas Storage Foundation for Oracle Graphical User Interface Guide*. It can be found in the Veritas Storage Foundation Documentation Set as the file `sf_ora_gui.pdf`.

Veritas Cluster Server documentation

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

Guide Title	Filename
Veritas Cluster Server Release Notes	<code>vcs_notes.pdf</code>
Veritas Cluster Server Installation Guide	<code>vcs_install.pdf</code>
Veritas Cluster Server User's Guide	<code>vcs_users.pdf</code>
Veritas Cluster Server Agent Developer's Guide	<code>vcs_agent_dev.pdf</code>
Veritas Cluster Server Bundled Agents Reference Guide	<code>vcs_bundled_agents.pdf</code>
Veritas Cluster Server SunFire 12K/15K Application Note	<code>vcs_appnote_f15k.pdf</code>
Veritas Cluster Server SunFire 6800 Application Note	<code>vcs_appnote_6800.pdf</code>
VCS Enterprise Agent for Oracle Installation and Configuration Guide	<code>vcs_oracle_install.pdf</code>
VCS Enterprise Agent for Sybase Installation and Configuration Guide	<code>vcs_sybase_install.pdf</code>
VCS Enterprise Agent for SunONE Installation and Configuration Guide	<code>vcs_sunone_install.pdf</code>
VCS Enterprise Agent for EMC SRDF Installation and Configuration Guide	<code>vcs_srdf_install.pdf</code>
VCS Enterprise Agent for IBM PPRC Installation and Configuration Guide	<code>vcs_pprc_install.pdf</code>

Veritas Volume Replicator documentation

The following Veritas Volume Replicator documentation is available with the Veritas Volume Replicator option:

Guide Title	Filename
<i>Veritas Volume Replicator Release Notes</i>	vvr_notes.pdf
<i>Veritas Volume Replicator Installation Guide</i>	vvr_install.pdf
<i>Veritas Volume Replicator Administrator's Guide</i>	vvr_admin.pdf
<i>Veritas Volume Replicator Planning and Tuning Guide</i>	vvr_planning.pdf
<i>Veritas Volume Replicator Web Console Administrator's Guide</i>	vvr_web_admin.pdf
<i>Veritas Volume Replicator Advisor User's Guide</i>	vvr_advisor_users.pdf
<i>Veritas Cluster Server Agents for Veritas Volume Replicator Configuration Guide</i>	vvr_agents_config.pdf

Manual pages

The Veritas manual pages are installed in the `/opt/VRTS/man` directory. This directory must be added to the `MANPATH` environment variable.

Installing documentation and manual pages is optional.

Documentation errata

The following section describes Veritas Storage Foundation documentation errata for the 5.0 release.

Veritas Storage Foundation for Oracle Administrator's Guide

Please note the following errata in the *Veritas Storage Foundation for Oracle Administrator's Guide*:

(Page 189) The path in the second bullet is incorrect and should read as follows:

```
LD_LIBRARY_PATH=$LD_LIBRARY_PATH:/opt/VRTSdbms3/lib32;  
\export LD_LIBRARY_PATH
```

Veritas File System Administrator's Guide

Please note the following errata in the *Veritas File System Administrator's Guide*:

(Page 126) Step 3 in the procedure under the section “Assigning Allocation Properties” is incorrect. Step 3 should read as follows:

Define two allocation policies called **metadatapolicy** and **datapolicy** to refer to the vol1 and vol2 volumes:

```
# fsapadm define /mnt1 metadatapolicy vol1  
# fsapadm define /mnt1 datapolicy vol2
```

(Page 127) Step 1 in the procedure under the section “Assigning Pattern Tables to Directories” is incorrect. Step 1 should read as follows:

Define two allocation policies called **mp3meta** and **mp3data** to refer to the vol1 and vol2 volumes:

```
# fsapadm define /mnt1 mp3meta vol1  
# fsapadm define /mnt1 mp3data vol2
```

(Page 128) Step 1 in the procedure under the section “Assigning Pattern Tables to File Systems” is incorrect. Step 1 should read as follows:

Define two allocation policies called **mymeta** and **mydata** to refer to vol1 and vol2 volumes:

```
# fsapadm define /mnt1 mymeta vol1  
# fsapadm define /mnt1 mydata vol2
```


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ACE (The Adaptive Communication Environment)

TAO

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Digital Encryption Standard (DES) - MIT

MIT and Dennis Ferguson

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Expat XML Parsing Library

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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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Crypt-CBC-2.17

File-Spec-0.90

IO-String-1.06

IO-Tty-1.02

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Module-Build-0.2611

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Sockets++ library

University of Texas

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