

Veritas Storage Foundation™ Release Notes

HP-UX 11i Version 3

5.0



Veritas Storage Foundation Release Notes

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5.0

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Symantec Corporation
20330 Stevens Creek Blvd.
Cupertino, CA 95014
www.symantec.com

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

Technical support

For technical assistance, visit <http://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

This document provides release information about the products in the Veritas Storage Foundation 5.0 HP-UX 11i Version 3 product suite:

- Veritas Storage Foundation (Standard, Standard HA, Enterprise, and Enterprise HA)
- Veritas Volume Manager (VxVM)
- Veritas File System (VxFS)
- Veritas Storage Foundation for Oracle (Standard, Enterprise, and HA Editions), formerly known as Veritas Database Edition for Oracle.

Note: Veritas Storage Foundation QuickStart is 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*.

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

<http://support.veritas.com/docs/293075>

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

This document does not contain release information for Veritas Volume Replicator or Veritas Cluster Server.

See the *Veritas Volume Replicator Release Notes* and the *Veritas Cluster Server Release Notes*.

Storage Foundation product suites

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

Storage Foundation Version	Products and Features
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 Optionally licensed features: Veritas Volume Replicator Option
Storage Foundation Enterprise HA	Veritas Volume Manager Veritas File System Veritas Cluster Server 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 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 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

Product descriptions

The following are brief descriptions of the various products and features that are part of Veritas Storage Foundation:

- [Veritas Volume Manager](#)
- [Veritas File System](#)
- [Veritas Storage Foundation for Oracle](#)
- [Veritas Volume Replicator](#)
- [Veritas Cluster Server](#)

Veritas Volume Manager

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

Veritas File System

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

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.

Using Veritas Quick I/O

The Veritas File System package, `VRTSvxfss`, includes the Veritas Quick I/O for Databases feature. Quick I/O is intended for operation only with Veritas Storage Foundation for Databases products.

See the *Veritas File System Administrator's Guide*.

Using Cluster File Systems

Veritas Storage Foundation Cluster File System (SFCFS) is the file system clustering functionality of VxFS. SFCFS is a separately licensable feature of VxFS that requires several other Veritas products to enable communication services and provide shared disk storage resources. Veritas Cluster Server and Veritas Volume Manager are packaged with VxFS to provide a complete clustering environment. There is also a high availability version, Veritas Storage Foundation Cluster File System HA.

Veritas Storage Foundation for Oracle

Veritas Storage Foundation for Oracle combines 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 frequently accessed data.

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

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 application programming interface (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 or a database. Storage Checkpoints are treated like any other VxFS file system and can be created, mounted, unmounted, and removed.

This option is available with the Enterprise versions of Veritas Storage Foundation for 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 versions 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 (VVR) 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

We offer the following new features in this release of Veritas Storage Foundation, Veritas Volume Manager, Veritas File System, and Veritas Storage Foundation for Oracle.

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.

Large Hostname Support

Veritas Volume Manager 5.0 supports hostnames up to 31 characters in length, although HP-UX 11.31 supports nodenames up to 64 characters and hostnames up to 256 characters in length.

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, `vxconfigd`, 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.

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 `vxchg` and `vxdisk` 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. A mechanism is also provided to deal with disk group inconsistencies between storage at different sites (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 16 cluster nodes

The clustering functionality of VxVM supports up to 16 nodes. For the latest information on clustered volume support, see the following TechNote:

<http://support.veritas.com/docs/282024>

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 DMP

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 is 0 seconds. In previous releases, the default value was set to 120 seconds, which is twice the value of the SCSI I/O timeout. However, the default value has been set to 0 seconds, as the parameter will become obsolete in future releases. 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.

- Retry period for handling transient errors

When all paths to a disk fail, there may be certain paths that have a temporary failure and are likely to be restored soon. If I/Os are not retried for a period of time, the I/Os may be failed to the application layer even though some paths are experiencing a transient failure. DMP tunable `dmp_lun_retry_timeout` can be used for more robust handling of such transient errors. If the tunable is set to a non-zero value, I/Os to a disk with all failed paths will be retried until `dmp_lun_retry_timeout interval` or until the IO succeeds on one of the paths, whichever happens first.

The tunable can be set and retrieved using following commands:

```
# vxddm adm gettune dmp_lun_retry_timeout  
# vxddm adm settune dmp_lun_retry_timeout=interval
```

Where the interval value is in seconds.

The default value of the tunable is 0, which means that the paths are probed only once.

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.
- 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.
- The `vxtemplate listtemplate` command can be used 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.

Storage device annotation using tags

Annotation of storage devices may now be performed by assigning tags and optional tag values to disks and LUNs.

Config Backup and Restore

The Config Backup and Restore (CBR) feature of VxVM allows the disk group configuration to be backed up and restored if configuration information is lost or corrupted.

The backup directory should be large enough to accommodate copies of all the disk groups present at any given point in time. With Veritas Volume Manager 5.0, it is recommended that the backup directory be a minimum of $m \times (n+1)$ MB, where m is the private region size and n is the number of disk groups. The default private region size is 32MB. The extra storage space is required to hold the temporary copy of the disk group configuration when a disk group import or configuration change occurs.

The default backup directory is `/etc/vx/cbr/bk`. The location of the backup directory can also be configured using the following command:

```
# vxconfigbackup -l backup_directory_path
```

Support for HP-UX native multipathing devices

By default, VxVM works on DMP metanodes. However, if you want to use HP-UX native multipathing metanodes, they must be added as foreign devices. You can use the `vxddladm addforeign` and `vxddladm rmforeign` commands to migrate a system between using DMP and using HP-UX native multipathing. These procedures migrate all devices in the `/dev/disk` and `/dev/rdisk` directories.

Caution: Before migrating between DMP and HP-UX native multipathing, ensure that no applications are accessing VxVM volumes. Migration is not supported without first stopping any applications that are using the volumes.

To migrate from DMP to HP-UX native multipathing

- 1 Stop all the volumes in each disk group on the system:

```
# vxvol -g diskgroup stopall
```

- 2 Use the following commands to initiate the migration:

```
# vxddladm addforeign blockdir=/dev/disk chardir=/dev/rdisk
# vxconfigd -kr reset
```

3 Restart all the volumes in each disk group:

```
# vxvol -g diskgroup startall
```

The output from the `vxdisk list` command now shows only HP-UX native multipathing metanode names, for example:

```
# vxdisk list
DEVICE          TYPE          DISK          GROUP          STATUS
disk155         auto:LVM      -             -             LVM
disk156         auto:LVM      -             -             LVM
disk224         auto:cdsdisk  -             -             online
disk225         auto:cdsdisk  -             -             online
disk226         auto:cdsdisk  -             -             online
disk227         auto:cdsdisk  -             -             online
disk228         auto:cdsdisk  -             -             online
disk229         auto:cdsdisk  -             -             online
```

When HP-UX native multipathing is configured, no DMP metanodes are configured for the devices in the `/dev/disk` and `/dev/rdisk` directories. As a result, the `vxdisk list` command only displays the names of the HP-UX native multipathing metanodes, and cannot display legacy names for the devices.

To migrate from HP-UX native multipathing to DMP

1 Stop all the volumes in each disk group on the system:

```
# vxvol -g diskgroup stopall
```

2 Use the following commands to initiate the migration:

```
# vxddladm rmforeign blockdir=/dev/disk chardir=/dev/rdisk
# vxconfigd -kr reset
```

3 Restart all the volumes in each disk group:

```
# vxvol -g diskgroup startall
```

The output from the `vxdisk list` command now shows DMP metanode names according to the current naming scheme. For example, under the default or legacy naming scheme, `vxdisk list` displays the devices as:

```
# vxdisk list
DEVICE          TYPE          DISK          GROUP          STATUS
c2t0d0         auto:LVM      -             -             LVM
c3t2d0         auto:LVM      -             -             LVM
c89t0d0         auto:cdsdisk  -             -             online
c89t0d1         auto:cdsdisk  -             -             online
c89t0d2         auto:cdsdisk  -             -             online
c89t0d3         auto:cdsdisk  -             -             online
c89t0d4         auto:cdsdisk  -             -             online
c89t0d5         auto:cdsdisk  -             -             online
```

and under the new naming scheme as:

```
# vxdisk list
DEVICE          TYPE          DISK          GROUP          STATUS
```

disk155	auto:LVM	-	-	LVM
disk156	auto:LVM	-	-	LVM
disk224	auto:cdsdisk	-	-	online
disk225	auto:cdsdisk	-	-	online
disk226	auto:cdsdisk	-	-	online
disk227	auto:cdsdisk	-	-	online
disk228	auto:cdsdisk	-	-	online
disk229	auto:cdsdisk	-	-	online

Rootability support and option to reboot when adding or removing boot disk into foreign category

The `vxddladm addforeign` command is used to add a device into a foreign device category and the `vxddladm rmforeign` command is used to remove a device from a foreign category. With 5.0 11.31, boot devices can be added into a foreign device category but it requires a reboot to make the migration effective. Users can specify the `-r` option when either adding or removing the boot disk into a foreign device category so that the system will automatically reboot on completion of the task. It is strongly recommended that this option be specified when adding the boot disk to a foreign category.

Example usage of rootability support:

To bring the current VM rootdisk under nMP control

Run the following command to bring the current VM rootdisk under nMP control:

```
# vxddladm addforeign blockpath=/dev/disk/diskname
charpath=/dev/rdisk/diskname
```

To bring the rootdisk to backDMP control

Run the following command to bring the rootdisk back to DMP control:

```
# vxddladm rmforeign blockpath=/dev/disk/diskname
charpath=/dev/rdisk/diskname
```

Where *diskname* is the new device name of the current boot disk without the slice part.

To transfer control of all devices to nMP

Run the following command to transfer control of all devices to nMP:

```
# vxddladm addforeign blockdir=/dev/disk/ chardir=/dev/rdisk/
```

To transfer control of all devices back to DMP

Run the following command to transfer control of all devices back to DMP:

```
# vxddladm rmforeign blockdir=/dev/disk/ chardir=/dev/rdisk/
```

To automatically reboot the system, users can specify the `-r` option along with the above commands. The `-r` option is only applicable if the current migration involves the boot disk, otherwise it is ignored.

Example:

```
# vxddladm -r addforeign blockdir=/dev/disk/ chardir=/dev/rdisk/  
# vxddladm -r rmforeign blockdir=/dev/disk/ chardir=/dev/rdisk/
```

The above commands will wait 15 seconds before rebooting the system. Users can interrupt this command by pressing `ctrl+c` to abort the system reboot.

Veritas File System

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

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:

- `fsmap` 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 `fsppadm` command administers the file placement policies of the DST feature, and replaces the functionality of the `fsrpadm`, `fsmove`, and `fssweep` commands.

See the `fsppadm(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.

Large directories

Disk layout Version 7 adds supplemental indexing to directories. This indexing improves creating, removing, and looking up files in directories that contain tens of thousands of entries and more.

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 Oracle

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

Support for 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).

Enhanced deep mapping

Deep mapping has been enhanced to differentiate between EMC STD and BCV mirrors for EMC arrays. Use the `vxstorage_stats` command.

Table level mapping

A table name now can be used as input to the `dbed_analyzer` command (with a new `-o mode=table [-f file | -t table]` 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.

System requirements

HP-UX operating system requirements

The system requirements for this release are:

- HP-UX 11i version 3.0

To verify the operating system version

Use the `machinfo` command as follows:

```
# machinfo | grep Release
   Release: HP-UX B.11.31
```

JFS must be installed on your system prior to installing any Veritas software.

To verify that JFS is installed

Use the `swlist` command as follows:

```
# swlist -l product JFS
   JFS B.11.31 Base VxFS File System 4.1 for HP-UX
```

Hardware requirements

The hardware compatibility list (HCL) is available at:

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

The hardware TechNote is available at:

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

Supported Oracle and HP-UX combinations

The following list identifies the supported Oracle and HP-UX combinations if you plan to use Veritas Storage Foundation with an Oracle database:

Oracle Release	HP-UX 11i version 3.0
9.2	Yes
10.1	Yes
10.2	Yes

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.

Required patches

Patch requirements and versions are determined at the time of product release. Contact your vendor for the most current patch version and information. For a list of current patches for component products, see the *Veritas Storage Foundation Installation Guide*.

No longer supported

Support is no longer provided for:

- Veritas Storage Foundation 4.1 on HP-UX 11i v3 was the last major release to support scheduling Storage Checkpoint creation.
- Veritas Storage Foundation 4.1 on HP-UX 11i v3 was the last major release to support Oracle Disk Manager for raw devices.
- Veritas Storage Foundation 4.1 HP-UX 11i v3 was the last major release to support the text-based VxDBA menu interface.
- Veritas Storage Foundation 3.5 was the last major release to support the Veritas Space Capacity Planning utility for Storage Checkpoints in the GUI. The 5.0 release supports the Veritas Space Capacity Planning utility with the CLI only.
- In Veritas Storage Foundation 5.0, snapshot plexes created by the `vxassist` command are not supported. A combination of snapshot plexes created by `vxassist` and `vxsnap` is also not supported in this release.
- VxFS disk layout Version 4 and 5 may no longer be supported in the next major release.
- The `seconly` mount option might not be supported in the next release of Veritas Storage Foundation.
- VxFS 5.0 does not support creating or mounting file systems using Version 1, 2, or 3 disk layouts. Symantec recommends that you upgrade all older disk layouts to Version 7.
See “[Compatibility with previous versions of Veritas File System](#)” on page 63.
- VxFS 5.0 does not support shared (cluster) mounts on VxFS disk layout Version 5 cluster file systems. Upgrade all current cluster file system disk layouts to Version 7 to enable new Veritas File System features and to support upgrades in future releases.
- The `nau`, `ausize`, `aufirst`, `aupad` and `ninode` options to the `mkfs` command are not supported. The `mkfs` command will accept these options,

but ignore them without a warning. These options may be omitted from the `mkfs` command in future releases.

- Arrays can no longer be configured through the GUI. Instead, configure arrays with the `vaildiag` CLI tool. For complete details, see the *Veritas Array Integration Layer Array Configuration Guide*.
- Veritas FlashSnap Agent for Symmetrix (VxFAS) will no longer 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.
- Veritas Storage Foundation 4.1 was the last release to support the Monitoring Agent.

Fixed Issues

The following incidents were corrected for this release.

Veritas Storage Foundation fixed issues

The following table contains information about fixed issues in this release of Veritas Storage Foundation.

Incident	Description
	The Veritas product installer exited when a required patch was not detected, even if a superseding patch was available.

Veritas Volume Manager fixed issues

The following table contains information about fixed issues in this release of VxVM.

Incident	Description
137175	The vxdiskadm utility no longer truncates default disk names to 9 characters.
140947	I/O policy settings were not persistent between reboots.
229538	Multiple enclosures of the same type generated unexpected enclosure-based names.

Veritas File System fixed issues

The following table contains information about fixed issues in this release of VxFS.

Incident	Description
472089	vxfs_ninode and vx_bc_bufhwm tunables are now dynamic.
478142	fscck binaries are included for older log versions.
511750	Swap space and tunable changes were required for using fscck and mkfs on big file systems.

Veritas Storage Foundation for Oracle fixed issues

The following table contains information about fixed issues in this release of Veritas Storage Foundation for Oracle.

Incident	Description
567342	An unmounted checkpoint clone database no longer reappears in the Java GUI tree after rescanning.
582069	SFDB commands executed with a different locale than the locale in use when the SFDB server was started no longer fail with the following message: ([Sybase][ODBC Driver][Adaptive Server Anywhere]Syntax error).
582416	Clicking the Help button on a GUI wizard no longer produces the following error message: Error V-39-53246-8 Get EntryPoint failed. Please check the manifest related information
600431	Storage Checkpoint operations are now supported for databases cloned with Database FlashSnap.
607001	Repository changes resulting from executing SFDB Storage Checkpoint CLIs are no longer delayed in the SFDB GUI.
608697	The Web GUI statistic scheduler no longer skips the first statistic collection.
608697	You can now refresh the View Statistics wizard in the Firefox browser.
609682	Specifying with <code>dbed_vmsnap</code> a <code>snapplan</code> that does not exist no longer produces the error <code>SFORA dbed_vmsnap ERROR V-81-6518 Could not find snapplan 'snap_plan' in repository.</code>
786989	The <code>qio_getdbfiles_ora</code> script now detects when an Oracle instance is in Standby mode.

Incident	Description
853363	<p>The I/O performance of EMC Symmetrix arrays has been improved in this release. To enable these changes, after upgrading to this release, set the discovery mode of the VAIL provider to discover only those Symmetrix devices that are visible to the host:</p> <ol style="list-style-type: none"><li data-bbox="575 435 1176 708">1 Determine the agent name under which the Symmetrix provider is configured: # <code>/opt/VRTSvail/bin/vail_symm_discovery_cfg.sh -l</code> The agent name will be "VAILAgent" for installations of Veritas Storage Foundation, Veritas Storage Foundation for Databases, or Veritas Storage Foundation for RAC. It will be "StorageAgent" if VxFAS is configured.<li data-bbox="575 713 1176 942">2 Set the discovery mode to discover host-visible devices only: # <code>/opt/VRTSvail/bin/vail_symm_discovery_cfg.sh \</code> <code>-a agent_name -s 0</code> where <i>agent_name</i> is the agent name out put from the <code>-l</code> option in the previous step.

Known issues

The following incidents were reported for this release.

Veritas Storage Foundation known issues

Software disc cannot be ejected during installation

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

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

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

To avoid this problem at install time

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

If a software disc cannot be ejected

- 1 Stop the event source daemon:


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


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

[622442]

Upgrading the software

To install a Veritas Storage Foundation product, configure Veritas Volume Manager as described in Chapter 2, "Installing the Veritas Software," of the *Veritas Storage Foundation Installation Guide*. Then, follow the instructions in Chapter 3, "Upgrading the Veritas Software," of the *Veritas Storage Foundation Installation Guide*.

Because Veritas Volume Manager 4.1 and Veritas File System 4.1 are bundled in the HP-UX 11i version 3.0 release, a fresh installation is *not* possible. You must perform an upgrade to move to the 5.0 versions of the Veritas products.

Uninstalling the VRTSmapro package

Uninstalling the VRTSmapro (mapping provider) package does not remove the corresponding entry from the VEA registry. The recommended workaround is to run the following command before uninstalling the VRTSmapro package:

```
# /opt/VRTSmapro/bin/vxmapping_prov.config -r  
[617740]
```

DBMS security issue

The Symantec Shared DBMS feature creates the following configuration files:

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

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

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

Host name may need to be entered manually on clustered host

When installing SF Management Server on a clustered host on which the Domain Name Service (DNS) is not configured, the you will be prompted to enter the fully-qualified host name manually to proceed with the installation.

When installing on a clustered host on which the DNS is running slowly, the you may occasionally be prompted to enter the fully-qualified host name manually to proceed with the installation.

Unconfigure VEA Action Agent after a MANAGED host installation

When installing in MANAGED mode you must execute the following script at any time after the Veritas packages have been installed:

```
/opt/VRTSaa/config/remove_vxaa.sh
```

This script unconfigures the VEA Action Agent and prevents it from starting on a MANAGED host installation. [616057]

Uninstallation fo Storage Foundation (SF for RAC and SF for Oracle) using the CPI results in an error message

During uninstallation of Storage Foundation, Symantec recommends that you select the option of removing the VM and VVR packages. If you choose not to remove the VM and VVR packages, only CLI based VM and VVR operations will be functional. The following error message will be displayed during subsequent reboots of the machine if only VM and VVR packages are retained during uninstallation:

```
ERROR: /opt/VRTSobc/pal33/bin/vxpalctrl not found .....  
FAIL *
```

Workaround: If you are interested only in CLI based VM/VVR operations, this message can be ignored, otherwise, reinstall the following packages in the following order: VRTSicsco, VRTSat, VRTSspb, and then VRTSobc33. [1191666]

System hangs due to memory pressure issue

When conducting stress tests on large sized files, the system may hang due to a memory pressure issue. When read/write operations are performed on files whose sizes are approaching the limit of physical memory available on the system, the system hangs.

Workaround: Install all the latest required HP-UX patches. For a list of current patches, see the *Veritas Storage Foundation Installation Guide*. [1212309]

Veritas Storage Foundation for Oracle known issues

Known issues in the 5.0 release are listed in the *Veritas Storage Foundation 5.0 Release Notes*, which is available at the following URL:

<http://entsupport.symantec.com/docs/283708>

The following are new known issues in this MP1 release of Veritas Storage Foundation for Oracle:

Checkpoint Rollback corrupts the database when upgrading database from 9i to 10g

If an Oracle 9i database is upgraded to 10g, and at a later point in time the database is rolled back to the 9i environment, then the recovery procedure for 9i will give the following errors in the alert log file:

```
ORA-00600: internal error code, arguments: [2662]...
```

This bug is documented by Oracle as bug number 2216823.

Workaround: Do not use the pre-existing tempfile. Instead either backup the tempfile with the rest of the database or remove the tempfile and then recreate a new tempfile once the database is open. [1111142]

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: Fix the issue that caused the failover to the other node, and then fall back to the fixed node.

File fragmentation check in the `qio_convertdbfiles` command may report errors

The file fragmentation check in `qio_convertdbfiles` may report errors when run on multi-volume file systems. These errors are harmless and may be safely ignored. This issue also causes the `dbed_checkconfig` command to fail with an error if run on a database which uses one or more multi-volume file systems. The method used to determine fragmentation in `qio_convertdbfiles` has been deprecated. The preferred way to check and resolve file or file system fragmentation is through the use of the `fsadm` tool. Refer to the *Veritas File System Administrator's Guide* for more information on using `fsadm` to display and resolve file system fragmentation. [819430]

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 Stop the repository database and unmount the repository volume.

In a stand-alone configuration:

Stop the database repository:

```
# /opt/VRTSdbcom/bin/sfua_db_config -o stopdb
```

Unmount the database repository:

```
# /opt/VRTSdbcom/config/sfua_rep_mount stop
```

In an HA configuration: Stop VCS processes on either the local system or all systems.

To stop VCS processes on the local system:

```
# hastop -local
```

To stop VCS processes on all systems:

```
# hastop -all
```

- 3 Remove the Veritas Storage Foundation for Oracle packages using the `swremove` command.

```
# swremove VRTSorgui VRTSdbed VRTSdbcom VRTSdbdoc
```

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 uses 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]

Cannot use Web GUI to view snapplan log

When trying to view a snapplan log with the Web GUI, the error message "Unable to load operation" is displayed.

Workaround: View snapplan logs with the VEA Java GUI or with the `dbed_vmchecksnap -o list` command. [861696]

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, and the message "ORA-01195: online backup of file 1 needs more recovery to be consistent" may appear in the log file.

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, 862687]

Reverse resync fails if performed after dbed_vmclonedb using either the -o mount or the -o mountdb options

If a database is cloned using Flashnap with the `-o mount` option or the `-o mountdb` option and a recovery is not performed on the cloned database, then

the reverse resynchronization operation will fail when the following command is executed:

```
/opt/VRTSdbed/bin/dbed_vmsnap -S $ORACLE_SID -f snapplan -o
reverse_resync_begin
```

The following error will be displayed:

```
SFORA dbed_vmsnap ERROR V-81-5682 The current status amount_end
does not allow for the option reverse_resync_begin.
```

[1142507]

dbdst_admin allows the addition of a class that is greater than the maxclass setting

The `dbdst_admin -o addclass` command adds a new class for the database. A database can have any number of classes and there is no limit. The `Maxclass/Minclass` parameter defines the maximum and minimum classes allowed for a filesystem (MVFS). However, these limits are not enforced.

[1144512]

Database editions utilities randomly fail to execute

Database editions utilities randomly fail to execute even if the required database files reside on VxFS. The following error will be displayed:

```
ERROR V-81-3012 One or more files reside on non-VxFS file
systems or devices.
```

Workaround: Restart the `vxdbd` daemon using following commands:

```
/opt/VRTS/bin/vxdbdctrl stop
/opt/VRTS/bin/vxdbdctrl start
```

Verify that no other Database editions utility is running while restarting the `vxdbd` daemon. [1144749]

reverse_resync_abort operation may display error message

Performing the `reverse_resync_abort` operation may display an error message similar to the following:

```
VXDBA_PRODUCT vxckptadm ERROR V-81-7100 /usr/sbin/mount -F vxfs
-o ckpt=SNAP_1193314118,ro
/dev/vx/dsk/flashdg48/datavol:SNAP_1193314118 /tmp/dbed_BA
A001066/snap_data9r2
VXDBA_PRODUCT vxckptadm ERROR V-81-7100 UX:vxfs mount: ERROR:
V-3-24706: /dev/vx/dsk/flashdg48/datavol:SNAP_1193314118 no such
device or filesystem on it missing one or more devices
VXDBA_PRODUCT vxckptadm ERROR V-81-4576 Could not mount Storage
Checkpoint SNAP_1193314118 on /snap_data9r2.
VXDBA_PRODUCT vxckptadm ERROR V-81-4569 Could not mount Storage
Checkpoint SNAP_1193314118.
VXDBA_PRODUCT vxckptadm ERROR V-81-4562 Storage Rollback failed.
```

```
SFORA dbed_vmsnap ERROR V-81-3016 Could not roll back the entire
database.
```

Despite this message, the `reverse_resync_abort` operation is complete and the user is expected to perform a `resync` after this operation.

Workaround: To avoid this error the user may restart the `vxdbd` daemon after the `reverse_resync_begin` operation using the following commands:

```
/opt/VRTS/bin/vxdbdctrl stop
/opt/VRTS/bin/vxdbdctrl start
```

[1129471]

Possible error with Oracle Disk Manager when Oracle creates a huge mmap

If you have Oracle installed with Oracle Disk Manager (ODM), during operations in which Oracle creates a huge `mmap()` and spans the `mmap()` across multiple regions, an error similar to the following message sometimes appears:

```
ORA-12801: error signaled in parallel query server P005
ORA-01115: IO error reading block from file 5 (block # 64128)
ORA-17500: ODM err:ODM ERROR V-41-4-1-264-14 Bad address
```

Oracle creating a such an `mmap()` sometimes occurs during parallel index creation. The `syslog` shows an "Invalid Argument" error or a data I/O error.

If you see this error, contact Technical Support. [1177244]

Veritas Volume Manager known issues

The following issues were reported for this release of VxVM.

Installation and upgrade Issues

Array support libraries

The upgrade procedure will attempt to remove any array support library (ASL) packages from previous releases. After an upgrade has been completed, the output from `swlist` should not show any such ASL packages. If a pre-5.0 ASL package is not removed for some reason, you can use the following command to remove it:

```
# swremove ASL_pkg_name
```

Upgrading systems running VxVM 3.5 Prior to Command Cumulative Patch 06

Before upgrading a system that is running under VxVM 3.5 at a patch level prior to Command Cumulative Patch 06 (PHCO_30834), it is strongly recommended that you download and apply this patch, and then run the `ckpublen.sh` utility

script, as documented in TechNote 270407, available at:
<http://support.Veritas.com/docs/270407>.

If the script reports that any disks need to be re-initialized, back up the file systems and data residing on the volumes on those disks, and restore them after re-initializing the disks and recreating the volumes. You can then proceed to upgrade the system with the Veritas Storage Foundation 5.0 software.

Error message appears while configuring the cluster after upgrading from HP-UX 4.1MP2 v2 to 5.0v3.

After upgrading to HP-UX 5.0 11.31, the following `/core` file can occasionally be found on the system after reboot:

```
# file /core
/core: ELF-32 core file - IA64 from 'vxesd'
```

This core file can be ignored, as the basic system operation is not impacted. To prevent the core file, stop the currently running `vxesd` process, if any, using the `vxddladm stop eventsource` or `kill -9 esd_pid` commands and then install the updated FibrChanl-00 B.11.31.0712 product from the December 2007 Application Release media. [1167006]

Utility issues

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

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

Specifying an enclosure to the vxmpadm getportids command

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

Running vxctl enable causes a core dump

The VxVM configuration daemon, `vxconfigd`, can dump core under rare conditions if the `vxctl enable` command is run on a system with an HDS array. [543803]

Disk group is disabled if private region sizes differ

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

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

Maximum size of a VxVM volume

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

Resizing a volume set with an unmounted file system

It is not possible to use the `vxresize` command to change the size of a component volume of a volume set that has an unmounted file system. This is because the `extendfs` command is not supported for volume sets with unmounted file systems. [574134, 571997]

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
```

Warning message at boot time

A message such as the following is displayed if an attempt is made to open a volume at boot time before any disk group has been imported.

```
WARNING: VxVM vxio V-5-0-23 Open on an spurious volume device
(hex_id) encountered. This device may be valid, but has not yet
been configured in the kernel.
```

This message may be ignored. Once the disk group has been imported successfully, there should be no problem in accessing its volumes.

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]

Using `vxdiskadm` to replace a failed disk

The `vxdiskadm` command requires two attempts to replace a failed disk. The first attempt can fail with a message of the form:

```
/usr/lib/vxvm/voladm.d/bin/disk.repl: test: argument expected
```

The command is not completed and the disk is not replaced. If you now rerun the command, using Option 5, the replacement successfully completes. [102381]

Replacement of the `old_layout` attribute

The `vxdisksetup` command gives the error message `Attribute unrecognized` when the `old_layout` attribute is used to make a disk into a VxVM controlled disk. The `old_layout` attribute is no longer supported. 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 also exhibits the same problem. When a `vxvol init` command is executed on the top level volume, the change is not propagated to the volumes corresponding to its subvolumes.

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

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

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

[134932]

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`) during resynchronization. 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, plex and subdisk names associated with the subvolumes, are changed.

vxconfigd hangs due to a faulty disk

If I/O hangs for some reason such as a disk failing while the VxVM configuration daemon, `vxconfigd`, is performing I/O from/to the disks, there is no way to communicate with `vxconfigd` via signals or native interprocess communication. This can potentially cause two kinds of problem:

- The node becomes unavailable for VxVM administrative commands.
- In a clustered or HA environment where Veritas Cluster Server agents need to communicate with `vxconfigd` to determine the health of VxVM components, service groups start timing out and failing.

Device issues

Invalid format attribute error during disk initialization

If a disk to be placed under VxVM control was previously used for a file system, VxVM cannot initialize the disk. Such disks are recognized as "FS_wholeldisk" by VxVM.

Workaround: If the disk was previously used for a file system, you must destroy the file system before placing the disk under VxVM control. To destroy a file system, type the following commands:

```
dd if=/dev/zero of=/dev/dsk/diskname bs=1024k count=50
vxdisk scandisks
vxdisk -f init diskname
```

Unsupported disk arrays

To ensure that DMP is set up correctly on a multiported JBOD or other disk array that is not supported by VxVM, use the procedure given in "Adding Unsupported Disk Arrays to the DISKS Category" in the "Administering Disks" chapter of the *Veritas Volume Manager Administrator's Guide*. Otherwise, VxVM treats the independent paths to the disks as separate devices, which can result in data corruption.

Hitachi arrays in Active/Active mode

When Hitachi DF400 and DF500 arrays are configured in Active/Active mode, performance is degraded. [73154]

Stale entries in /dev/disk and /dev/rdisk directories are added as disks in "error" state

If there are any stale devices in the /dev/disk and /dev/rdisk directories on which IO processes cannot be performed, the devices cannot be accessed by VxVM and are added as disks in the "error" state. The devices are displayed as disks in the "error" state when using the `vxdisk list` command.

Hot-relocation issues

Impact of hot-relocation on performance

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

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

DMP threads appear as processes

Unlike the VxVM I/O daemons, DMP daemons, which are also kernel threads, appear in the output from the `ps` command as they have an associated process table entry. This difference in behavior is harmless. [498970]

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`.

Site failure in an EDC setup with CVM causes application I/O and VxVM commands to hang

When there is a site failure in an Extended Distance Cluster (EDC) setup with CVM configuration, the link that connects the storage devices (either A/P or A/AA array) between the two sites is disconnected. On the remaining site, DMP does not return the I/O on the failed paths to the application and causes application I/Os and VxVM commands to hang.

Workaround:

There is no workaround for this issue. [1190287]

Cluster functionality issues

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

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

Workaround:

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

```
# vxclustadm nidmap
```

The output from this command should show an entry for the node.

- 3 Reconnect the cable that corresponds to the primary path between the node and the array.
- 4 Use the following command to trigger cluster-wide failback:

```
# vxdisk scandisks
```

All the nodes should now be using the primary path.

[579536]

Volume persists in SYNC state

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

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

[20448]

RAID-5 volumes

VxVM does not currently 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

Volume relayout

Volume relayout is not supported for site-confined volumes or for site-consistent volumes in this release. [528677]

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]

Reattaching a site

Reattaching a site when the disks are in the serial-split brain condition gives an error message similar to the following if the `-o overridesb` option is not specified:

```
VxVM vxdg ERROR V-5-1-10127 disassociating sitename: Record not
in disk group
```

Use the following commands to reattach the site and recover the disk group:

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

[540351]

Site records are not propagated during disk group split, move or join

Split, join and move operations fail on a source disk group that has any site-confined volumes. This is because site records cannot be propagated to a target disk group during such operations.

One of the following messages is displayed as a result of a failed disk group split, join or move operation:

```
There are volume(s) with allsites flag which do not have a plex
on site sitename. Use -f flag to move all such the volumes
turning off allsites flag on them.
```

```
The volume(s) with allsites flags are being moved to the target
disk group that doesn't have any site records. Use -f flag to
add all such volumes turning off allsites flag on them.
```

The suggested workaround is to ensure that `allsites=off` is set on all the volumes that are being moved between disk groups:

- 1 Run the following command on each of the volumes that is being moved split or joined to find out if `allsites=on` is set on any of them.

```
# vxprint -g diskgroup -F %allsites volume
```
- 2 Run the following command on each of the volumes with `allsites=on` set that you found in the previous step.

```
# vxvol -g diskgroup set allsites=off volume
```
- 3 Proceed with the disk group split, join or move operation.

[563524]

Restoring site records

The `vxmake` command can be used to recreate a disk group configuration, but not to restore site records. After restoring a disk group configuration, use the following command to recreate the site records manually:

```
# vxdg -g diskgroup addsite site
```

[584200]

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 SFCFS file system

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

```
VxVM vxio WARNING V-5-0-4 Plex plex detached from volume volume
```

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

File system check of a snapshot

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

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

Mount operation can cause inconsistencies in snapshots

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

Cache volumes in volume sets

Do not add cache volumes (used by space-optimized instant snapshots) to volume sets. This causes data corruption and system panics.

[614061, 614787]

VxVM Flashsnap operation on volume sets with mounted VxFS file systems can cause loss of changes

The operation to create snapshots on volume sets experiences a known problem when a VxFS file system is created on top of it and the file system is mounted at the time of snapshot creation. The snapshot volume that is created may lose

recent changes in file system of the parent volume set just before the snapshot operation was performed.

Workaround: When taking a snapshot of an SFCFS file system, you should ensure that at least one of the volumes defined in the command line is mounted on the cluster master. [1229651]

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. [137185]

Miscellaneous issues

Disks with write-back caches

Disk drives configured to use a write-back cache, or disk arrays configured with volatile write-back cache, exhibit data integrity problems. The problems occur after a power failure, SCSI bus reset, or other event in which the disk has cached data, but has not yet written it to non-volatile storage. Contact 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 `vxchg 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 needs 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 cannot allocate physical memory pages any more.

Messages about VVR 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 (VVR) user.

Number of columns in a RAID-5 ISP volume

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

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.

Volume tags not displayed

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

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.sl /opt/VRTSddlpr/lib/ddl.sl.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/vxpalctrl -a StorageAgent -c restart
```

Name service switch configuration file

For VEA to operate successfully, the name service switch configuration file, `/etc/nsswitch.conf`, must be present on the system.

See the `nsswitch.conf(4)` manual page.

Permitting remote access to the X Windows server

The following X Windows system error may occur when starting VEA:

```
xlib: connection to "hostname:0.0" refused by server
xlib: Client is not authorized to connect to Server
```

Workaround: Allow access to the local X server by using the following command:

```
# xhost + [hostname]
```

Disk group creation failure with duplicate disk ID

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

Comments in Japanese on a snapshot volume are not saved or displayed correctly

Comments that are entered in the Japanese character set in the **Snapshot Options** dialog of the **Create Instant Snapshot** screen of the VEA GUI are not saved or displayed correctly. [322954]

VEA GUI may display incorrect CVM information

The VEA GUI may not display the correct CVM information. The object tree in the VEA GUI may not display any nodes under “Cluster Nodes” and imported shared disgroups may be displayed as not imported.

Workaround: Restart the StorageAgent using the following command:

```
# /opt/VRTSobc/pal33/bin/vxpalctrl - a StorageAgent -c restart
```

Veritas Volume Manager Web GUI issues

Maximum size of a volume

The maximum size of a volume is shown as a rounded-down integer number of gigabytes. If the maximum size is less than 1GB, the maximum size is shown as 0GB. [573897]

Corrupted import disk group dialog

If some objects are not present, the import disk group dialog may be displayed as blank or may show the text `<!--td align="center" height="287" valign="midd"`. For example, this can occur when attempting to import a disk group from a host that is being rebooted. [607096]

Create disk group wizard

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

Object not found error on creating a volume set

An “object not found error” may be displayed when a volume set is created. [615960]

Disconnecting a disk produces a ghost entry

Ghost entries for disconnected disks in the All Disks View cannot be removed by using the GUI. A command such as `vxchg -g diskgroup rmdisk diskname` must be used instead. [576794]

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 onward:

VxVM Release	Cluster Protocol Versions	Disk Group Version	Supported Disk Group Versions
3.0	n/a	60	60
3.1	n/a	60	60
3.2	30	60	60
3.5	40	90	60, 90
4.1	60	120	60, 90, 120
5.0	70	140	60, 90, 120, 140

You can use the following command to find out the version number of a disk group:

```
# vxdbg list diskgroup
```

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

To upgrade a disk group, use the following command:

```
# vxdbg [-T version] upgrade diskgroup
```

Unless a disk group version is specified, this command upgrades the disk group to the highest version supported by the VxVM version on your system.

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*.

Veritas File System known issues

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

Large file support

VxFS 5.0 only supports files up to 2 TB on 64-bit kernels.

Mapping a large offset of a file

Calling the `mmap(2)` function on a large offset of a file might require a large amount of swap space. If `mmap(2)` is called on a 1 TB offset in `MAP_SHARED` mode, then approximately 256 MB of virtual memory pages could be instantiated. This means that VM requires space to hold 256 MB of data structures. Each of these structures are 16 bytes, thus approximately 4 GB space is required. Since these data structures are able to be paged, more than 4 GB of swap space is reserved when `mmap(2)` is called.

System hang can occur on systems with less cache memory

VxFS allocates a fixed amount of memory. You can change the amount of memory allocated using the tunables `vx_ninode` and `vxfs_bc_bufhwm`. After long hours of operation, low-memory systems (that is, systems having less physical RAM), may slow down or hang due to memory pressure. To alleviate this problem, lower the values of `vx_ninode` and `vxfs_bc_bufhwm` to limit VxFS memory consumption.

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

Tuning down the inode cache

VxFS file systems allocate and release inodes based on the file system load. Generally, larger inode caches help the file systems to perform better in the case of a file server or web server load. The global (static) tunable, `vx_ninode`, determines the maximum possible size of the VxFS inode cache. If the default value of `vx_ninode` is set to zero, VxFS automatically tunes the size of the inode cache at boot time, based on the size of the physical memory on the system. On systems with a RAM size of less than or equal to 1 GB per CPU, you can manually tune down `vx_ninode` to a value not less than that of `nfile`

(`nfile` is an HP-UX tunable that represents the maximum number of file descriptors).

Tuning down the buffer cache

VxFS 5.0 implements a private buffer cache to use exclusively for metadata. The allocations to this buffer cache vary during system usage based on file system load and the maximum cache size specified in the global (static) tunable, `vxfstbcbufhwm`. If the value of `vxfstbcbufhwm` is set to zero, VxFS automatically tunes the maximum size of the metadata buffer cache at boot time, based on the system memory size. On systems with a RAM size of 1 GB per CPU or less, you can manually tune down the value of `vxfstbcbufhwm` to a minimum of 6144 (6MB).

100% full file system cannot be resized

In some circumstances, the `fsadm` command 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. If a file system is busy or too fragmented, the resize operation can also fail.

Setting `max_thread_proc` tunable

Setting `max_thread_proc` to a low value may result in the system being in a hung state. If the value of this tunable is less than 1100, the value will be automatically set to 1100 when VxFS is installed. This value must be maintained at or above 1100.

DMAPI `dm_get_dirattr` can skip directory entries

`vx_hsm_get_dirattr()` reads a directory's `dirents` 8 KB at a time, if the passed in user buffer is not large enough to hold the combined entries' corresponding file stats information (up to ~114kb). Then the next call to `vx_hsm_get_dirattr()` will continue from the wrong offset within the directory, resulting in some directory entries being skipped.

Note: There is no error indication. The expectation is to continue from the last dirent information that could fit into the user's buffer. However, the next directory read will begin 8 KB farther down the directory.

As a workaround this issue can be avoided by passing a sufficiently large user buffer.

File system with quotas cannot be mounted after doing cross-platform data sharing conversion

If a file system is using quotas, it cannot be mounted with quotas turned on after converting the byte order of the file system with the `fscdsconv(1M)` utility. Similarly, quotas cannot be turned on, if the converted file system is first mounted with quotas turned off.

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

CDS validate error running in `ja_JP.UTF-8`-encoded locale

The `fscdstask validate` command returns an error when files on the specified mount point have names with `ja_JP.eucJP` or `ja_JP.PCK` encodings, but the locale has been changed to `jp_JP.UTF-8`. The error is as follows:

```
xargs: Input file is corrupt. : Incorrect byte order
```

Files should be created with the same locale encoding as the file system on which they reside.

Under some conditions, `fsadm` cannot truncate a directory

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

Inode limitation on file systems without large file support

For a file system to have more than 8 million inodes, you must create it using the `largefiles` option of `mkfs`. The `fsadm` utility can also be used to set the `largefiles` flag on the file system. The `largefiles` option is enabled by

default on VxFS 4.1 and later releases. In previous VxFS releases, `nolargefiles` was the default mount option.

See the `mkfs_vxfs(1M)` and `fsadm_vxfs(1M)` manual pages.

Non-standard command behavior when using ACLs

The output of the `ls -l` command on VxFS file systems shows `mask/CLASS_OBJ` in place of group permissions if Access Control Lists (ACLs) are in use on a file or a directory. You can determine the effective group permissions by using the `getacl` command. In the next release of VxFS, the behavior of `ls -l` will show effective group permissions, that is, `GROUP_OBJ` masked by `CLASS_OBJ`.

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

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

Even if the parent directory has default ACLs, `umask` is applied to a newly created file. According to POSIX standards, `umask` should be applied only if the parent directory does not have any default ACLs. In the next release of VxFS, this behavior will be made POSIX compliant.

See the `aclsort(3C)`, `chmod(1)`, `getacl(1)`, `ls(1)`, `setacl(1)`, and `uname(1)` manual pages.

The `newfs -R` command allows reserving swap space larger than the device

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

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 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 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 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 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.

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

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, the HP-UX quota commands on the NFS client cannot be used to edit quotas. The VxFS quota commands can be used on the server to edit quotas.

Files and directories

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

Cross-Platform Data Sharing (CDS)

■ External Quota File

CDS does not support converting the external quota file. The external quota file would need to be manually migrated as follows:

On source:

Prior to unmounting the file system, remove the `quotas` file. Run the `fscdsconv` command after unmounting the file system.

On target:

Mount the file system without quotas. Manually edit the `quotas` and the `quotas.grp` file to enter the limits.

■ Handling ACLs with CDS

Because not all target platforms support ACLs, converting a file system with ACLs from the source to a target on which ACLs are not supported results in ACLs not being enabled on the target. If the file system is converted back to a target on which ACLs are supported, permission checks are enforced again.

Quick I/O files cannot be sparse files

If you try to convert a sparse file to a Quick I/O file, the Oracle instance can fail if Oracle tries to write into an unallocated block. Specifically, datafiles used by the Oracle8i and Oracle9i temporary tablespace may be sparse files, so do not convert these to Quick I/O files.

See the *Veritas Storage Foundation for Oracle Database Administrator's Guide*.

fsck -m does not recognize a VxVM volume root partition

The `fsck -m` command does not recognize a VxVM volume root partition and fails when the file system is mounted. This occurs because the `devid` of the block device and the `devid` of the character device are different for VxVM volumes.

vxdiskusg -i is not supported on file systems with disk layout Version 7

The `-i` option of the `vxdiskusg` command, which is used to ignore the disk usage of the specified file systems, does not work on file systems with disk layout Version 7.

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 `fsmap` on the FCL file is not supported since these commands use an internal ioctl to implement their functionality.

Veritas File System Web GUI online help known issues

The following known issues were reported for this release:

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

fsck may terminate when applied to unclean file systems from Veritas File System 4.0 or 4.1

Due to an incompatibility in the VxFS `fsck` utility between the 5.0 and 4.0 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 4.0 or 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 system GUI fails to set directory ownership for a mount point when the user and group IDs do not match

The file system GUI fails to set directory ownership for a mount point when the specified user and group IDs do not match. This results in the following error message:

```
Error V-44-50456-9045
  Either group or user id is invalid
  Either group or user id is invalid
```

Choose the primary group of the specified user instead of other group IDs to which the user belongs when setting the directory's ownership.

Software limitations

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

Storage Foundation software limitations

Node and host names

The HP-UX Node and Host Name Expansion feature is not supported on Symantec products.

This release does not support host names that are longer than 8 characters.

Veritas Volume Manager software limitations

nMP rootability support

The following are software limitations for nMP rootability support:

- Migration of a root disk from DMP to nMP or vice versa must be followed by a system reboot.

Note: Online migration of nMP to DMP or vice versa is not supported, i.e., the changes will not be effective until the system reboots. VxVM also disables the configuration daemon (`vxconfigd`) until the system reboots. This ensures that any operation, which could lead to a configuration change, would be failed.

- Migration of disks from DMP to nMP is dependent on the current boot disk. Therefore changes may not be reflected if the system is booted with a different disk.
- Target devices must be under DMP control when executing any of the rootability scripts.
- After performing the `vxrootmir` operation in nMP mode, the mirrored disk is not capable of booting until the mirror is broken off from the original root disk.

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.

Compatibility with previous versions of Veritas File System

VxFS 5.0 release does not support creating or mounting disk layout Version 1, 2, or 3 file systems. Symantec recommends upgrading any previously installed VxFS file system to the disk layout Version 7 that is available with VxFS 5.0.

Caution: Do **not** upgrade `/stand` and `/file` systems to disk layout Version 7. The HP bootloader does not understand this layout.

The disk layout of a VxFS file system can be upgraded after installing VxFS 5.0. Use `vxupgrade(1M)` command to upgrade the disk layout from Version 4 or 5 to disk layout Version 6, then Version 7 on a mounted file system. Use `vxfsconvert(1M)` to convert an unmounted file system to VxFS disk layout Version 7.

Note: A disk layout Version 7 file system created with VxFS 5.0 software will not be accessible if the VxFS 5.0 file system software is removed and the system is reverted to VxFS 4.x. In addition, if a disk layout Version 6 file system exists on a boot disk and VxFS 4.1 is removed, the host will not reboot successfully and will remain at the `bcheckrc` prompt. To reboot the host successfully, first edit the `fstab` file and comment out disk layout Version 6 file system entries.

See the *Veritas Storage Foundation Installation Guide*.

See the *Veritas File System Administrator's Guide*.

Note: VxFS file systems must be cleanly unmounted before upgrading to the Veritas File System 5.0 release from any previous release.

See TechNote 265504, available at:
<http://support.Veritas.com/docs/265504>.

Veritas Storage Foundation for Oracle software limitations

DBDST limitations with non-English filenames and placement class names

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 GCO 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]

Avoid using UNIX VEA via PC-based UNIX emulators

There can be problems displaying deep mapping topology in PC-based UNIX emulators like Exceed. Use the Windows VEA client instead of running the UNIX VEA client via emulators.

No support for Intelligent Storage Provisioning

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

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

You can click the **Quota** tab for the Storage Checkpoint available via the GUI. If the file system and the Storage Checkpoint are on a version prior to Disk Layout Version 6, you will see the error 4646.

For Disk Layout Version 5 and earlier to display Storage Checkpoints Quotas via the GUI, perform the following steps:

- 1 Using Veritas File System 3.5, create a file system.
- 2 Upgrade to Veritas File System 5.0 but *do not* upgrade the file system.
- 3 Create a checkpoint and then click the **Quota** tab accessible via the GUI.

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 4.1 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.

VEA limitations

- Veritas Enterprise Administrator (VEA) does not display tablespace information when the `v$table` column names are changed using the SQL*Plus profile facility. Normally this happens when SQL*Plus settings are used in `login.sql` to change column names in reports. [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:

```
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]

- Existing snapshot plexes created by the vxassist command are not supported. A combination of snapshot plexes created by vxassist and vxsnap is also not supported.

Oracle Disk Manager limitations

- 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. The default option is the correct option to use.
- 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.

Clone database ORACLE_SID character limit

When cloning an Oracle instance using the dbed_clonedb or dbed_vmclonedb command, the clone database's ORACLE_SID can be only eight characters or less. You will receive an error (ERROR V-81-5713) if the ORACLE_SID is more the eight characters.

Renaming columns in login.sql

Renaming columns in login.sql can sometimes cause scripts to fail or produce incorrect results. To prevent this, make the following changes in the user environment to generally avoid loading login.sql:

- 1 Move `login.sql` to another directory, for example, to `~oracle/login.sql`.
- 2 Make sure this new directory is included in `SQLPATH`, for example:

```
export SQLPATH=~oracle/sql:$SQLPATH
```
- 3 Do not make `SQLPATH` read-only, so that Storage Foundation for Oracle scripts can unset it at runtime.
- 4 Avoid starting Storage Foundation for Oracle scripts from the directory where `login.sql` resides, unless you are sure that `login.sql` does not contain any settings or commands that change the default output for queries against the data dictionary or increase the startup time for SQL*Plus.

Also avoid using any settings or commands in the `glogin.sql` file that change the default output for queries against the data dictionary, or that may increase the startup time for SQL*Plus.

DBDST 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]

Selected utilities require `setuid`

Some Veritas Storage Foundation for Oracle 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:

- `/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]

One-time scheduled tasks need Specific Date

When scheduling a one-time task from the GUI, the task may not be executed if a Specific Date (Include Date) is not set for it. [861274]

Documentation

Product guides are available on the documentation disc in PDF and HTML formats. We recommend copying pertinent information, such as installation guides and release notes, from the disc to your system directory `/opt/VRTS/docs` for reference.

Veritas documentation disc

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

All documentation is organized by product groups.

Release notes and installation guides

Release notes and installation guides are not installed by any packages. Symantec 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:

Table 5 Guides in Veritas Storage Foundation Documentation Set

Guide Title	Filename
<i>Veritas Storage Foundation and High Availability Getting Started Guide</i>	getting_started.pdf
<i>Veritas Storage Foundation Release Notes</i> (this document)	sf_notes.pdf
<i>Veritas Storage Foundation Installation Guide</i>	sf_install.pdf
<i>Veritas Storage Foundation Oracle Administrator's Guide</i>	sf_ora_admin.pdf
<i>Veritas Storage Foundation for Oracle Graphical User Interface Guide</i> (NEW)	sf_ora_gui.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

Veritas Cluster Server documentation

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

Table 6 Guides in Veritas Cluster Server Documentation Set

Guide Title	Filename
<i>Veritas Cluster Server Release Notes</i>	vcs_notes.pdf
<i>Veritas Cluster Server Installation Guide</i>	vcs_install.pdf
<i>Veritas Cluster Server User's Guide</i>	vcs_users.pdf
<i>Veritas Cluster Server Agent Developer's Guide</i>	vcs_agent_dev.pdf
<i>Veritas Cluster Server Bundled Agents Reference Guide</i>	vcs_bundled_agents.pdf
VCS Enterprise Agent for Oracle Installation and Configuration Guide	vcs_oracle_install.pdf

Veritas Volume Replicator documentation

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

Table 7 Guides in Veritas Volume Replicator Documentation Set

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

Veritas Storage Foundation for Databases Documentation Changes

The 5.0 release introduces a new guide for the GUI, *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`.

Manual pages

The Veritas online manual pages are installed in the `/opt/VRTS/man` directory. This directory must be added to the `MANPATH` environment variable. Installing documentation and online manual pages is optional.

Documentation errata

On page 11 of the *Veritas Volume Replicator Web GUI Administrator's Guide*, the following URL results in a Page Not Found error:

<http://www.veritas.com/Products/www?c=product&refId=3>

For comprehensive, up-to-date information about the Veritas Volume Replicator product offerings, the correct URL is:

http://www.symantec.com/business/products/overview.jsp?pcid=2245&pvid=3_1

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Apache Lucene

Apache Portable Runtime

Apache Snmp4j - The Object Oriented SNMP API for Java

Apache Spring Framework

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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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MD5.h

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JavaTip87: Automate the Hourglass Cursor

Kyle Davis

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

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Sockets++ library

University of Texas

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