Veritas Storage Foundation™ and High Availability Release Notes

AIX

6.0

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Symantec™

Veritas Storage Foundation and High Availability Release Notes

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Legal Notice

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Veritas Storage Foundation and High Availability Release Notes

This document includes the following topics:

About this document

This document provides important information about Veritas Storage Foundation and High Availability (SFHA) version 6.0 for AIX. Review this entire document before you install or upgrade SFHA.

The information in the Release Notes supersedes the information provided in the product documents for SFHA.

This is Document version: 6.0.5 of the *Veritas Storage Foundation and High Availability Release Notes*. Before you start, make sure that you are using the latest version of this guide. The latest product documentation is available on the Symantec Web site at:

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Component product release notes

In addition to reading this Release Notes document, review the component product release notes before installing the product.

Product guides are available at the following location on the software media in PDF formats:

`/product_name/docs`

Symantec recommends copying the `docs` directory on the software media that contains the product guides to the `/opt/VRTS` directory on your system.

This release includes the following component product release notes:

- *Veritas Storage Foundation Release Notes* (6.0)
- *Veritas Cluster Server Release Notes* (6.0)

About Veritas Storage Foundation High Availability

Storage Foundation High Availability includes Veritas Storage Foundation and Veritas Cluster Server. Veritas Cluster Server adds high availability functionality to Storage Foundation products.

Before you install the product, read the *Veritas Storage Foundation and High Availability Release Notes*.

To install the product, follow the instructions in the *Veritas Storage Foundation and High Availability Installation Guide*.

For HA installations, also read the *Veritas Cluster Server Release Notes*.

About Symantec Operations Readiness Tools

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SORT can help you do the following:

Prepare for your next installation or upgrade	■ List product installation and upgrade requirements, including operating system versions, memory, disk space, and architecture. ■ Analyze systems to determine if they are ready to install or upgrade Symantec products. ■ Download the latest patches, documentation, and high availability agents from a central repository. ■ Access up-to-date compatibility lists for hardware, software, databases, and operating systems.
Manage risks	■ Get automatic email notifications about changes to patches, array-specific modules (ASLs/APMs/DDIs/DDLs), and high availability agents from a central repository. ■ Identify and mitigate system and environmental risks. ■ Display descriptions and solutions for hundreds of Symantec error codes.
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- For important updates regarding this release, review the Late-Breaking News TechNote on the Symantec Technical Support website: http://www.symantec.com/docs/TECH164885

- For the latest patches available for this release, go to:
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- The hardware compatibility list contains information about supported hardware and is updated regularly. For the latest information on supported hardware visit the following URL:
  http://www.symantec.com/docs/TECH170013
  Before installing or upgrading Storage Foundation and High Availability Solutions products, review the current compatibility list to confirm the compatibility of your hardware and software.

Changes introduced in 6.0

This section lists the changes in Veritas Storage Foundation and High Availability 6.0.

Changes related to Veritas Storage Foundation and High Availability (SFHA)

Storage Foundation and High Availability (SFHA) includes the new features and changes introduced in 6.0 of the underlying products.

Changes related to Veritas File System

Veritas File System includes the following changes in 6.0:

Data deduplication

You can run post-process periodic deduplication in a file system, which eliminates duplicate data without any continuous cost. This feature requires an Enterprise license.

See the *Administrator's Guide*.

Default disk layout Version is now 9

In this release, disk layout Version 9 is now the default version, which enables support for the following features:

- Data deduplication

See the *Administrator's Guide*.

Multi-threaded Thin Reclamation

You can perform multi-threaded Thin Reclamation operations for improved performance.

See the `fsadm_vxfs`(1M) and `vxfs_ts_reclaim`(3) manual pages.

Storage Checkpoints

The following changes were made to Storage Checkpoints:

- You can tune Veritas File System (VxFS) file systems to create removable Storage Checkpoints by default.
  See the `vxtunefs`(1M) manual page.
- VxFS now attempts to remove removable Storage Checkpoints if the file system does not have enough space instead of failing the operation.
- Storage Checkpoints have improved visibility to the file system. With the `ckptautomnt` mount option, all Storage Checkpoints are made accessible automatically through a directory in the root directory of the file system that has the special name `.checkpoint`, which does not appear in directory listings. Inside this directory is a directory for each Storage Checkpoint in the file system. Each of these directories behave as a mount of the corresponding Storage Checkpoint with some exceptions.
  See the *Veritas Storage Foundation and High Availability Administrator's Guide*.

Partitioned directories

Normally, a large volume of parallel threads performing access and updates on a directory that commonly exist in an file system suffers from exponentially longer wait times for the threads. This feature creates partitioned directories to improve the directory performance of file systems. When any directory crosses the tunable threshold, this feature takes an exclusive lock on the directory inode and redistributes the entries into various respective hash directories. These hash directories are not visible in the name-space view of the user or operating system. For every new create, delete, or lookup thread, this feature performs a lookup for the respective hashed directory (depending on the target name) and performs the operation in that directory. This leaves the parent directory inode and its other hash directories unobstructed for access, which vastly improves file system performance.

See the *Administrator's Guide*.

Delayed allocation for extending writes

Performance of extending writes on local mounts is improved using the delayed allocation feature, which is turned on by default for all applicable writes.

See the *Administrator's Guide*.

Migrating a source file system to the VxFS file system over NFS v3

NFS is one of the most commonly used file systems in network-attached storage solutions and is one of the standard file sharing mechanisms used in UNIX environments. This feature enables you to migrate a source file system to the VxFS file system over your existing NFS v3 solution.

See the *Veritas Storage Foundation and High Availability Solutions Solutions Guide*.

vxfsconvert can upgrade additional Veritas File System disk layout versions

The `vxfsconvert` command can upgrade the VxFS disk layout Version 4.

Free space defragmentation

You can now specify the `-C` option with the `fsadm` command to minimize file system free space fragmentation. This attempts to generate bigger chunks of free space in the specified device.

Improved fsadm fragmentation reporting

The `fsadm` command's fragmentation reporting now includes the file fragmentation index and the free space fragmentation index. Both of these indices range between 0 and 100, and give an idea about the level of file fragmentation and free space fragmentation, respectively, which gives you a good indication of when you should defragment a file system.

Changes related to Veritas Volume Manager

Veritas Volume Manager (VxVM) includes the following changes in 6.0:

Recovery for synchronization tasks

In this release, VxVM tracks the plex synchronization for the following commands: vxplex att, vxassist mirror, vxsnap addmir, vxsnap reattach, and vxsnap restore. If the system crashes or the vxconfigd daemon fails, VxVM provides automatic recovery for the synchronization task. When the system is recovered,VxVM restarts the synchronization from the point where it failed. The synchronization occurs in the background, so the volume is available without delay.

Secure deletion of Veritas Volume Manager disks

When you decommission a disk that contained sensitive data, you may need to destroy any remaining data on the disk. In this release, VxVM provides the ability to shred the data on the disk to minimize the chance that the data is recoverable. When you specify the disk shred operation, VxVM shreds the entire disk, including any existing disk labels. After the shred operation, VxVM writes a new empty label on the disk to prevent the disk from going to the error state. The VxVM shred

operation overwrites all of the addressable blocks with a digital pattern in one, three, or seven passes.

Caution: All data in the volume will be lost when you shred it. Make sure that the information has been backed up onto another storage medium and verified, or that it is no longer needed.

For more information on shredding disks, see the *Veritas Storage Foundation Administrator's Guide*.

Creating a volume of maximum size

In previous releases, Veritas Volume Manager provided a two-step approach to creating a volume of the maximum size. You had to run the `vxassist maxsize` command to find the maximum size of the volume to be created with the given constraints. Then, you had to run the `vxassist make` command and specify the volume size as the maximum determined by the `vxassist maxsize` command.

In this release, you can create a maximum sized volume with a single command. Specify the `vxassist make` command with the `maxsize` keyword. The `vxassist` command creates the maximum sized volume possible, taking into consideration any other allocation attributes that you specify.

Veritas Volume Manager co-existence with Oracle Automatic Storage Management (ASM) disks

ASM disks are the disks used by Oracle Automatic Storage Management software. Veritas Volume Manager (VxVM) co-exists with Oracle ASM disks, by recognizing the disks as the type Oracle ASM. VxVM protects ASM disks from any operations that may overwrite the disk. VxVM classifies and displays the ASM disks as ASM format disks. You cannot initialize an ASM disk, or perform any VxVM operations that may overwrite the disk.

For more information about VxVM co-existence with ASM disks, see the *Veritas Storage Foundation Administrator's Guide*.

Changing VxVM tunables

The `vxtune` command is used to display or modify the values of Veritas Volume Manager tunable parameters. In this release, the `vxtune` command is extended and enhanced. The `vxtune` command has the following new functionality:

- manages an extended list of Veritas Volume Manager tunable parameters, including Veritas Volume Replicator and Cluster Volume Manager tunable parameters.

- provides a template format for tuning parameters. The template feature enables you to export the list of tunable parameters into a file, modify the values as necessary, then reload the tunables with an import command.
- enhanced command output. The output now displays the current value, the default value, and whether a reboot is required for the new value to take effect. Optionally, the output displays a description of the tunable parameters.
- makes the tunable values persistent across reboots.
- categorizes the tunable parameters by VxVM component. Specify the component to list or export the tunable parameters in that category. The components are the following:
  - basevm
    Basic core VxVM functionality.
  - fmr
    FlashSnap functionality.
  - cvm
    Cluster Volume Manager.
  - vvr
    Veritas Volume Replicator.

Changes to the instant snapshot (version 20) data change object (DCO) volume layout

In this release, the volume layout of the data change object (DCO) has been changed to improve the I/O performance and scalability of instant snapshots. The change in layout does not alter how you administer instant snaphosts. The only visible effect is in improved I/O performance and in some cases, increased size of DCO volume. As with previous releases, you create DCOs for instant snapshots using "vxsnap prepare" or by specifying "logtype=dco dcoversion=20" while creating volume with "vxassist make".

The instant snapshot DCO (previously known as a version 20 DCO) now uses dynamic creation of maps on the preallocated storage.

Online Migration of native LVM volumes to VxVM volumes

In this release, Veritas Volume Manager (VxVM) provides a feature to migrate volumes under native LVM control to VxVM volumes, with a limited application downtime.

This migrates source LVM volume data to target VxVM volumes on new storage, with the flexibility of different storage and layouts. Once the migration is set up,

the application can be resumed, while data synchronization from source LVM to target VxVM volumes continues in the background.

The migration configuration is set up such that the application does not require immediate reconfiguration to the new VxVM device paths.

You can also choose the point of committing the migration, when data synchronization is complete for all required volumes. In case of errors, it provides a way to abort the migration and safely revert to the original LVM configuration.

This feature is also integrated with VCS to provide online migration in a VCS HA environment. During the migration process, VCS monitors and maintains high availability of the updated configuration.

A new CLI `vxmigadm` is provided, to administer online migration.

For more details, refer to *Veritas™ Storage Foundation and High Availability Solutions Solutions Guide*.

Veritas Volume Manager throttling of administrative I/O

In this release, Veritas Volume Manager (VxVM) provides throttling of administrative I/O. During heavy I/O loads, VxVM throttles I/O that it creates to do administrative operations. This behavior ensures that the administrative I/Os do not affect the application I/O performance. When the application I/O load is lighter, VxVM increases the bandwidth usage for administrative I/O operations.

VxVM automatically manages the I/O throttling for administrative tasks, based on its perceived load on the storage. Currently, I/O throttling is supported for the copy operations which use ATOMIC_COPY and involve one destination mirror. The I/O throttling is transparent, and does not change the command usage or output. The following commands are supported:

- `vxassist mirror`
- `vxassist snapcreate`
- `vxevac`
- `vxplex att`
- `vxplex cp`
- `vxplex mv`
- `vxprint`
- `vxsnap addmir`
- `vxsnap reattach`
- `vxsd mv`

- `vxtune`

The administrative I/O operations allocate memory for I/O from a separate memory pool. You can tune the maximum size of this pool with the tunable parameter, `vol_max_adminio_poolsz`.

See the *Veritas Storage Foundation Administrator's Guide* for information about tuning the `vol_max_adminio_poolsz` parameter.

Command completion for Veritas commands

Veritas Storage Foundation and High Availability now supports command completion for Veritas Volume Manager (VxVM) commands and Dynamic Multi-Pathing (DMP) commands. In this release, command completion is supported only on the bash shell. The shell must be bash version 2.4 or later.

To use this feature, press **Tab** while entering a supported VxVM or DMP command. The command is completed as far as possible. When there is a choice, the command completion displays the next valid options for the command. Enter one of the displayed values. A value in brackets indicates a user-specified value.

Note: Platform-specific options are not supported with command completion in this release.

The following commands support command completion:

- vxassist
- vxdisk
- vxplex
- vxprint
- vxsnap
- vxstat
- vxtune
- vxcache
- vxconfigd
- vxtask
- vxreattach
- vxdmpadm
- vxddladm

- vxvol
- vxcdsconvert
- vxresize
- vxdctl
- vxsd
- vxdisksetup
- vxdiskunsetup
- vxrecover
- vxedit
- vxdg
- vxclustadm

vxdisk -o thin list command now shows the disk space used by a VxFS file system

The `vxdisk -o thin list` command now shows the disk space used by a VxFS file system.

Changes related to Veritas Dynamic Multi-Pathing (DMP)

The following sections describe changes in this release related to Veritas Dynamic Multi-Pathing (DMP).

Tuning Dynamic Multi-Pathing with templates

Veritas Dynamic Multi-Pathing (DMP) has multiple tunable parameters and attributes that you can configure for optimal performance. In this release, DMP introduces a template method to update several tunable parameters and attributes with a single operation. The template represents a full or partial DMP configuration, showing the values of the parameters and attributes of the host.

To view and work with the tunable parameters, you can dump the configuration values of the DMP tunable parameters to a file. Edit the parameters and attributes, if required. Then, load the template file to a host to update all of the values in a single operation.

For more information about tuning DMP with templates, see the *Veritas Dynamic Multi-Pathing Administrator's Guide*.

You can manage the DMP configuration file with the `vxdmpadm config` commands.

See the `vxdmpadm`(1M) man page.

Changes to DMP support for ALUA arrays

In this release, DMP has improved support for ALUA arrays. DMP now efficiently handles most implementations of the ALUA standard. The enhancements include the following:

- DMP now detects whether an ALUA array is A/A-A, A/A or A/P-F.
- DMP handles the array state correctly, when a node is taken out of the cluster. The enclosure level attribute failoverpolicy is now set internally.
- DMP handles Standby and unavailable LUN states for ALUA arrays.
- DMP monitors LUN ownership changes. DMP can shift the I/O load depending on the current state of the LUN.

DMP detects "persist through power loss" storage device server capability

In this release, DMP detects when a storage device server has the capability "persist through power loss". Certain arrays, such as Oracle's Sun Storage 7310, use this capability to preserve the persistent reservation and registrations across power cycles, controller reboots, and other similar operations.

If DMP detects that the device supports this capability, then DMP sets the APTPL (Activate Persist Through Power Loss) bit to 1 in the PERSISTENT RESERVE OUT parameter data sent with a REGISTER, REGISTER AND IGNORE EXISTING KEY service action, according to SPC-3 specifications.

When APTPL is set to 1, the persistent reservation (PR) keys are preserved during array controller takeover or failback operations.

Dynamic Multi-Pathing (DMP) detects and reports extended attributes from Veritas Operations Manager

If you have Veritas Operations Manager (VOM), and you have configured a central Management Server, the Device Discovery layer (DDL) of DMP can obtain extended attributes for managed hosts. DDL obtains these additional attributes out of band from the VOM database. DMP displays these attributes as output of the `vxdisk -p list` command.

See the *Administrator's Guide*.

DMP support for LVM rootvg using DMP ODM definitions

This release of Dynamic Multi-Pathing supports LVM root volume group (rootvg) using DMP ODM definitions, which enables LVM commands such as `lspv` and `lsvg -p rootvg` to show the DMP device name rather than the native (hdisk) names.

When dmp_native_support feature is turned on, DMP supports online configuration for the LVM rootvg, that is, adding a DMP device to the LVM rootvg using the `extendvg` command, or removing a DMP device using the `reducevg` command. In previous releases, this required a reboot.

DMP enhancements

The following DMP enhancements have been made in this release:

- The `vxdmpadm enable` command and the `vxdmpadm disable` command now accept multiple controllers on the command line.
- In addition, you can now enable or disable paths between a given controller and a port-id pair. If you specify both an HBA controller and an array port, DMP disables I/O on the specific portion of the Storage Area Network (SAN).
- The `vxdmpadm stat errord` command and the `vxdmpadm stat restored` command are deprecated.
  To see status for the restore tasks, use the `vxdmpadm gettune` command.
- Excluding or including paths from DMP is deprecated.
  Excluding paths from DMP but not from VxVM can lead to unsupported configurations. The command operations to exclude or include paths from DMP are now deprecated. You can exclude or include paths from VxVM. The deprecated commands are as follows:
  `vxdmpadm exclude dmp`
  `vxdmpadm include dmp`
  `vxdiskadm`: DMP options under `Suppressing or including devices for VxVM`
- `vxddladm list devices` command now displays the name of the ASL even if the device is skipped.
- `vxddladm status eventsource` is added to show the status of the `vxesd` daemon
- `vxscsiinq` diagnostic utility is enhanced to take hexadecimal page numbers as arguments.

Changes related to replication

Veritas Storage Foundation and High Availability Solutions includes the following changes related to replication in 6.0:

vvrcheck configuration utility

There is now a configuration utility, `/etc/vx/diag.d/vvrcheck`, that displays current replication status, detects and reports configuration anomalies, and

creates statistics files that can be used by display tools. The `vvrcheck` also runs diagnostic checks for missing daemons, valid licenses, and checks on the remote hosts on the network. For more information, see the `vvrcheck(1M)` man page.

SmartMove for VVR

The initial sync between the Primary and Secondary is performed using the autosync option. The autosync to sync the volume now uses the SmartMove API from VxFS and provides the data only sync between the Primary and Secondary. This increases the initial autosync performance, which is dependent on the file system usage in the volume. This feature also helps thin provision LUNs configured on the Secondary site to use storage space only for data.

See the *Veritas Storage Foundation and High Availability Solutions Replication Administrator's Guide*.

Thin provisioning and reclamation support for VVR

Storage reclamation is now possible on VVR volumes with VxFS file system on it. The storage corresponding to the volumes on the Secondary RVG is automatically reclaimed when the Primary volumes are reclaimed. The existing `vxdisk reclaim` or `fsadm -R` commands function for reclaiming VVR objects as well. For storage reclamation to work, the volumes on the Primary RVG must be mounted.

See the *Veritas Storage Foundation and High Availability Solutions Replication Administrator's Guide*.

Enable compression with VVR

VVR compression lets you send data over the network in a compressed format from a Primary to one or more Secondary hosts. Compression reduces network bandwidth consumption and is useful in scenarios where there is low available bandwidth or where the bandwidth is shared among several applications. The compression option can be enabled on a per system or per Secondary basis using the CLI.

See the *Veritas Storage Foundation and High Availability Solutions Replication Administrator's Guide*.

Replication performance improvement

Replication performance is improved by introducing Secondary logging (logging the I/O on the Secondary SRL before writing to the data volume). The primary requirement for this feature to work is to have the same size SRL on both the Secondary and Primary. The Secondary SRL is used for staging the I/O from the Primary, and parallelize the data volume write. This improves the replication performance both in VVR and CVR. By default, this feature is enabled in 6.0.

There are other replication-specific tunables that may be increased to obtain the maximum replication performance.

See the *Veritas Storage Foundation and High Availability Solutions Replication Administrator's Guide*.

Support for 8-node cluster applications

In a shared disk group environment, VVR supports replication of 8-node cluster applications. In previous releases, support was limited to 4-node cluster applications.

The following improvements enable scalability to 8-node support:

- Improved message processing allows the logowner to process more messages per second, resulting in improved application throughput
- Secondary logging feature improves replication performance
- Improved CPU usage provides more CPU cycles to the logowner to process requests from other nodes in a cluster
- Increased limit on max outstanding I/Os with VVR

See the *Veritas Storage Foundation and High Availability Solutions Replication Administrator's Guide*.

Changes related to SFDB tools

The following sections describe the changes related to Storage Foundation for Databases (SFDB) tools in 6.0.

Support for space-optimized snapshots for database cloning

You can use Storage Foundation for Databases (SFDB) tools to take space-optimized snapshots of your Oracle database and then create database clones by using those snapshots. SFDB tools use the underlying features of Storage Foundation for this operation.

See *Veritas Storage Foundation: Storage And Availability Management for Oracle Databases*.

SmartTier integration with OEM

You can now view the following SmartTier related information in the Oracle Enterprise Manager (OEM) reports:

- Storage allocation and free space in each tier
- Space occupied by a data file in each tier

This is useful when a part of a data file is moved from tier to tier when database objects such as table or index are moved.

Enhancements to Cached ODM Advisor (dbed_codm_adm)

You can use the Cached ODM Advisor command `dbed_codm_adm` to generate a variety of reports that help you determine which data files are suitable for enabling Cached ODM. The reports generated by Cached ODM Advisor are enhanced to use the historical data from Oracle Automatic Workload Repository (AWR).

See *Veritas Storage Foundation: Storage And Availability Management for Oracle Databases*.

Support for space-optimized snapshots on DR site for database cloning

You can use Storage Foundation for Databases (SFDB) tools in a replicated environment to take space-optimized snapshots on a disaster recovery (DR) site. This functionality lets you create clones of your Oracle database on the DR site in a setup where the database on the primary site is being replicated on the DR site.

See *Veritas Storage Foundation: Storage And Availability Management for Oracle Databases*.

Single CLI for different point-in-time copy operations

You can use the new SFDB command `vxsfadm` to perform various point-in-time copy operations on your Oracle database. `vxsfadm` provides the following benefits:

- Uniform command line for multiple operations
- Use case based functionality
- Enhanced error handling

See *Veritas Storage Foundation: Storage And Availability Management for Oracle Databases*.

Support for file-level snapshots for database cloning

You can use Storage Foundation for Databases (SFDB) tools to take file-level snapshots of your Oracle database and then create one or more clones based on those snapshots. SFDB tools use the underlying features of Storage Foundation for this operation.

See *Veritas Storage Foundation: Storage And Availability Management for Oracle Databases*.

Enhanced authentication support

The authentication support for Storage Foundation for Databases (SFDB) tools is enhanced in this release. You can use the `sfae_auth_op` to set up and configure authentication for SFDB tools.

See *Veritas Storage Foundation: Storage And Availability Management for Oracle Databases*.

Changes related to Veritas Cluster Server (VCS)

The following sections contain changes related to VCS kernel components such as LLT, GAB, and I/O fencing, and clusters in secure mode.

For more information on changes related to VCS, see the *Veritas Cluster Server Release Notes*.

Changes to SFHA clusters in secure mode

In this release, the installation and configuration experience of secure cluster is considerably simplified. You can easily convert the cluster into secure cluster with this simplified secure cluster configuration model.

The new architecture is based on embedded VxAT, where the security components are installed as a part of the SFHA package. The root broker is no longer a single-point-of-failure in the new architecture. There is no dependency on a separate VRTSat package. Non-root users who are already logged on SFHA hosts are now not prompted for password. Additionally, a cluster-level user feature is introduced to simplify user administration in secure clusters.

See the *Installation Guide* and *Administrator's Guide* for more information.

Changes to LLT

This release includes the following new features and changes to LLT:

- LLT now supports VLAN tagging (IEEE 802.1Q).
- The `lltconfig` command includes the following new options:
  - -N
    You can use this option to list all the used cluster IDs.
  - -M
    You can use this option to display the currently loaded LLT module version information.

  See the `lltconfig` manual page for more information.
- Link utilization statistics are enhanced that help in the root cause analysis of performance related issues.

- Periodic flushing of ARP cache is disabled.

See the *Veritas Storage Foundation and High Availability Installation Guide* and the *Veritas Storage Foundation and High Availability Administrator's Guide* for more details.

Changes to GAB

This section covers the new features and changes related to GAB in this release.

Better GAB and I/O fencing integration to ensure application availability

In the event of a split-brain situation before VxFEN module implements the decision, sometimes GAB proceeds with attempting to resolve the join after the split-brain. GAB removes all but one joining subcluster. This behavior can cause the entire cluster to shut down. To avoid this scenario, GAB now gives priority to the fencing module.

With the GAB and I/O fencing integration in this release, if the I/O fencing module's decision is still pending before GAB initiates a join of the subcluster, GAB delays the iofence message. GAB wait depends on the value of the VxFEN tunable parameter *panic_timeout_offst* based on which VxFEN computes the delay value and passes to GAB.

See the Veritas Storage Foundation and High Availability Administrator's Guide for more details.

GAB can now recognize clients with names in addition to ports

When kernel clients initialize GAB API, they can now define a client name string. GAB now adds a client name which enables GAB to track the client even before GAB port is registered. GAB also passes the client name information to LLT when registering the LLT port. The `lltstat -p` command also displays the GAB client names when providing the status details of the ports in use.

This feature is applicable only to GAB kernel clients, and not applicable for user-land GAB clients such as HAD.

The gabconfig command has new -C option

The -C option of the `gabconfig` command lists the names of the GAB clients that have registered with GAB. The `-C` option when used with `-a` option lists the client names along with the port membership details.

Changes to I/O fencing

This section covers the new features and changes related to I/O fencing in this release.

Support for racer node re-election during I/O fencing race

At the time of a network partition, the VxFEN module elects the lowest node in each sub-cluster as the racer node to race for the coordination points on behalf of the sub-cluster. The other spectator nodes wait on the racer node to do the fencing.

In the previous releases, the I/O fencing race was entirely dependent on the single racer node as follows:

- If the racer node is not able to reach a majority of coordination points, then the VxFEN module on the racer node sends a LOST_RACE message and all nodes in the subcluster also panic when they receive the LOST_RACE message.
- If the racer node panics during the arbitration, then the spectator nodes in the sub-cluster assume that the racer node lost the race and the spectator nodes also panic.

With the new racer node re-election feature, the VxFEN module re-elects the node with the next lowest node id in the sub-cluster as the racer node. This feature optimizes the chances for the sub-cluster to continue with the race for coordination points.

See the *Veritas Storage Foundation and High Availability Administrator's Guide* for more details.

With fencing enabled, GAB can now automatically seed the cluster when some cluster nodes are unavailable

In the earlier releases, if some of the nodes are not up and running in a cluster, then GAB port does not come up to avoid any risks of preexisting split-brain. In such cases, you can manually seed GAB using the command `gabconfig -x` to bring the GAB port up. However, if you have enabled I/O fencing in the cluster, then I/O fencing can handle any preexisting split-brain in the cluster.

In this release, I/O fencing has extended this functionality to be able to automatically seed GAB as follows:

- If a number of nodes in a cluster are not up, GAB port (port a) still comes up in all the member-nodes in the cluster.
- If the coordination points do not have keys from any non-member nodes, I/O fencing (GAB port b) also comes up.

This new functionality is disabled by default. You must manually enable this automatic seeding feature of GAB in clusters where I/O fencing is configured in enabled mode.

See the *Veritas Storage Foundation and High Availability Administrator's Guide* for more details.

You can still use the `gabconfig -x` command to manually seed the cluster.

Installer support to migrate between fencing configurations in an online cluster

You can now use the installer to migrate between disk-based and server-based fencing configurations. You can also replace the coordination points for any I/O fencing configuration in an online cluster using the same installer option. The installer uses the `vxfenswap` script internally.

You can also use response files to perform these I/O fencing reconfiguration operations.

See the *Veritas Storage Foundation and High Availability Administrator's Guide* for more details.

Support for multiple virtual IP addresses in CP servers

You can now configure multiple network paths (virtual IP addresses) to access a CP server. CP server listens on multiple virtual IP addresses. If a network path fails, CP server does not require a restart and continues to listen on one of the other available virtual IP addresses.

See the *Veritas Storage Foundation and High Availability Installation Guide* and the *Veritas Storage Foundation and High Availability Administrator's Guide* for more details.

Support for Quorum agent in CP servers

With the support for multiple virtual IP addresses, you can now use the Quorum agent to configure CP server service group failover policies. You can specify the minimum number of IP resources that must be online for the Quorum resource to remain online.

See the *Veritas Storage Foundation and High Availability Installation Guide* and the *Veritas Storage Foundation and High Availability Administrator's Guide* for more details.

Graceful shutdown of a node no longer triggers I/O fencing race condition on peer nodes

In the earlier releases, a gracefully leaving node clears its I/O fencing keys from coordination points. But the remaining sub-cluster races against the gracefully leaving node to remove its registrations from the data disks. During this operation, if the sub-cluster loses access to the coordination points, the entire cluster may panic if the racer loses the race for coordination points.

In this release, this behavior has changed. When a node leaves gracefully, the CVM or other clients on that node are stopped before the VxFEN module is

unconfigured. Hence, data disks are already clear of its keys. The remaining sub-cluster tries to clear the gracefully leaving node's keys from the coordination points but does not panic if it is not able to clear the keys.

Entering and displaying values in human-friendly units

Storage Foundation now supports reporting and inputting values in human-friendly units.

The following commands were modified to display human-friendly units:

- `diskusg`
- `ff`
- `fsadm`
- `fsckptadm`
- `fsvoladm`
- `vxdg free`
- `vxdisk list`
- `vxdisk -o thin list`
- `vxdisk -o thin,fssize list`
- `vxdmpadm iostat show`
- `vxedquota`
- `vxmemstat`
- `vxprint`
- `vxquot`
- `vxquota`
- `vxrepquota`
- `vxstat`
- `vxtune`

See the manual pages for more information.

Displaying SFHA information with vxlist

The `vxlist` command is a new display command that provides a consolidated view of the SFHA configuration. The `vxlist` command consolidates information

from Veritas Volume Manager (VxVM) and Veritas File System (VxFS). The `vxlist` command provides various options to display information. For example, use the following form of the command to display file system information including information about the volume, disk group, and so on. In previous releases, you needed to run at least two commands to retrieve the following information.

```
# /opt/VRTSsfmh/bin/vxlist fs
TY FS   FSTYPE SIZE   FREE   %USED DEVICE_PATH          MOUNT_POINT
fs /    ext3   65.20g 51.70g 17%   /dev/sda1                /
fs mnt  vxfs   19.84g  9.96g 49%   /dev/vx/dsk/bardg/vol1   /mnt
```

For help on the `vxlist` command, enter the following command:

```
# vxlist -H
```

See the `vxlist(1m)` manual page.

Discovering renamed devices on AIX

Starting with AIX 6.1TL6, AIX provides a feature to rename a device using the `rendev` command. You can now specify user-defined names instead of the traditional hdisk name.

Veritas Dynamic Multi-Pathing (DMP) now can discover the renamed devices. DMP supports device renaming for both enclosure-based naming (EBN) and operating system naming (OSN). Before renaming a device, remove the DMP node from VxVM/DMP control.

You can use the `vxdmpadm` command to enable and disable the renamed path.

The following features are not supported with renamed devices:

- Enabling rootability
- Migrating LVM to VxVM using the `vxconvert` command.
- Hot relocation

Licensing changes in the SFHA Solutions 6.0 release

Storage Foundation and High Availability Solutions 6.0 introduces the following licensing changes:

- The Cluster File System license is deprecated. CFS customers are entitled to the Storage Foundation Cluster File System High Availability (SFCFS HA) functionality.

- The VVR Option is renamed as Veritas Replicator Option. This option includes VVR (volume-based replication) and the new file-based replication solution.
- The VVR Enterprise license is deprecated; you can use Storage Foundation Enterprise and add Veritas Replicator Option to get this functionality. VVR Enterprise customers are entitled to Storage Foundation Enterprise with Replicator Option.
- The VCS license enables full cluster functionality as well as the limited start/stop functionality.
- Storage Foundation Enterprise CFS for Oracle RAC (Linux/x64) customers are entitled to Storage Foundation Enterprise for Oracle RAC (Linux/x64.)

The following functionality is included in the Standard and Enterprise licenses:

- The Compression feature is available with the Standard license.
- The SmartTier feature is now available with the Standard license.
- The Deduplication feature is available with the Enterprise license.

The following products are included in this release:

- Dynamic Multi-Pathing
- VirtualStore
- Storage Foundation Basic
- Storage Foundation Standard
- Storage Foundation Enterprise
- Veritas Cluster Server
- Veritas Cluster Server HA/DR
- Storage Foundation Standard HA: Storage Foundation Standard plus Veritas Cluster Server
- Storage Foundation Enterprise HA: Storage Foundation Enterprise plus Veritas Cluster Server
- Storage Foundation Enterprise HA/DR
- Storage Foundation Enterprise Cluster File System HA
- Storage Foundation Enterprise Cluster File System HA/DR
- Storage Foundation Enterprise for Oracle RAC
- Storage Foundation Enterprise HA/DR for Oracle RAC
- Storage Foundation Enterprise for Sybase ASE CE

- Storage Foundation Enterprise HA/DR for Sybase CE

HA: High Availability

HA/DR: High Availability and Disaster Recovery

Veritas Replicator Option can be added to all Storage Foundation and High Availability products, except Dynamic Multi-Pathing and Veritas Cluster Server.

Note that products, features, and options may differ by operating system and platform. Please see the product documentation for information on supported platforms.

Changes related to installation and upgrades

The product installer includes the following changes in 6.0.

Support for product upgrades using the Network Installation Manager Alternate Disk Migration utility on AIX

You can now use the Network Installation Manager Alternate Disk Migration (nimadm) utility to upgrade the operating system and the product.

See the *Installation Guide* for more information.

The installsfha script and the uninstallsfha script are now available

The installsfha script and the uninstallsfha script scripts are now available in the storage_foundation_high_availability directory to directly install, uninstall, or configure the Storage Foundation and High Availability product.

See the *Veritas Storage Foundation and High Availability Installation Guide* for more details.

The installer can now detect duplicate VCS cluster IDs and can automatically generate cluster IDs

The installer can now detect duplicate VCS cluster IDs and prompt you to select an unused one. It can also generate an unused ID during installation.

The installer can check product versions and hotfixes

You can check the existing product versions using the installer command with the `-version` option before or after you install. After you have installed the current version of the product, you can use the `showversion` script in the /opt/VRTS/install directory to find version information.

You can discover the following information with these commands:

- The installed version of all released Strorage Foundation and High Availability Suite of products
- The missing required filesets or patches as applicable for platform
- The available updates (including patches or hotfixes) from SORT for the installed products

Depending on the product, the script can identify versions from 4.0 onward.

Using the installer's postcheck option

You can use the installer's postcheck option to diagnose installation-related problems and to provide troubleshooting information.

Rolling upgrade improvements

The rolling upgrade procedure has been streamlined and simplified.

Allow Response files to change tuning parameters

You can set non-default product and system tunable parameters using a tunables template file. With the file, you can set tunables such as the I/O policy or toggle native multi-pathing during or after the installation procedure.

See the *Installation Guide* for more information.

Packaging updates

The following lists the package changes in this release.

- New `VRTSsfcpi60` fileset for product installer scripts

  The `VRTSsfcpi60` fileset is introduced in this release. The VRTSsfcpi60 fileset contains the installer scripts and libraries that the installer uses to install, configure and upgrade Veritas products.
- New `VRTSfsadv` fileset for product data deduplication

  The `VRTSfsadv` fileset is introduced in this release. The `VRTSfsadv` fileset contains the libraries for the data deduplication feature.

For more information, see the *Installation Guide*.

Enhancements to collecting a VxExplorer troubleshooting archive

The Symantec Operations Readiness Tools (SORT) data collector contains functionality to collect and submit a VxExplorer archive. You can send this archive

to Symantec Technical Support for problem diagnosis and troubleshooting. VxExplorer does not collect customer data.

The legacy `VxExplorer` script now works differently. When you run the script, it launches the SORT data collector on the specified local host with the `-vxexplorer` option.

To learn more about using the data collector to collect a VxExplorer archive, see:

www.symantec.com/docs/HOWTO32575

Changes related to product documentation

The Storage Foundation and High Availability Solutions 6.0 release includes the following changes to the product documentation.

Table 1-1 lists the documents introduced in this release.

Table 1-1 New documents

New documents	Notes
Veritas Storage Foundation Installation Guide	Installation and upgrade information for Storage Veritas Foundation.
Veritas Storage Foundation Administrator's Guide	Administration information for Veritas Storage Foundation.
Veritas Storage Foundation and High Availability Release Notes	Release-specific information for Veritas Storage Foundation and High Availability users.
Veritas Storage Foundation and High Availability Solutions Solutions Guide	Solutions and use cases for Veritas Storage Foundation and High Availability Solutions.
Veritas Storage Foundation and High Availability Solutions Troubleshooting Guide	Troubleshooting information for Veritas Storage Foundation and High Availability Solutions.

Table 1-2 lists the documents that are deprecated in this release.

Table 1-2 Deprecated documents

Deprecated documents	Notes
Veritas File System Administrator's Guide	Content now appears in the *Veritas Storage Foundation Administrator's Guide* and in the *Veritas Storage Foundation Cluster File System High Availability Administrator's Guide*.
Veritas Volume Manager Administrator's Guide	Content now appears in the *Veritas Storage Foundation Administrator's Guide* and in the *Veritas Storage Foundation Cluster File System High Availability Administrator's Guide*.
Veritas Storage Foundation Advanced Features Administrator's Guide	Content now appears in the *Veritas Storage Foundation and High Availability Solutions Solutions Guide*.
Veritas Volume Manager Troubleshooting Guide	Content now appears in the *Veritas Storage Foundation and High Availability Solutions Troubleshooting Guide*.
Veritas Cluster Server Agents for Veritas Volume Replicator Configuration Guide	Content now appears in the *Veritas Cluster Server Bundled Agents Reference Guide*.
Veritas Volume Replicator Planning and Tuning Guide	Content now appears in the *Veritas Storage Foundation and High Availability Solutions Replication Administrator's Guide*.
Veritas Volume Replicator Advisor User's Guide	Content now appears in the *Veritas Storage Foundation and High Availability Solutions Replication Administrator's Guide*.

Table 1-3 lists documents that are no longer bundled with the binaries. These documents are now available online.

Table 1-3 Online documents

Document
Veritas Cluster Server Agent Developer's Guide
Veritas File System Programmer's Reference Guide

No longer supported

The following features are not supported in this release of SFHA products:

- Several documents are deprecated in this release.
  See "Changes related to product documentation" on page 32.
- Disk layout Version 4 is no longer supported. You cannot create nor mount a file system with disk layout Version 4. You can use the `vxfsconvert` utility to upgrade the disk layout to Version 7 or later after installing this release.
  See the `vxfsconvert`(1M) manual page.
- Disk layout Version 6 is deprecated. You can only local mount a file system with disk layout Version 6, and the only operation that you can perform is to upgrade the disk layout to a supported version by using the `vxupgrade` utility. Symantec recommends that you upgrade from Version 6 to the latest default disk layout version. You cannot create new file systems with disk layout Version 6. If you upgrade a file system from disk layout Version 6 to a later version, once the upgrade operation finishes, you must unmount the file system cleanly, then re-mount the file system.
  See the `vxupgrade`(1M) manual page.

Veritas Storage Foundation for Databases (SFDB) tools features which are no longer supported

The following Storage Foundation for Databases (SFDB) tools features are not supported in this release:

- FlashSnap reverse resync
- Checkpoint policy and Checkpoint quotas
- Interactive modes in clone and rollback

System requirements

The following topics describe the system requirements for this release:

Supported AIX operating systems

This section lists the supported operating systems for this release of Veritas products.

Table 1-4 shows the supported AIX operating systems for this release.

Table 1-4 Supported AIX operating systems

Operating systems	Levels	Chipsets
AIX 7.1	TL0 or TL1	Any chipset that the operating system supports
AIX 6.1	TL5	Power 7, Power 6, or earlier

For Dynamic Multi-Pathing (DMP), Veritas Storage Foundation (SF), and Veritas Storage Foundation and High Availability Solutions (SFHA), install IBM APAR for AIX 6.1 TL6 and TL7, or AIX 7.1 TL0 and TL1. Contact IBM to get the necessary APAR for your level.

AIX 7.1 support for virtual processors

Veritas Storage Foundation and High Availability supports up to 1024 virtual processors on AIX 7.1.

Hardware compatibility list (HCL)

The hardware compatibility list contains information about supported hardware and is updated regularly. Before installing or upgrading Storage Foundation and High Availability Solutions products, review the current compatibility list to confirm the compatibility of your hardware and software.

For the latest information on supported hardware, visit the following URL:

http://www.symantec.com/docs/TECH170013

For information on specific High Availability setup requirements, see the *Veritas Cluster Server Installation Guide*.

Veritas Storage Foundation for Database features supported in database environments

Veritas Storage Foundation for Database (SFDB) product features are supported for the following database environments:

Table 1-5 SFDB features supported in database environments

SFDB feature	DB2	Oracle	Sybase
Oracle Disk Manager, Cached Oracle Disk Manager	No	Yes	No
Quick I/O, Cached Quick I/O	Yes	Yes	Yes

Table 1-5 SFDB features supported in database environments *(continued)*

SFDB feature	DB2	Oracle	Sybase
Concurrent I/O	Yes	Yes	Yes
Storage Checkpoints	Yes	Yes	Yes
Flashsnap	Yes	Yes	Yes
SmartTier	Yes	Yes	Yes
Database Storage Checkpoints	No	Yes	No
Database Flashsnap	No	Yes	No
SmartTier for Oracle	No	Yes	No

For the most current information on SFHA and single instance Oracle versions supported, see:

http://www.symantec.com/docs/DOC4039

Review current documentation for your database to confirm the compatibility of your hardware and software.

Veritas Storage Foundation memory requirements

Symantec recommends 2 GB of memory over the minimum requirement for the operating system.

Number of nodes supported

SFHA supports cluster configurations with up to 64 nodes.

Known issues

This section covers the known issues in this release.

See the corresponding Release Notes for a complete list of known issues related to that product.

See "Documentation" on page 82.

Issues related to installation

This section describes the known issues during installation and upgrade.

Stopping the installer during an upgrade and then resuming the upgrade might freeze the service groups (2591399)

The service groups freeze due to upgrading using the product installer if you stopped the installer after the installer already stopped some of the processes and then resumed the upgrade.

Workaround: You must unfreeze the service groups manually after the upgrade completes.

To unfreeze the service groups manually

1 List all the frozen service groups

```
# hagrp -list Frozen=1
```

2 Unfreeze all the frozen service groups:

```
# haconf -makerw
# hagrp -unfreeze service_group -persistent
# haconf -dump -makero
```

EULA changes (2161557)

The locations for all EULAs have changed.

The English EULAs now appear in */product_dir*/EULA/en/*product_eula.pdf*

The EULAs for Japanese and Chinese now appear in those language in the following locations:

The Japanese EULAs appear in */product_dir*/EULA/ja/*product_eula.pdf*

The Chinese EULAs appear in */product_dir*/EULA/zh/*product_eula.pdf*

NetBackup 6.5 or older version is installed on a VxFS file system (2056282)

If you have NetBackup 6.5 or older version installed on a VxFS file system and before upgrading to Veritas Storage Foundation (SF) 6.0, if you unmount all VxFS file systems including the one that hosts the NetBackup binaries (`/usr/openv`), then while upgrading to SF 6.0, the installer fails to check if NetBackup is installed on the same machine and uninstalls the shared infrastructure filesets `VRTSpbx`, `VRTSat`, and `VRTSicsco`. This causes NetBackup to stop working.

Workaround: Before you unmount the VxFS file system that hosts NetBackup, copy the `/usr/openv/netbackup/bin/version` file and `/usr/openv/netbackup/version` file to the `/tmp` directory. If you have clustered

NetBackup installed, you must also copy the `/usr/openv/netbackup/bin/cluster/NBU_RSP` file to the `/tmp` directory. After you unmount the NetBackup file system, manually copy these two version files from `/tmp` to their original directories. If you have clustered NetBackup installed, you must also copy the `/usr/openv/netbackup/bin/cluster/NBU_RSP` file from `/tmp` to its original directory.

If the `version` files' directories do not exist, create the directories:

```
# mkdir -p /usr/openv/netbackup/bin
# mkdir -p  /usr/openv/netbackup/bin
```

Run the installer to finish the upgrade process. After upgrade process completes, remove the two version files and their directories.

If your system is already affected by this issue, then you must manually install the `VRTSpbx`, `VRTSat`, and `VRTSicsco` filesets after the upgrade process completes.

During product migration the installer overestimates disk space use (2088827)

The installer displays the space that all the product filesets and patches needs. During migration some filesets are already installed and during migration some filesets are removed. This releases disk space. The installer then claims more space than it actually needs.

Workaround: Run the installer with `-nospacecheck` option if the disk space is less than that installer claims but more than actually required.

The VRTSacclib fileset is deprecated (2032052)

The VRTSacclib fileset is deprecated. For installation, uninstallation, and upgrades, note the following:

- Fresh installs: Do not install VRTSacclib.
- Upgrade: Uninstall old VRTSacclib and install new VRTSacclib.
- Uninstall: Ignore VRTSacclib.

The VRTSvxvm fileset fails to install on a few cluster nodes because the template file is corrupted (2348780)

The installer debug log displays the failure of the `errupdate` command as following: `errupdate -f /usr/lpp/VRTSvxvm/inst_root/VRTSvxvm.err`. The `errupdate` command gets invoked through `/usr/lib/instl/install` by the operating

system. The command also fails for the VRTSvxfs, VRTSglm, and VRTSgms packages.

The `errupdate` command generally creates a `*.undo.err` file to remove entries from the Error Record Template Repository in case of failed installation or cleanup. However, in this case the `*.undo.err` file does not get generated as the `errupdate` command fails. Also, it is not possible to manually remove entries from the Error Record Template Repository in order to undo the changes made by the failed installation, because the file is corrupted.

Workaround: Save a copy of the `/var/adm/ras/errtmplt` and `/etc/trcfmt` files before you install the product. Replace `/var/adm/ras/errtmplt` and `/etc/trcfmt` files with the ones that you saved, when the installation fails because the template file is corrupted. Uninstall all the packages you installed and reinstall.

After a locale change restart the vxconfig daemon (2417547)

You need to restart the vxconfig daemon you change the locale of nodes that use it. The vxconfig daemon starts at boot. If you have changed locale, you need to restart the daemon.

Workaround:

Refer to the *Veritas Storage Foundation Cluster File System High Availability Administrator's Guide* for the section, "vxconfigd daemon recovery."

Web installer does not ask for authentication after the first session if the browser is still open (2509330)

If you install or configure SFHA and then close the Web installer, if you have other browser windows open, the Web installer does not ask for authentication in the subsequent sessions. Since there is no option to log out of the Web installer, the session remains open as long as the browser is open on the system.

Workaround: Make sure that all browser windows are closed to end the browser session and subsequently log in again.

After finishing a kernel upgrade on a master node the cvm group on a slave node does not come online (2439439)

After successfully finishing a kernel upgrade on one node, the cvm group does not come online on the second node.

Workaround: Check that your cluster is not in a jeopardy state before you perform a rolling upgrade.

sfmh discovery issue when you upgrade your Veritas product to 6.0 (2622987)

If a host is not reporting to any management server but sfmh discovery is running before you upgrade to 6.0, sfmh-discovery may fail to start after the upgrade.

Workaround:

If the host is not reporting to VOM, stop sfmh-discovery manually before upgrading to 6.0 by executing the following command on the managed host:

```
/opt/VRTSsfmh/adm/vxvmdiscovery-ctrl.sh stop
```

Incorrect server names sometimes display if there is a clock synchronization issue (2627076)

When you install a cluster with the Web-based installer, you choose to synchronize your systems with an NTP server due to a clock synchronization issue, you may see the NTP server name in messages instead of your server names.

Workaround:

Ignore the messages. The product is still installed on the correct servers.

When you uninstall CommandCentral Storage Managed Host from a system where Veritas Storage Foundation 6.0 is installed, SF 6.0 reconfiguration or uninstallation fails (2631486)

On a system where Veritas Storage Foundation (SF) 6.0 is installed, if you uninstall CommandCentral Storage (CCS) Managed Host (MH) using the installer script from the CCS media, the installer script removes the contents of `/opt/VRTSperl`. As a result, SF 6.0 reconfiguration or uninstallation using `/opt/VRTS/install/install_sf_product_name` or `/opt/VRTS/install/uninstall_sf_product_name` fails, because the installer script removed the contents of `/opt/VRTSperl`.

Workaround: To uninstall CCS MH from a system where SF 6.0 is installed, before you perform the uninstallation, perform the procedure in the following CCS TechNote:

http://www.symantec.com/business/support/index?page=content&id=HOWTO36496

Stopping the Web installer causes Device Busy error messages (2633924)

If you start the Web installer, and then perform an operation (such as prechecking, configuring, or uninstalling), you may get an error message saying the device is busy.

Workaround: Do one of the following:

- Kill the start.pl process.
- Start the webinstaller again. On the first Web page you see that the session is still active. Either take over this session and finish it or terminate it directly.

Issues related to LLT

This section covers the known issues related to LLT in this release.

LLT port stats sometimes shows recvcnt larger than recvbytes (1788315)

With each received packet, LLT increments the following variables:

- recvcnt (increment by one for every packet)
- recvbytes (increment by size of packet for every packet)

Both these variables are integers. With constant traffic, recvbytes hits and rolls over MAX_INT quickly. This can cause the value of recvbytes to be less than the value of recvcnt.

This does not impact the LLT functionality.

LLT may incorrectly declare port-level connection for nodes in large cluster configurations (1809827)

When ports get registered and unregistered frequently on the nodes of the cluster, LLT may declare that a port-level connection exists with another peer node. This occurs in some corner cases even though a port is not even registered on the peer node.

LLT may fail to make connections with LLT on peer nodes in virtual environment (2343451/2376822)

After you upgrade from 5.0 MP3 or earlier releases to version 6.0, LLT may fail to make connections with LLT on the peer nodes in AIX virtual environment.

This is a known IBM VIOS issue. Install APAR IV00776 on your VIOS server. Without this fix, VIOS fails to handle new LLT packet header and drops packets.

Workaround: Disable the largesend attribute of the SEA adapter. Check the properties of the SEA adapter (on which the virtual links are configured under LLT maps) on each VIOS using the following command:

```
#lsattr -El SEA
```

If the largesend is set to 1, then set it to 0 using the following command:

```
#chdev -l SEA -a largesend=0
```

Issues related to GAB

This section covers the known issues related to GAB in this release.

While deinitializing GAB client, "gabdebug -R GabTestDriver" command logs refcount value 2 (2536373)

After you unregister the gtx port with `-nodeinit` option, the `gabconfig -C` command shows refcount as 1. But when forceful `deinit` option (`gabdebug -R GabTestDriver`) is run to deinitialize GAB client, then a message similar to the following is logged.

```
GAB INFO V-15-1-20239
Client GabTestDriver with refcount 2 forcibly deinited on user request
```

The `refcount` value is incremented by 1 internally. However, the refcount value is shown as 2 which conflicts with the `gabconfig -C` command output.

Cluster panics during reconfiguration (2590413)

While a cluster is reconfiguring, GAB broadcast protocol encounters a race condition in the sequence request path. This condition occurs in an extremely narrow window which eventually causes the GAB master to panic.

Issues related to I/O fencing

This section covers the known issues related to I/O fencing in this release.

CP server repetitively logs unavailable IP addresses (2530864)

If coordination point server (CP server) fails to listen on any of the IP addresses that are mentioned in the `vxcps.conf` file or that are dynamically added using the command line, then CP server logs an error at regular intervals to indicate the failure. The logging continues until the IP address is bound to successfully.

```
CPS ERROR V-97-51-103 Could not create socket for host
10.209.79.60 on port 14250
CPS ERROR V-97-1400-791 Coordination point server could not
open listening port = [10.209.79.60]:14250
Check if port is already in use.
```

Workaround: Remove the offending IP address from the listening IP addresses list using the `rm_port` action of the `cpsadm` command.

See the *Veritas Storage Foundation and High Availability Administrator's Guide* for more details.

Fencing port b is visible for few seconds even if cluster nodes have not registered with CP server (2415619)

Even if the cluster nodes have no registration on the CP server and if you provide coordination point server (CP server) information in the `vxfenmode` file of the cluster nodes, and then start fencing, the fencing port b is visible for a few seconds and then disappears.

Workaround: Manually add the cluster nodes' and users' information to the CP server to resolve this issue. Alternatively, you can use installer as the installer adds cluster nodes' and users' information to the CP server during configuration.

The cpsadm command fails if LLT is not configured on the application cluster (2583685)

The `cpsadm` command fails to communicate with the coordination point server (CP server) if LLT is not configured on the application cluster node where you run the `cpsadm` command. You may see errors similar to the following:

```
# cpsadm -s 10.209.125.200 -a ping_cps
CPS ERROR V-97-1400-729 Please ensure a valid nodeid using
environment variable
CPS_NODEID
CPS ERROR V-97-1400-777 Client unable to communicate with CPS.
```

However, if you run the `cpsadm` command on the CP server, this issue does not arise even if LLT is not configured on the node that hosts CP server. The `cpsadm` command on the CP server node always assumes the LLT node ID as 0 if LLT is not configured.

According to the protocol between the CP server and the application cluster, when you run the `cpsadm` on an application cluster node, `cpsadm` needs to send the LLT node ID of the local node to the CP server. But if LLT is unconfigured temporarily, or if the node is a single-node VCS configuration where LLT is not configured,

then the cpsadm command cannot retrieve the LLT node ID. In such situations, the cpsadm command fails.

Workaround: Set the value of the CPS_NODEID environment variable to 255. The cpsadm command reads the CPS_NODEID variable and proceeds if the command is unable to get LLT node ID from LLT.

In absence of cluster details in CP server, VxFEN fails with pre-existing split-brain message (2433060)

When you start server-based I/O fencing, the node may not join the cluster and prints error messages in logs similar to the following:

In the /var/VRTSvcs/log/vxfen/vxfen.log file:

```
VXFEN vxfenconfig ERROR V-11-2-1043
Detected a preexisting split brain. Unable to join cluster.
```

In the /var/VRTSvcs/log/vxfen/vxfen.log file:

```
operation failed.
CPS ERROR V-97-1400-446 Un-authorized user cpsclient@node1,
domaintype vx; not allowing action
```

The vxfend daemon on the application cluster queries the coordination point server (CP server) to check if the cluster members as seen in the GAB membership are registered with the CP server. If the application cluster fails to contact the CP server due to some reason, then fencing cannot determine the registrations on the CP server and conservatively assumes a pre-existing split-brain.

Workaround: Before you attempt to start VxFEN on the application, ensure that the cluster details such as cluster name, UUID, nodes, and privileges are added to the CP server.

The vxfenswap utility does not detect failure of coordination points validation due to an RSH limitation (2531561)

The vxfenswap utility runs the vxfenconfig -o modify command over RSH or SSH on each cluster node for validation of coordination points. If you run the vxfenswap command using RSH (with the -n option), then RSH does not detect the failure of validation of coordination points on a node. From this point, vxfenswap proceeds as if the validation was successful on all the nodes. But, it fails at a later stage when it tries to commit the new coordination points to the VxFEN driver. After the failure, it rolls back the entire operation, and exits cleanly with a non-zero error code. If you run vxfenswap using SSH (without the -n option),

then SSH detects the failure of validation of coordination of points correctly and rolls back the entire operation immediately.

Workaround: Use the `vxfenswap` utility with SSH (without the `-n` option).

Fencing does not come up on one of the nodes after a reboot (2573599)

If VxFEN unconfiguration has not finished its processing in the kernel and in the meantime if you attempt to start VxFEN, you may see the following error in the `/var/VRTSvcs/log/vxfen/vxfen.log` file:

```
VXFEN vxfenconfig ERROR V-11-2-1007 Vxfen already configured
```

However, the output of the `gabconfig -a` command does not list port b. The `vxfenadm -d` command displays the following error:

```
VXFEN vxfenadm ERROR V-11-2-1115 Local node is not a member of cluster!
```

Workaround: Start VxFEN again after some time.

Server-based fencing comes up incorrectly if default port is not mentioned (2403453)

When you configure fencing in customized mode and do no provide default port, fencing comes up. However, the `vxfenconfig -l` command output does not list the port numbers.

Workaround: Retain the "port=<port_value>" setting in the `/etc/vxfenmode` file, when using customized fencing with atleast one CP server. The default port value is 14250.

Secure CP server does not connect from localhost using 127.0.0.1 as the IP address (2554981)

The `cpsadm` command does not connect to the secure CP server on the localhost using 127.0.0.1 as the IP address

Workaround: Connect the secure CP server using any of the virtual IPs that is configured with the CP server and is plumbed on the local node.

Unable to customize the 30-second duration (2551621)

When the vxcpserv process is not able to bind to an IP address during startup, it attempts to bind to that IP address at an interval of 30 seconds. This interval is not configurable.

Workaround: No workaround.

NIC resource gets created with incorrect name while configuring CPSSG with the configure_cps.pl script (2585229)

The name of the NIC resource created by the `configure_cps.pl` script does not come out correct when, for example, m^{th} VIP is mapped to n^{th} NIC and every m is not equal to n. In this case, although CPSSG continues to function without any problem, when you unconfigure CPSSG using `configure_cps.pl`, it fails.

Workaround: To unconfigure CPSSG, you must remove the CPSSG configuration from the VCS configuration.

The cpsadm command fails after upgrading CP server to 6.0 in secure mode (2478502)

The `cpsadm` command may fail after you upgrade coordination point server (CP server) to 6.0 in secure mode. If the old VRTSat fileset is not removed from the system, the `cpsadm` command loads the old security libraries present on the system. As the installer runs the `cpsadm` command on the CP server to add or upgrade the SFHA cluster (application cluster), the installer also fails.

Workaround : Perform the following steps on all the nodes of the CP server:

- Rename cpsadm to cpsadmbin.

  ```
  # mv /opt/VRTScps/bin/cpsadm /opt/VRTScps/bin/cpsadmbin
  ```

- Create a file `/opt/VRTScps/bin/cpsadm` with the following content:

  ```
  #!/bin/sh
  EAT_USE_LIBPATH="/opt/VRTScps/lib"
  export EAT_USE_LIBPATH
  /opt/VRTScps/bin/cpsadmbin "$@"
  ```

- Provide the following permissions to the new file:

  ```
  # chmod 755 /opt/VRTScps/bin/cpsadm
  ```

Veritas Storage Foundation known issues

This section describes the known issues in this release of Veritas Storage Foundation (SF).

In an IPv6 environment, db2icrt and db2idrop commands return a segmentation fault error during instance creation and instance removal (1602444)

When using IBM DB2 `db2icrt` command to create a DB2 database instance on a pure IPv6 environment, the `db2icrt` command returns segmentation fault error message. For example:

```
$ /opt/ibm/db2/V9.5/instance/db2icrt -a server -u db2fen1 db2inst1
/opt/ibm/db2/V9.5/instance/db2iutil: line 4700: 26182 Segmentation fault
$ {DB2DIR?}/instance/db2isrv -addfcm -i ${INSTNAME?}
```

The `db2idrop` command also returns segmentation fault, but the instance is removed successfully after the `db2idrop` command is issued. For example:

```
$ /opt/ibm/db2/V9.5/instance/db2idrop db2inst1
/opt/ibm/db2/V9.5/instance/db2iutil: line 3599:  7350 Segmentation fault
$ {DB2DIR?}/instance/db2isrv -remove -s DB2_${INSTNAME?} 2> /dev/null

DBI1070I  Program db2idrop completed successfully.
```

This happens on DB2 9.1, 9.5, and 9.7.

This issue has been identified as an IBM issue. Once IBM has fixed this issue, then IBM will provide a hotfix for this segmentation problem.

At this time, you can communicate in a dual-stack to avoid the segmentation fault error message until IBM provides a hotfix.

To communicate in a dual-stack environment

- Add an IPv6 hostname as an IPv4 loopback address to the `/etc/hosts` file. For example:

  ```
  127.0.0.1 swlx20-v6
  ```

  Or

  ```
  127.0.0.1 swlx20-v6.punipv6.com
  ```

  `127.0.0.1` is the IPv4 loopback address.

  `swlx20-v6` and `swlx20-v6.punipv6.com` are the IPv6 hostnames.

AT Server crashes when authenticating unixpwd user multiple times (1705860)

There is a known issue in the AIX kernel code that causes '`getgrent_r`' function to corrupt the heap. This issue is present in AIX 5.3 and AIX 6.1 Refer to IBM's Web site for more information:

http://www-01.ibm.com/support/docview.wss?uid=isg1IZ52585

AT uses `getgrent_r` function to get the groups of the authenticated user.

IBM has released the fix as a patch to fileset bos.rte.libc. There are different patches available for different version of bos.rte.libc. You need to check the version of `bos.rte.libc` (For example: `lslpp -l | grep bos.rte.libc`) and apply the appropriate IBM patch:

- For version 6.1.3.1:
  http://www-01.ibm.com/support/docview.wss?uid=isg1IZ52959
  For the fix:
  ftp://ftp.software.ibm.com/aix/efixes/iz52959/
- For version 6.1.2.4:
  http://www-01.ibm.com/support/docview.wss?uid=isg1IZ52720
  For the fix:
  ftp://ftp.software.ibm.com/aix/efixes/iz52720/
- For version 6.1.2.5 :
  http://www-01.ibm.com/support/docview.wss?uid=isg1IZ52975
  For the fix:
  ftp://ftp.software.ibm.com/aix/efixes/iz52975/

There are IBM patches for only certain version of `bos.rte.libc` that are available. If your system has a different `bos.rte.libc` version, you may have to upgrade to a higher version where the fix is available. If your version is not available, you may have to contact IBM.

Oracle 11gR1 may not work on pure IPv6 environment (1819585)

There is problem running Oracle 11gR1 on a pure IPv6 environment.

Running AIX 6.1, you may receive the following error message when using sqlplus:

```
$ sqlplus " / as sysdba"
SQL> startup nomount
SQL> ORA 0-0-0-0
```

Workaround: There is no workaround for this, as Oracle 11gR1 does not fully support pure IPv6 environment. Oracle 11gR2 release may work on a pure IPv6 enviroment, but it has not been tested or released yet.

Not all the objects are visible in the VOM GUI (1821803)

After upgrading SF stack from 5.0MP3RP2 to 5.1, the volumes are not visible under the Volumes tab and the shared diskgroup is discovered as Private and Deported under the Disgroup tab in the SFM GUI.

Workaround:

To resolve this known issue

- On each manage host where `VRTSsfmh` 2.1 is installed, run:

  ```
  # /opt/VRTSsfmh/adm/dclisetup.sh -U
  ```

An error message is received when you perform off-host clone for RAC and the off-host node is not part of the CVM cluster (1834860)

There is a known issue when you try to perform an off-host clone for RAC and the off-host node is not part of the CVM cluster. You may receive a similar error message:

```
Cannot open file /etc/vx/vxdba/rac11g1/.DB_NAME
(No such file or directory).
SFORA vxreptadm ERROR V-81-8847 Cannot get filename from sid
for 'rac11g1', rc=-1.
SFORA vxreptadm ERROR V-81-6550 Could not connect to repository
database.
VxVM vxdg ERROR V-5-1-582 Disk group SNAP_rac11dg1: No such disk
group SFORA
vxsnapadm ERROR V-81-5623 Could not get CVM information for
SNAP_rac11dg1.
SFORA dbed_vmclonedb ERROR V-81-5578 Import SNAP_rac11dg1 failed.
```

Workaround: Currently there is no workaound for this known issue. However, if the off-host node is part of the CVM cluster, then off-host clone for RAC works fine.

Also the `dbed_vmclonedb` command does not support LOCAL_LISTENER and REMOTE_LISTENER in the `init.ora` parameter file of the primary database.

DB2 databases are not visible from the VOM Web console (1850100)

If you upgraded to SF 5.1, DB2 databases will be not visible from the VOM web console.

This will be fixed in the SF 5.1 Patch 1 release.

Workaround: Reinstall is required for VOM DB2-Hotfix (`HF020008500-06.sfa`), if the host is upgraded to SF 5.1. Use the deployment framework and reinstall the hotfix for DB2 (`HF020008500-06.sfa`) on the managed host.

To resolve this issue

1. In the Web GUI, go to **Settings** > **Deployment**.
2. Select **HF020008500-06 hotfix**.
3. Click **Install**.
4. Check the **force** option while reinstalling the hotfix.

A volume's placement class tags are not visible in the Veritas Enterprise Administrator GUI when creating a dynamic storage tiering placement policy (1880622)

A volume's placement class tags are not visible in the Veritas Enterprise Administrator (VEA) GUI when you are creating a SmartTier placement policy if you do not tag the volume with the placement classes prior to constructing a volume set for the volume.

Workaround: To see the placement class tags in the VEA GUI, you must tag the volumes prior to constructing the volume set. If you already constructed the volume set before tagging the volumes, restart `vxsvc` to make the tags visible in the GUI.

Upgrading operating system Technology Levels along with Storage Foundation using an alternate disk fails (2162945)

Upgrading the operating system Technology Levels (TL) along with Storage Foundation using an alternate disk fails occasionally with the following error:

```
alt_disk_copy: 0505-224 ATTENTION:
An error occurred during installation of
one or more software components.
Modifying ODM on cloned disk.
Building boot image on cloned disk.
forced unmount of /alt_inst/var/adm/ras/platform
```

```
forced unmount of /alt_inst/var
umount: error unmounting /dev/alt_hd2: Device busy
0505-144 alt_disk_install: Unable to unmount alt_inst filesystems.
```

No issues have been observed with Storage Foundation in the cause of the failure.

Veritas Volume Manager known issues

The following are the Veritas Volume Manager known issues for this release.

The cluster may hang if a node goes down (1835718)

The cluster may hang if a node goes down while one array is disabled or offline in a mirror=enclosure configuration.

This may occur, if a node panics or loses power while one array of a mirror=enclosure configuration is offline or disabled, then the cluster, fencing, I/O loads, and VxVM transactions hang.

Workaround: There is no workaround for this issue.

vxconvert failures if PowerPath disks are formatted as simple disks (857504)

If a PowerPath disk is formatted as a simple disk (a foreign device), then the vxconvert utility may fail during conversion of LVM to VxVM. To view the format of the disk, use the vxdisk list command. This issue may also occur if the /etc/vx/darecs file contains an hdiskpower disk entry. This entry may be present if PowerPath disks were configured as foreign disks in Storage Foundation 4.0, and the entry was not changed after subsequent upgrades.

Veritas Volume Manager (VxVM) might report false serial split brain under certain scenarios (1834513)

VxVM might detect and report a false serial split brain when all of the following conditions are met:

- One or more arrays that provide the shared storage for the cluster are being powered off
- At the same time when the arrays are being powered off, an operation that requires an internal transaction is initiated (such as VxVM configuration commands)

In such a scenario, disk group import will fail with a split brain error and the vxsplitlines output will show 0 or 1 pools.

Workaround:

To recover from this situation

1 Retrieve the disk media identifier (dm_id) from the configuration copy:

```
# /etc/vx/diag.d/vxprivutil dumpconfig device-path
```

The dm_id is also the serial split brain id (ssbid)

2 Use the dm_id in the following command to recover from the situation:

```
# /etc/vx/diag.d/vxprivutil set device-path ssbid=dm_id
```

vxdisk -f init can overwrite some of the public region contents (1190117)

If a disk was initialized by a previous VxVM version or defined with a smaller private region than the new default of 32 MB, then the public region data will be overridden.

Workaround:

Specify explicitly the length of privoffset, puboffset, publen, and privlen while initializing the disk.

The relayout operation fails when there are too many disks in the disk group. (2015135)

The attempted relayout operation on a disk group containing approximately more than 300 LUNs or disks may fail with the following error:

```
Cannot setup space
```

Co-existence check might fail for CDS disks

In Veritas Volume Manager (VxVM) 5.1 SP1, VxVM introduces the ability to support Cross-platform Data Sharing (CDS) on disks larger than 1 TB. VxVM uses the SUN VTOC Table to initialize the cdsdisk layout on devices up to 1 TB. VxVM uses the GUID Partition Table (GPT) to initialize the cdsdisk layout on devices larger than 1 TB.

In layouts where SUN VTOC Table is used for initialization (typically, when the disk size has never exceeded 1 TB), the AIX co-existence label can be found at sector 7 and VxVM ID block (also known as HP co-existence label) can be found at sector 16.

In layouts where GPT is used for initialization (typically, when the disk size is currently greater than or had earlier exceeded 1 TB), the AIX co-existence label is placed at sector 55 and VxVM ID block (also known as HP co-existence label) is placed at sector 64. Consequently, AIX utilities would not be able to recognize a cdsdisk initialized using GPT to be a valid VxVM disk. Symantec is working with IBM and third party OEMs to enhance the co-existence check in these utilities.

Workaround: There is no workaround for this issue.

I/O fails on some paths after array connectivity is restored, due to high restore daemon interval (2091619)

If a path loses connectivity to the array, the path is marked as suspected to fail and hence is not used for I/O. After the connectivity is restored, the restore daemon detects that the path is restored when the restore daemon probes the paths. The restore daemon makes the path available for I/O. The restore daemon probes the paths at the interval set with the tunable parameter dmp_restore_interval. If you set the dmp_restore_interval parameter to a high value, the paths are not available for I/O until the next interval.

Changes in enclosure attributes are not persistent after an upgrade to VxVM 6.0 (2082414)

The Veritas Volume Manager (VxVM) 6.0 includes several array names that differ from the array names in releases prior to release 5.1SP1. Therefore, if you upgrade from a previous release to VxVM 6.0, changes in the enclosure attributes may not remain persistent. Any enclosure attribute set for these arrays may be reset to the default value after an upgrade to VxVM 6.0. Manually reconfigure the enclosure attributes to resolve the issue.

Table 1-6 shows the Hitachi arrays that have new array names.

Table 1-6 Hitachi arrays with new array names

Previous name	New name
TagmaStore-USP	Hitachi_USP
TagmaStore-NSC	Hitachi_NSC
TagmaStoreUSPV	Hitachi_USP-V
TagmaStoreUSPVM	Hitachi_USP-VM
<New Addition>	Hitachi_R700

Table 1-6 Hitachi arrays with new array names *(continued)*

Previous name	New name
Hitachi AMS2300 Series arrays	New array names are based on the Model Number 8x. For example, AMS_100, AMS_2100, AMS_2300, AMS_2500, etc.

In addition, the Array Support Library (ASL) for the enclosures XIV and 3PAR now converts the cabinet serial number that is reported from Hex to Decimal, to correspond with the value shown on the GUI. Because the cabinet serial number has changed, any enclosure attribute set for these arrays may be reset to the default value after an upgrade to VxVM 6.0. Manually reconfigure the enclosure attributes to resolve the issue.

The cabinet serial numbers are changed for the following enclosures:

- IBM XIV Series arrays
- 3PAR arrays

DS4K series array limitations

In case of DS4K array series connected to AIX host(s), when all the paths to the storage are disconnected and reconnected back, the storage does not get discovered automatically. To discover the storage, run the `cfgmgr` OS command on all the affected hosts. After the `cfgmgr` command is run, the DMP restore daemon brings the paths back online automatically in the next path restore cycle. The time of next path restore cycle depends on the restore daemon interval specified (in seconds) by the tunable dmp_restore_interval.

```
# vxdmpadm gettune dmp_restore_interval
        Tunable           Current Value  Default Value
------------------------  -------------  -------------
dmp_restore_interval            300            300
```

On DS4K array series connected to AIX host(s) DMP is supported in conjunction with RDAC. DMP is not supported on DS4K series arrays connected to AIX hosts In MPIO environment.

vxconfigd hang with path removal operation while IO is in-progress (1932829)

In AIX with HBA firmware version SF240_320, vxdisk scandisks (device discovery) takes a long time when a path is disabled from the switch or from the array.

Workaround:

To resolve this issue, upgrade the HBA firmware version to SF240_382.

vxsnap addmir command sometimes fails under heavy I/O load (2441283)

The `vxsnap addmir` command sometimes fails under heavy I/O load and produces multiple errors.

Workaround: Rerun the `vxsnap addmir` command.

Failback to primary paths does not occur if the node that initiated the failover leaves the cluster (1856723)

When CVM is configured on non-A/A storage, if a node loses access to the storage through all the primary paths, then all the nodes in the cluster switches to the secondary paths. If the node which raised the protocol leaves the cluster and if all the rest of the nodes in the cluster are seeing the primary paths as healthy, then failback to primary paths never happens.

Issues if the storage connectivity to data disks is lost on a CVM slave node while vxconfigd was not running on the node (2562889)

If storage connectivity to data disks is lost on a CVM slave node while vxconfigd was not running on the node, this may result in following issues when `vxconfigd`comes up on this node:

- The shared disk groups on the disconnected storage are marked as dgdisabled on the slave node only.
- The shared disk groups are available to rest of the cluster nodes but no transactions, such as VxVM configuration changes, are possible on any shared disk group.
- Attempts to deport such shared disk groups will fail.

Work-arounds:

Use one of the following work-arounds:

- Remove the faulty slave node out of CVM cluster, restore storage connectivity, and rejoin the node to the cluster.
- Restart `vxconfigd` on the CVM master node.

The vxassist maxsize option fails to report the maximum size of the volume that can be created with given constraints when the disk group has the siteconsistent flag set (2563195)

The `vxassist maxsize` option fails to report the maximum size of volume that can be created with given constraints when the disk group has the siteconsistent flag set. The following error is reported:

```
# vxassist -g dgname maxsize
VxVM vxassist ERROR V-5-1-752 No volume can be created within the given
constraints
```

Workaround:

Specify the size explicitly to the `vxassist make` command.

Encapsulation of a multi-pathed root disk fails if the dmpnode name and any of its path names are not the same (2607706)

The encapsulation of a multi-pathed root disk fails if the dmpnode name and any of its path name are not the same.

For example:

Dmpnode:sdh

Paths: sda sdb

Work-around:

Before running the encapsulation command (`vxencap`), run the following command:

```
# vxddladm assign names
```

The vxcdsconvert utility is supported only on the master node (2616422)

The `vxcdsconvert` utility should be run only from the master node, not from the slave nodes of the cluster.

Recovery and rollback to original configuration may not succeed if the system reboots while the online migration setup is in partial state (2611423)

During online migration from LVM to VxVM volumes, if there is a system reboot when the migration setup is in partial state, that is, the start operation has not completed successfully, then the recover and abort operations might not be able to recover and rollback the configuration.

Workaround: This needs manual intervention for cleanup, depending on the state, to restore the original configuration.

Required attributes of LUNs for DMP devices with cluster set-up having fencing enabled (2521801)

When cluster set-up has fencing enabled, the following attributes are required to be set on the LUNs.

Set the following attributes for LUNs

1 Set the following attributes:

- If the path has the `reserve_policy` attribute set, change the `reserve_policy` attribute to `no_reserve` for all the paths.

```
# lsattr -E1 hdisk557 | grep res
reserve_policy single_path
Reserve Policy True

# chdev -l hdisk557 -a reserve_policy=no_reserve -P
hdisk557 changed
```

- If the path has the `reserve_lock` attribute set, change the `reserve_lock` attribute to `no`.

```
# lsattr -E1 hdisk558 | grep reserve_lock
reserve_lock  yes
Reserve Device on open True

# chdev -l hdisk558 -a reserve_lock=no -P
hdisk558 changed
```

2 Reboot the system for the changes to take effect.

Issues with the disk state on the CVM slave node when vxconfigd is restarted on all nodes (2615680)

When a CVM master node and a slave node have lost storage access, and `vxconfigd` is restarted on all nodes, the disk state on the CVM slave node shows as invalid.

Work-around:

To work around this issue

1. Restore storage connectivity.
2. Deport the disk group.
3. Import the disk group.

Array controller reboot on CLARiiON storage in failovermode 1 or 4 on AIX 6.1 (2418875)

On an AIX 6.1 host, when you reboot the array controller on a CLARiiON array that is configured in failovermode 1 or 4, the dmpnode may go in failed state, resulting in I/O failures on the LUN.

Upgrading SFHA to version 6.0 marks vSCSI disks as cloned disks (2434444)

This issue is seen when you upgrade from a previous version of SFHA which has vSCSI disks included in a disk group. After upgrading SFHA to 6.0, the vSCSI disks that were included in a disk group are marked as cloned disks.

Workaround:

Use the following procedure to clear the clone disk flag.

To clear the clone disk flag

1. Remove the vSCSI devices that are in error state (ibm_vscsi#_#) using the following command:

   ```
   # vxdisk rm device_name
   ```

2. Deport the disk group.

   ```
   # vxdg deport dg_name
   ```

3. Re-import the disk group with a new udid.

   ```
   # vxdg -o updateid import dg_name
   ```

4. Display the devices that are part of the disk group.

   ```
   # vxdisk -g dg_name list
   ```

5. Clear the clone_disk tag from these devices.

   ```
   # vxdisk set device_name clone=off
   ```

Veritas File System known issues

This section describes the known issues in this release of Veritas File System (VxFS).

Cannot use some commands from inside an automounted Storage Checkpoint (2490709)

If your current work directory is inside an automounted Storage Checkpoint, for example `/mnt1/.checkpoint/clone1`, some commands display the following error:

```
can't find current directory
```

This issue is verified with the following commands:

- `cp -r`
- `du`

However, this issue might occur with other commands.

Workaround: Run the command from a different directory.

Enabling delayed allocation on a small file system sometimes disables the file system (2389318)

When you enable delayed allocation on a small file system, such as around 100 MB, the file system can get disabled. In this case, the following error message ,displays in the system console log:

```
mesg 001: V-2-1: vx_nospace - file_system file system full
(size block extent)
```

Workaround: Use the `vxtunefs` command to turn off delayed allocation for the file system.

Delayed allocation sometimes gets turned off automatically when one of the volumes in a multi-volume file system nears 100% usage even if other volumes have free space (2438368)

Delayed allocation sometimes gets turned off automatically when one of the volumes in a multi-volume file system is nearing 100% usage even if other volumes in the file system have free space.

Workaround: After sufficient space is freed from the volume, delayed allocation automatically resumes.

A mutex contention in vx_worklist_lk() can use up to 100% of a single CPU (2086902)

A mutex contention in the `vx_worklist_lk`() call can use up to 100% of a single CPU.

Workaround: There is no workaround for this issue.

Performance on a VxFS file system can be slower than on a JFS file system (2511432)

There are two causes for the performance degradation:

- There are unnecessary page faults that set the write permissions on mapped pages.
- The entire file flushes.

The issue of unnecessary page faults has been fixed, which has improved the performance considerably. However, the performance on a VxFS file system can still be slower than on a JFS file sometimes due to the entire file flushing.

Workaround: There is no workaround for this issue.

Upgrading from disk layout Version 8 to 9 on a file system with partitioned directories and Storage Checkpoints can return with a read-only file system error message (2583201)

Upgrading from disk layout Version 8 to 9 on a file system with partitioned directories and Storage Checkpoints can return with a read-only file system error message. The issue with partitioned directories occurs because disk layout Version 9 has a new hash function. The issue with Storage Checkpoints occurs because the Storage Checkpoints are marked as read-only during the upgrade.

Workaround: Before upgrading a VxFS file system with disk layout Version 8 to Version 9, use the following procedure to avoid this error message.

To avoid the system error message

1. Disable the partitioned directories feature if the feature is enabled by setting the `pdir_enable` tunable to 0.

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

2. Remove all Storage Checkpoints before the upgrade.

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

Using cross-platform data sharing to convert a file system that has more than 32k nlinks does not update the vx_maxlink and maxlink_enable tunables (2655788)

If you use cross-platform data sharing to convert a file system that has more than 32k nlinks, the conversion process does not update the `vx_maxlink` and `maxlink_enable` tunables on the target file system.

Workaround: After the cross-platform data sharing conversion completes, validate the values of the `vx_maxlink` and `maxlink_enable` tunables. If the file system had more than 32k nlinks before the conversion, ensure that the these tunables are updated on the target file system before mounting the file system.

Deduplication can fail with error 110 (2591473)

In some cases, data deduplication fails with a message similar to the following example:

```
Saving    Status    Node            Type        Filesystem
-------------------------------------------------------------------------
00%       FAILED    node01          MANUAL      /data/fs1
        2011/10/26 01:38:58 End full scan with error
```

In addition, the deduplication log contains an error similar to the following example:

```
2011/10/26 01:35:09 DEDUP_ERROR AddBlock failed. Error = 110
```

These errors indicate that the deduplication process is running low on space and needs more free space to complete.

Workaround: Make more space available on the file system.

You are unable to unmount the NFS exported file system on the server if you run the fsmigadm command on the client (2355258)

Unmounting the NFS-exported file system on the server fails with the "Device busy" error when you use the `fsmigadm` command on the NFS client.

Workaround: Unexport the file system prior to unmounting.

vxresize fails while shrinking a file system with the "blocks are currently in use" error (2437138)

The `vxresize` shrink operation may fail when active I/Os are in progress on the file system and the file system is being shrunk to a size closer to its current usage. You see a message similar to the following example:

```
UX:vxfs fsadm: ERROR: V-3-20343: cannot shrink /dev/vx/rdsk/dg1/vol1 -
blocks are currently in use.
VxVM vxresize ERROR V-5-1-7514 Problem running fsadm command for volume
vol1, in diskgroup dg1
```

Workaround: Rerun the shrink operation after stopping the I/Os.

System hang when using ls, du and find (2598356)

The system sometimes hangs when using the `ls`, `du`, or `find` commands. The hang occurs in the following stack:

```
schedule_timeout
vx_iget
vx_dirlook
vx_lookup
do_lookup
do_path_lookup
```

Workaround: There is no workaround for this issue.

Expanding a 100% full file system can cause a panic (2599590)

Expanding a 100% full file system can cause a panic with the following stack trace:

```
bad_kern_reference()
$cold_vfault()
vm_hndlr()
bubbledown()
vx_logflush()
vx_log_sync1()
vx_log_sync()
vx_worklist_thread()
kthread_daemon_startup()
```

Workaround: There is no workaround for this issue.

Replication known issues

This section describes the replication known issues in this release of Veritas Storage Foundation and High Availability.

vradmin syncvol command compatibility with IPv6 addresses (2075307)

The `vradmin syncvol` command does not work with the compressed form of IPv6 addresses. In IPv6 environments, if you run the `vradmin syncvol` command and identify the target host using compressed form of the IPv6 address, the command fails with following error message:

```
# vradmin -s -full syncvol vol1 fe80::221:5eff:fe49:ad10:dg1:vol1
VxVM VVR vradmin ERROR V-5-52-420 Incorrect format for syncvol.
```

Also, if you run the `vradmin addsec` command and you specify the Secondary host using the compressed IPv6 address, the `vradmin syncvol` command also fails – even if you specify the target as `hostname`.

Workaround: When you use the `vradmin addsec` and `vradmin syncvol` commands, do not specify compressed IPv6 addresses; instead, use hostnames.

RVGPrimary agent operation to start replication between the original Primary and the bunker fails during failback (2054804)

The RVGPrimary agent initiated operation to start replication between the original Primary and the bunker fails during failback – when migrating back to the original Primary after disaster recovery – with the error message:

```
VxVM VVR vxrlink ERROR V-5-1-5282 Error getting information from
remote host. Internal Error.
```

The issue applies to global clustering with a bunker configuration, where the bunker replication is configured using storage protocol. It occurs when the Primary comes back even before the bunker disk group is imported on the bunker host to initialize the bunker replay by the RVGPrimary agent in the Secondary cluster.

Workaround:

To resolve this issue

1. Before failback, make sure that bunker replay is either completed or aborted.
2. After failback, deport and import the bunker disk group on the original Primary.
3. Try the start replication operation from outside of VCS control.

Bunker replay did not occur when the Application Service Group was configured on some of the systems in the Primary cluster, and ClusterFailoverPolicy is set to "AUTO" (2047724)

The time that it takes for a global cluster to fail over an application service group can sometimes be smaller than the time that it takes for VVR to detect the configuration change associated with the primary fault. This can occur in a bunkered, globally clustered configuration when the value of the `ClusterFailoverPolicy` attribute is `Auto` and the `AppGroup` is configured on a subset of nodes of the primary cluster.

This causes the RVGPrimary online at the failover site to fail. The following messages appear in the VCS engine log:

```
RVGPrimary:RVGPrimary:online:Diskgroup bunkerdgname could not be
imported on bunker host hostname. Operation failed with error 256
and message VxVM VVR vradmin ERROR V-5-52-901 NETWORK ERROR: Remote
server unreachable... Timestamp VCS ERROR V-16-2-13066 (hostname)
Agent is calling clean for resource(RVGPrimary) because the resource
is not up even after online completed.
```

Workaround:

To resolve this issue

- When the configuration includes a bunker node, set the value of the `OnlineRetryLimit` attribute of the RVGPrimary resource to a non-zero value.

The RVGPrimary agent may fail to bring the application service group online on the new Primary site because of a previous primary-elect operation not being run or not completing successfully (2043831)

In a primary-elect configuration, the RVGPrimary agent may fail to bring the application service groups online on the new Primary site, due to the existence of previously-created instant snapshots. This may happen if you do not run the `ElectPrimary` command to elect the new Primary or if the previous `ElectPrimary` command did not complete successfully.

Workaround: Destroy the instant snapshots manually using the `vxrvg -g` *`dg`* `-P` *`snap_prefix`* `snapdestroy` *`rvg`* command. Clear the application service group and bring it back online manually.

A snapshot volume created on the Secondary, containing a VxFS file system may not mount in read-write mode and performing a read-write mount of the VxFS file systems on the new Primary after a global clustering site failover may fail (1558257)

Issue 1:

When the `vradmin ibc` command is used to take a snapshot of a replicated data volume containing a VxFS file system on the Secondary, mounting the snapshot volume in read-write mode may fail with the following error:

```
UX:vxfs mount: ERROR: V-3-21268: /dev/vx/dsk/dg/snapshot_volume
is corrupted. needs checking
```

This happens because the file system may not be quiesced before running the `vradmin ibc` command and therefore, the snapshot volume containing the file system may not be fully consistent.

Issue 2:

After a global clustering site failover, mounting a replicated data volume containing a VxFS file system on the new Primary site in read-write mode may fail with the following error:

```
UX:vxfs mount: ERROR: V-3-21268: /dev/vx/dsk/dg/data_volume
is corrupted. needs checking
```

This usually happens because the file system was not quiesced on the original Primary site prior to the global clustering site failover and therefore, the file systems on the new Primary site may not be fully consistent.

Workaround: The following workarounds resolve these issues.

For issue 1, run the `fsck` command on the snapshot volume on the Secondary, to restore the consistency of the file system residing on the snapshot.

For example:

```
# fsck -V vxfs /dev/vx/dsk/dg/snapshot_volume
```

For issue 2, run the `fsck` command on the replicated data volumes on the new Primary site, to restore the consistency of the file system residing on the data volume.

For example:

```
# fsck -V vxfs /dev/vx/dsk/dg/data_volume
```

In an IPv6-only environment RVG, data volumes or SRL names cannot contain a colon

Issue: After upgrading VVR to an IPv6-only environment in 6.0 release, vradmin commands may not work when a colon is specified in the RVG, data volume(s) and/or SRL name. It is also possible that after upgrading VVR to an IPv6-only environment, vradmin createpri may dump core when provided with RVG, volume and/or SRL names containing a colon in it.

Workaround: Make sure that colons are not specified in the volume, SRL and RVG names in the VVR configuration

vradmin commands might fail on non-logowner node after logowner change (1810827)

When VVR is used for replicating shared disk groups in an SFCFS or SFRAC environment consisting of three or more nodes, a logowner change event might, in rare instances, render `vradmin` commands unusable on some or all of the cluster nodes. In such instances, the following message appears in the "Config Errors:" section of the output of the `vradmin repstatus` and `vradmin printrvg`commands:

```
vradmind not reachable on cluster peer
```

In addition, all other `vradmin` commands (except `vradmin printvol`) fail with the error:

```
"VxVM VVR vradmin ERROR V-5-52-488 RDS has configuration error related
to the master and logowner."
```

This is due to a defect in the internal communication sub-system, which will be resolved in a later release.

Workaround: Restart `vradmind` on all the cluster nodes using the following commands:

```
# /lib/svc/method/vras-vradmind.sh stop
# /lib/svc/method/vras-vradmind.sh start
```

While vradmin commands are running, vradmind may temporarily lose heart beats (2162625, 2275444)

This issue may occasionally occur when you use `vradmin` commands to administer VVR. While the `vradmin` commands run, `vradmind` may temporarily lose heartbeats, and the commands terminate with the following error message:

```
VxVM VVR vradmin ERROR V-5-52-803 Lost connection to host host;
terminating command execution.
```

Workaround:

To resolve this issue

1 Depending on the application I/O workload and network environment, uncomment and increase the value of the `IPM_HEARTBEAT_TIMEOUT` variable in the `/etc/vx/vras/vras_env` on all the hosts of the RDS to a higher value. The following example increases the timeout value to 120 seconds.

```
export IPM_HEARTBEAT_TIMEOUT
IPM_HEARTBEAT_TIMEOUT=120
```

2 Restart `vradmind` on all the hosts of the RDS to put the new `IPM_HEARTBEAT_TIMEOUT` value into affect. Enter the following on all the hosts of the RDS:

```
# /etc/init.d/vras-vradmind.sh stop
# /etc/init.d/vras-vradmind.sh start
```

vxassist relayout removes the DCM (2162522)

If you perform a relayout that adds a column to a striped volume that has a DCM, the DCM is removed. There is no message indicating that this has happened. To replace the DCM, enter the following:

```
#vxassist -g diskgroup addlog vol logtype=dcm
```

vxassist and vxresize operations do not work with layered volumes that are associated to an RVG (2162579)

This issue occurs when you try a resize operation on a volume that is associated to an RVG and has a striped-mirror layout.

Workaround:

To resize layered volumes that are associated to an RVG

1 Pause or stop the applications.

2 Wait for the RLINKs to be up to date. Enter the following:

```
# vxrlink -g diskgroup status rlink
```

3 Stop the affected RVG. Enter the following:

```
# vxrvg -g diskgroup stop rvg
```

4 Disassociate the volumes from the RVG. Enter the following:

```
# vxvol -g diskgroup dis vol
```

5 Resize the volumes. In this example, the volume is increased to 10 GB. Enter the following:

```
# vxassist -g diskgroup growto vol 10G
```

6 Associate the data volumes to the RVG. Enter the following:

```
# vxvol -g diskgroup assoc rvg vol
```

7 Start the RVG. Enter the following:

```
# vxrvg -g diskgroup start rvg
```

8 Resume or start the applications.

Creating a primary diskgroup fails if there is no extra LUN to mirror the data change map (2478684)

Creating a primary diskgroup fails if there is no extra LUN to mirror the data change map (DCM), even if you have enough disk space.

Workaround: Add a LUN to the diskgroup before creating the primary diskgroup.

verifydata operation fails when replicating between versions 5.1 and 6.0 (2360713)

When replicating in a cross-version VVR environment consisting of hosts running Storage Foundation 5.1 and hosts running Storage Foundation 6.0, the `vradmin verifydata` command fails with the following error:

```
VxVM VVR vxrsync ERROR V-5-52-2222 [from host]: VxVM in.vxrsyncd
ERROR V-5-36-2125 Server volume access error during [assign volids]
volume path: [/dev/vx/dsk/dg/snapshot_volume] reason: [this could be
because a target volume is disabled or an rlink associated with a
target volume is not detached during sync operation].
```

Workaround: There are two workarounds for this issue.

- Upgrade the hosts running Storage Foundation 5.1 to Storage Foundation 5.1SP1 or later and re-run the `vradmin verifydata` command.
- Follow the offline verification procedure in the "Verifying the data on the Secondary" section of the *Veritas Storage Foundation and High Availability Solutions Replication Administrator's Guide*. This process requires ensuring that the secondary is up-to-date, pausing replication, and running the `vradmin syncrvg` command with the `-verify` option.

Replication hang when VVR logowner is on CVM slave node (2405943)

When VVR is used for asynchronous replication in shared disk group environment, one of the nodes of the cluster at the primary site is chosen as the logowner. When the logowner node is on a node which is a slave node for the underlying CVM cluster, in the presence of heavy I/O from a node that is not the logowner, it is possible to get into a replication hang. This is due to an internal defect which will be fixed in later releases.

Workaround: Enable the PreOnline trigger of the RVGLogOwner agent so that the VVR logowner will always reside on the CVM master node. For the detailed procedure, refer to the RVGLogowner agent notes section in the *Veritas Cluster Server Bundled Agents Reference Guide*.

Cannot relayout data volumes in an RVG from concat to striped-mirror (2162537)

This issue occurs when you try a relayout operation on a data volume which is associated to an RVG, and the target layout is a striped-mirror.

Workaround:

To relayout a data volume in an RVG from concat to striped-mirror

1. Pause or stop the applications.
2. Wait for the RLINKs to be up to date. Enter the following:

```
# vxrlink -g diskgroup status rlink
```

3. Stop the affected RVG. Enter the following:

```
# vxrvg -g diskgroup stop rvg
```

4. Disassociate the volumes from the RVG. Enter the following:

```
# vxvol -g diskgroup dis vol
```

5 Relayout the volumes to striped-mirror. Enter the following:

```
# vxassist -g diskgroup relayout vol layout=stripe-mirror
```

6 Associate the data volumes to the RVG. Enter the following:

```
# vxvol -g diskgroup assoc rvg vol
```

7 Start the RVG. Enter the following:

```
# vxrvg -g diskgroup start rvg
```

8 Resume or start the applications.

Veritas Storage Foundation for Databases (SFDB) tools known issues

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

Database Storage Checkpoints created by using `dbed_ckptcreate` may not be visible after upgrading to 6.0 (2626248)

After upgrading from a 5.0 release to 6.0, the Database Storage Checkpoints created earlier using `dbed_ckptcreate` may not be migrated.

Workaround

Perform the following steps to make the old Database Storage Checkpoints visible.

To resolve the issue

1 Remove the new repository.

- Examine the contents of the `/var/vx/vxdba/rep_loc`file to determine the location of the 6.0 repository.
- Remove the `.sfae` directory specified as the `location` attribute.

2 Remove the repository location file: `/var/vx/vxdba/rep_loc`.

3 Create a symlink `/var/vx/vxdba/<SID>/.sfdb_rept` pointing to the `.sfdb_rept` directory created in the same location as the `.sfae` directory removed earlier.

```
$ ln -s <location>/.sfdb_rept /var/vx/vxdba/<SID>/.sfdb_rept
```

This step creates a symlink to the old repository.

4 Import repository data by running the `dbed_update` command.

This step imports the data from the old repository.

The old Database Storage Checkpoints are now visible.

Database Storage Checkpoint unmount may fail with device busy (2591463)

In some cases, when a database that is cloned using a Database Storage Checkpoint is shut down, an error similar to the following may occur:

```
SFAE Error:0457: Failed to unmount device
/dev/vx/dsk/datadg/datavol:Ckpt_1317707593_rw_1317708154.
Reason: VxFS returned error : umount: /tmp/clonedb/data: device is busy
```

Workaround

As an Oracle user, force shut down the clone database if it is up and then retry the unmount operation.

Incorrect error message if wrong host name is provided (2585643)

If you provide an incorrect host name with the `-r` option of `vxsfadm`, the command fails with an error message similar to one of the following:

```
FSM Error: Can't use string ("") as a HASH ref while "strict refs"
in use at /opt/VRTSdbed/lib/perl/DBED/SfaeFsm.pm line 776.

SFDB vxsfadm ERROR V-81-0609 Repository location  is invalid.
```

The error messages are unclear.

Workaround

Provide the name of a host that has the repository database, with the `-r` option of `vxsfadm`.

FlashSnap validate reports snapshot unsplittable (2534422)

The FlashSnap validation operation fails with the following error if the mirrors for data volumes and archive log volumes share the same set of disks:

```
SFAE Error:0642: Storage for diskgroup oradatadg is not splittable.
```

Workaround

Ensure that snapshot plexes for data volumes and snapshot plexes for archive log volumes reside on separate set of disks.

Attempt to use SmartTier commands fails (2332973)

The attempts to run SmartTier commands such as `dbdst_preset_policy` or`dbdst_file_move` fail with the following error:

```
fsppadm: ERROR: V-3-26551: VxFS failure on low level mechanism
with message - Device or resource busy
```

This error occurs if a sub-file SmartTier command such as `dbdst_obj_move` has been previously run on the file system.

There is no workaround for this issue. You cannot use file-based SmartTier and sub-file SmartTier simultaneously.

`dbed_vmclonedb` ignores new clone SID value after cloning once (2580318)

After you have done FlashSnap cloning using a snapplan, any further attempts to create a clone from the same snapplan using the `dbed_vmclonedb` continue to use the original clone SID, rather than the new SID specified using the *new_sid* parameter.

This issue is also observed when you resynchronize the snapplan, take a snapshot again without specifying the new clone SID, and then try to clone with the new SID.

Workaround

You can use one of the following workarounds:

- After the snapshot is resynchronized, delete the snapplan using the `dbed_vmchecksnap -o remove` command. You can then use a new clone SID by creating a new snapplan, which may have the same name, and using the snapplan for taking more snapshots.

- Use the `vxsfadm` command to take the snapshot again and specify the clone SID with the snapshot operation so that the clone operation can be done with the new clone SID.

Attempt to use certain names for tiers results in error (2581390)

If you attempt to use certain names for tiers, the following error message is displayed:

```
SFORA dbdst_classify ERROR V-81-6107 Invalid Classname BALANCE
```

This error occurs because the following names are reserved and are not permitted as tier names for SmartTier:

- BALANCE
- CHECKPOINT
- METADATA

Workaround

Use a name for SmartTier classes that is not a reserved name.

User authentication fails (2579929)

The `sfae_auth_op -o auth_user` command, used for authorizing users, fails with the following error message:

```
SFDB vxsfadm ERROR V-81-0384 Unable to store credentials for <username>
```

Reattempting the operation fails with the following error message:

```
SFDB vxsfadm ERROR V-81-0372 AT broker failed to start:
```

The authentication setup might have been run with a strict umask value, which results in the required files and directories being inaccessible to the non-root users.

Workaround

If you have not done authentication setup, set umask to a less strict value before running the `sfae_auth_op -o setup` or `sfae_auth_op -o import_broker_config` commands.

To set umask to a less strict value

- Use the command:

```
# umask 022
```

If you have already done authentication setup, perform the following steps.

To resolve the problem if you have already done authentication setup

1. Shut down the authentication broker, if it is running.

```
# /opt/VRTSdbed/at-broker/bin/sfaeatd.sh stop
```

2. Change the permissions for files and directories that are required to be readable by non-root users.

```
# chmod o+r /etc/vx/vxdbed/admin.properties
# chmod o+rx /var/vx/vxdba/auth/users
# find /opt/VRTSdbed/at-broker -type d -exec chmod o+rx {} \;
```

Clone operation failure might leave clone database in unexpected state (2512664)

If the clone operation fails, it may leave the clone database in an unexpected state. Retrying the clone operation might not work.

Workaround

If retrying does not work, perform one the following actions depending on the point-in-time copy method you are using:

- For FlashSnap, resync the snapshot and try the clone operation again.
- For FileSnap and Database Storage Checkpoints, destroy the clone and create the clone again.
- For space-optimized snapshots, destroy the snapshot and create a new snapshot.

Contact Symantec support if retrying using the workaround does not succeed.

FlashSnap resync fails if there is an existing space-optimized snapshot (2479901)

If you try a FlashSnap resync operation when there is an existing space-optimized snapshot, the resync operation fails with the following error:

```
Error: VxVM vxdg ERROR V-5-1-4597 vxdg join FS_oradg oradg failed
datavol_snp : Record already exists in disk group
archvol_snp : Record already exists in disk group
```

Workaround

Destroy the space-optimized snapshot first and then perform the FlashSnap resync operation.

Upgrading Veritas Storage Foundation for Databases (SFDB) tools from 5.0x to 6.0 (2184482)

The `sfua_rept_migrate`command results in an error message after upgrading SFHA or SF for Oracle RAC version 5.0 or 5.0MP3 to SFHA or SF for Oracle RAC 6.0.

When upgrading from SFHA version 5.0 or 5.0MP3 to SFHA 6.0 the S*vxdbms3 startup script is renamed to NO_S*vxdbms3. The S*vxdbms3 startup script is required by `sfua_rept_upgrade`. Thus when `sfua_rept_upgrade` is run, it is unable to find the S*vxdbms3 startup script and gives the error message:

```
/sbin/rc3.d/S*vxdbms3 not found
SFORA sfua_rept_migrate ERROR V-81-3558 File:  is missing.
SFORA sfua_rept_migrate ERROR V-81-9160 Failed to mount repository.
```

Workaround

Before running `sfua_rept_migrate`, rename the startup script NO_S*vxdbms3 to S*vxdbms3.

Clone command fails if PFILE entries have their values spread across multiple lines (1764885)

If you have a `log_archive_dest_1` in single line in the init.ora file, then `dbed_vmclonedb` will work but `dbed_vmcloneb` will fail if you put in multiple lines for `log_archive_dest_1`.

Workaround

There is no workaround for this issue.

Health check monitoring is not supported for Oracle database 11g R1 and 11g R2 [1985055]

Health check monitoring is not supported for Oracle database 11g R1 and 11g R2.

Workaround: Set MonitorOption attribute for Oracle resource to 0.

Software limitations

This section covers the software limitations of this release.

See the corresponding Release Notes for a complete list of software limitations related to that component or product.

See "Documentation" on page 82.

Veritas Volume Manager software limitations

The following are software limitations in this release of Veritas Volume Manager.

Limitation with device renaming on AIX 6.1TL6

If you rename an operating system (OS) path with the `rendev` command on AIX 6.1TL6, the operation might remove the paths from DMP control. DMP cannot discover these paths.

DMP settings for NetApp storage attached environment

To minimize the path restoration window and maximize high availability in the NetApp storage attached environment, set the following DMP tunables:

Table 1-7

Parameter name	Definition	New value	Default value
dmp_restore_internal	DMP restore daemon cycle	60 seconds.	300 seconds.
dmp_path_age	DMP path aging tunable	120 seconds.	300 seconds.

The change is persistent across reboots.

To change the tunable parameters

1. Issue the following commands:

```
# vxdmpadm settune dmp_restore_internal=60

# vxdmpadm settune dmp_path_age=120
```

2. To verify the new settings, use the following commands:

```
# vxdmpadm gettune dmp_restore_internal

# vxdmpadm gettune dmp_path_age
```

DMP support in AIX virtualization environment (2138060)

DMP does not support exporting paths to the same LUN through both vSCSI and NPIV interfaces.

DMP treats the same LUN seen through vSCSI and NPIV interfaces as two separate LUNs, because the behavior of the LUN at the VIOC level is different due to the intermediate SCSI interface at the VIOS level for vSCSI devices.

Veritas File System software limitations

The following are software limitations in the 6.0 release of Veritas Storage Foundation.

Recommended limit of number of files in a directory

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

The vxlist command cannot correctly display numbers greater than or equal to 1 EB

The `vxlist` command and all of the other commands that use the same library as the `vxlist` command cannot correctly display numbers greater than or equal to 1 EB.

Limitations with delayed allocation for extending writes feature

The following limitations apply to the delayed allocation for extending writes feature:

- In the cases where the file data must be written to disk immediately, delayed allocation is disabled on that file. Examples of such cases include Direct I/O, concurrent I/O, FDD/ODM access, and synchronous I/O.
- Delayed allocation is not supported on memory mapped files.
- Delayed allocation is not supported with BSD quotas. When BSD quotas are enabled on a file system, delayed allocation is turned off automatically for that file system.
- Delayed allocation is not supported for shared mounts in a cluster file system.

FlashBackup in NetBackup 7.1 and prior does not support disk layout Version 8 and 9

The FlashBackup feature of NetBackup 7.1 or prior does not support a VxFS file system with disk layout Version 8 or 9.

Replication software limitations

The following are replication software limitations in this release of Veritas Storage Foundation and High Availability.

Replication in a shared environment

Currently, replication support is limited to 8-node cluster applications.

IPv6 software limitations

VVR does not support the following Internet Protocol configurations:

- A replication configuration from an IPv4-only node to an IPv6-only node and from an IPv6-only node to an IPv4-only node is not supported, because the IPv6-only node has no IPv4 address configured on it and therefore VVR cannot establish communication between the two nodes.
- A replication configuration in which an IPv4 address is specified for the `local_host` attribute of a primary RLINK and an IPv6 address is specified for the `remote_host` attribute of the same RLINK.
- A replication configuration in which an IPv6 address is specified for the `local_host` attribute of a primary RLINK and an IPv4 address is specified for the `remote_host` attribute of the same RLINK.
- IPv6 is not supported in a CVM and VVR cluster where some nodes in the cluster are IPv4-only and other nodes in the same cluster are IPv6-only, or all nodes of a cluster are IPv4-only and all nodes of a remote cluster are IPv6-only.
- VVR does not support Edge and NAT-PT routers that facilitate IPv4 and IPv6 address translation.

VVR support for replicating across Storage Foundation versions

VVR supports replication between Storage Foundation 6.0 and the prior major releases of Storage Foundation (5.1 and 5.1SP1). Replication between versions is supported for disk group versions 150, 160, and 170 only. Both the Primary and Secondary hosts must be using a supported disk group version.

Limitations related to I/O fencing

This section covers I/O fencing-related software limitations.

Preferred fencing limitation when VxFEN activates RACER node re-election

The preferred fencing feature gives preference to more weighted or larger subclusters by delaying the smaller subcluster. This smaller subcluster delay is effective only if the initial RACER node in the larger subcluster is able to complete the race. If due to some reason the initial RACER node is not able to complete the race and the VxFEN driver activates the racer re-election algorithm, then the smaller subcluster delay is offset by the time taken for the racer re-election and the less weighted or smaller subcluster could win the race. This limitation though not desirable can be tolerated.

Limitation with RDAC driver and FAStT array for coordinator disks that use raw disks

For multipathing to connected storage, AIX uses the RDAC driver for FAStT arrays. Since it is an active/passive array, only the current active path is exposed to clients. The I/O fencing driver, vxfen, can use only a single active path and has no foreknowledge of the passive paths to the coordinator disks on an array. If the single active path fails, all nodes in the cluster lose access to the coordinator disks.

The loss of the path to the coordinator disks can potentially go unnoticed until a reboot, split brain, or any other reason that leads to a cluster membership change occurs. In any of these conditions, the cluster cannot form, and all nodes panic to prevent data corruption. No data loss occurs.

Workaround: Use DMP and specify paths to coordinator disks as DMP paths rather than raw disks to avoid this limitation.

Stopping systems in clusters with I/O fencing configured

The I/O fencing feature protects against data corruption resulting from a failed cluster interconnect, or “split brain.” See the *Veritas Cluster Server Administrator's Guide* for a description of the problems a failed interconnect can create and the protection I/O fencing provides.

In a cluster using SCSI-3 based fencing, I/O fencing implements data protection by placing the SCSI-3 PR keys on both the data disks and coordinator disks. In a cluster using CP server-based fencing, I/O fencing implements data protection by placing the SCSI-3 PR keys on data disks and similar registrations on CP server. The VCS administrator must be aware of several operational changes needed when working with clusters protected by I/O fencing. Specific shutdown procedures

ensure keys are removed from coordination points and data disks to prevent possible difficulties with subsequent cluster startup.

Using the reboot command rather than the shutdown command bypasses shutdown scripts and can leave keys on the coordination points and data disks. Depending on the order of reboot and subsequent startup events, the cluster may warn of a possible split brain condition and fail to start up.

Workaround: Use the shutdown -r command on one node at a time and wait for each node to complete shutdown.

Uninstalling VRTSvxvm causes issues when VxFEN is configured in SCSI3 mode with dmp disk policy (2522069)

When VxFEN is configured in SCSI3 mode with dmp disk policy, the DMP nodes for the coordinator disks can be accessed during system shutdown or fencing arbitration. After uninstalling VRTSvxvm fileset, the DMP module will no longer be loaded in memory. On a system where VRTSvxvm fileset is uninstalled, if VxFEN attempts to access DMP devices during shutdown or fencing arbitration, the system panics.

Limitations related to LLT

This section covers LLT-related software limitations.

LLT over IPv6 UDP cannot detect other nodes while SFHA tries to form a cluster (1533308)

LLT over IPv6 requires link-local scope multicast to discover other nodes when SFHA tries to form a cluster. If multicast networking is undesirable, or unavailable in your environment, use the address of the peer nodes to eliminate the need for the multicast traffic.

Workaround: Add the set-addr entry for each local link into the /etc/llttab file. You add the entry to specify the address of the peer nodes that are available on the corresponding peer links. For example, you add the following lines into the llttab file to specify the set-addr entry for a node. In this example, the node's IPv6 address is fe80::21a:64ff:fe92:1d70.

```
set-addr 1 link1 fe80::21a:64ff:fe92:1d70
set-arp 0
```

LLT does not start automatically after system reboot (2058752)

After you reboot the systems, if you had not completed the terminal setting procedure, LLT does not start automatically and does not log any error messages. You can manually start LLT using the `/etc/init.d/llt.rc` command.

If you reinstall a system, when the system reboots a message appears on the system console to set the terminal setting if you have not already done so. LLT does not start until you complete the terminal setting procedure.

Workaround: To resolve the LLT startup issue

1. After you reboot the systems, open the system console using any available method, for example, from HMC.
2. On the console, go to the terminal setting menu, and set the terminal of your choice.
3. Select the **Task Completed** menu option.

Veritas Storage Foundation for Databases (SFDB) tools software limitations

The following are the SFDB tools software limitations in this release.

Oracle Data Guard in an Oracle RAC environment

Database snapshots and Database Storage Checkpoints are not supported in a Data Guard with Oracle RAC environment.

Upgrading if using Oracle 11.1.0.6

If you are running Oracle version 11.1.0.6 and upgrading a Storage Foundation product to 6.0: upgrade the Oracle binaries and database to version 11.1.0.7 before moving to 6.0.

Parallel execution of `vxsfadm` is not supported (2515442)

Only one instance of the `vxsfadm` command can be run at a time. Running multiple instances of `vxsfadm` at a time is not supported.

Creating point-in-time copies during database structural changes is not supported (2496178)

SFDB tools do not support creating point-in-time copies while structural changes to the database are in progress, such as adding or dropping tablespaces and adding or dropping data files.

However, once a point-in-time copy is taken, you can create a clone at any time, regardless of the status of the database.

Documentation errata

The following sections cover additions or corrections for Document version: 6.0.5 of the product documentation. These additions or corrections may be included in later versions of the product documentation that can be downloaded from the Symantec Support website and the Symantec Operations Readiness Tools (SORT).

See the corresponding Release Notes for documentation errata related to that component or product.

See "Documentation" on page 82.

See "About Symantec Operations Readiness Tools" on page 9.

Veritas Storage Foundation Administrator's Guide

The following errata applies to the *Veritas Storage Foundation and High Availability Administrator's Guide*.

"VxFS Version 9 disk layout" section in the "Disk layout" appendix

Replace the beginning of the sentence that begins with, "For the 64-bit kernel versions of AIX 5.2 and 5.3..." with "For the 64-bit kernel versions of AIX 6.1 and 7.1...".

The following text should be deleted:

The Version 8 disk layout supports group quotas.

See "About quota files on Veritas File System" on page x.

Documentation

Product guides are available in the PDF format on the software media in the `/product_name/docs` directory. Additional documentation is available online.

Make sure that you are using the current version of documentation. The document version appears on page 2 of each guide. The publication date appears on the title page of each document. The latest product documentation is available on the Symantec website.

http://sort.symantec.com/documents

Documentation set

Table 1-8 lists the documentation for Veritas Storage Foundation and High Availability.

Table 1-8 Veritas Storage Foundation and High Availability documentation

Document title	File name
Veritas Storage Foundation and High Availability Release Notes	sfha_notes_60_aix.pdf
Veritas Storage Foundation and High Availability Installation and Configuration Guide	sfha_install_60_aix.pdf

Table 1-9 lists the documents for Veritas Cluster Server.

Table 1-9 Veritas Cluster Server documentation

Title	File name
Veritas Cluster Server Installation Guide	vcs_install_60_aix.pdf
Veritas Cluster Server Release Notes	vcs_notes_60_aix.pdf
Veritas Cluster Server Administrator's Guide	vcs_admin_60_aix.pdf
Veritas Cluster Server Bundled Agents Reference Guide	vcs_bundled_agents_60_aix.pdf
Veritas Cluster Server Agent Developer's Guide	vcs_agent_dev_60_unix.pdf
Veritas Cluster Server Agent for DB2 Installation and Configuration Guide	vcs_db2_agent_60_aix.pdf
Veritas Cluster Server Agent for Oracle Installation and Configuration Guide	vcs_oracle_agent_60_aix.pdf
Veritas Cluster Server Agent for Sybase Installation and Configuration Guide	vcs_sybase_agent_60_aix.pdf

Table 1-10 lists the documentation for Veritas Storage Foundation.

Table 1-10 Veritas Storage Foundation documentation

Document title	File name
Veritas Storage Foundation Release Notes	sf_notes_60_aix.pdf
Veritas Storage Foundation Installation Guide	sf_install_60_aix.pdf

Table 1-10 Veritas Storage Foundation documentation *(continued)*

Document title	File name
Veritas Storage Foundation Administrator's Guide	sf_admin_60_aix.pdf
Veritas Storage Foundation: Storage and Availability Management for Oracle Databases	sf_adv_ora_60_aix.pdf
Veritas File System Programmer's Reference Guide	vxfs_ref_60_aix.pdf

Table 1-11 lists the documentation for Veritas Storage Foundation and High Availability Solutions products.

Table 1-11 Veritas Storage Foundation and High Availability Solutions products documentation

Document title	File name
Veritas Storage Foundation and High Availability Solutions Solutions Guide	sfha_solutions_60_aix.pdf
Veritas Storage Foundation and High Availability Solutions Virtualization Guide	sfha_virtualization_60_aix.pdf
Veritas Storage Foundation and High Availability Solutions Replication Administrator's Guide	sf_replication_admin_60_aix.pdf

If you use Veritas Operations Manager (VOM) to manage Veritas Storage Foundation and High Availability products, refer to the VOM product documentation at:

http://sort.symantec.com/documents

Manual pages

The manual pages for Veritas Storage Foundation and High Availability Solutions products are installed in the `/opt/VRTS/man` directory.

Set the `MANPATH` environment variable so the `man`(1) command can point to the Veritas Storage Foundation manual pages:

- For the Bourne or Korn shell (`sh or ksh`), enter the following commands:

```
MANPATH=$MANPATH:/opt/VRTS/man
  export MANPATH
```

- For C shell (`csh` or `tcsh`), enter the following command:

```
setenv MANPATH ${MANPATH}:/opt/VRTS/man
```

See the `man`(1) manual page.