

# Veritas Storage Foundation™ Cluster File System Release Notes

Solaris

5.1



# Veritas Storage Foundation™ Cluster File System Release Notes

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Customers with a current maintenance agreement may access Technical Support information at the following URL:

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When you contact Technical Support, please have the following information available:

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- Hardware information
- Available memory, disk space, and NIC information
- Operating system

- Version and patch level
- Network topology
- Router, gateway, and IP address information
- Problem description:
  - Error messages and log files
  - Troubleshooting that was performed before contacting Symantec
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## Licensing and registration

If your Symantec product requires registration or a license key, access our non-technical support Web page at the following URL:

[customercare.symantec.com](http://customercare.symantec.com)

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Customer Care information is available at the following URL:

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- Questions regarding product licensing or serialization
- Product registration updates, such as address or name changes
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- Latest information about product updates and upgrades
- Information about upgrade assurance and maintenance contracts
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- Nontechnical presales questions
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Asia-Pacific and Japan	<a href="mailto:customercare_apac@symantec.com">customercare_apac@symantec.com</a>
Europe, Middle-East, and Africa	<a href="mailto:semea@symantec.com">semea@symantec.com</a>
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Managed Security Services	These services remove the burden of managing and monitoring security devices and events, ensuring rapid response to real threats.
Consulting Services	Symantec Consulting Services provide on-site technical expertise from Symantec and its trusted partners. Symantec Consulting Services offer a variety of prepackaged and customizable options that include assessment, design, implementation, monitoring, and management capabilities. Each is focused on establishing and maintaining the integrity and availability of your IT resources.
Educational Services	Educational Services provide a full array of technical training, security education, security certification, and awareness communication programs.

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Select your country or language from the site index.

# Storage Foundation Cluster File System Release Notes

This document includes the following topics:

- [Overview of this release](#)
- [Changes in Storage Foundation Cluster File System](#)
- [Storage Foundation for Databases supported features](#)
- [System requirements](#)
- [Component product release notes](#)
- [Software limitations](#)
- [Fixed issues](#)
- [Known issues](#)
- [No longer supported](#)
- [Documentation](#)

## Overview of this release

Before you continue, make sure that you are using the current version of this guide. It is online at:

[http://sfdoccentral.symantec.com/sf/5.1/solaris/sfcfs\\_notes.pdf](http://sfdoccentral.symantec.com/sf/5.1/solaris/sfcfs_notes.pdf)

This document is Document version: 5.1.2.

This document provides release information about the products in the Veritas Storage Foundation Cluster File System 5.1 product line:

- Veritas Storage Foundation™ Cluster File System (SFCFS) (Standard, Standard HA, Enterprise, and Enterprise HA)
- Veritas™ Volume Manager (VxVM)
- Veritas™ File System (VxFS)

See the *Veritas Storage Foundation Cluster File System Installation Guide*.

For the latest patches available for this release, go to: <http://vos.symantec.com/>.

For important updates regarding this release, review the Late-Breaking News TechNote on the Symantec Technical Support website:

<http://entsupport.symantec.com/docs/334829>

The hardware compatibility list (HCL) contains information about supported hardware and is updated regularly. For the latest information on supported hardware visit the following URL:

<http://entsupport.symantec.com/docs/330441>

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.

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

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

See the *Veritas Cluster Server Release Notes*.

## About the Simple Admin utility

Veritas Storage Foundation has an optional utility, called Simple Admin, that you can use with Veritas File System and Veritas Volume Manager. The Simple Admin utility simplifies storage management by providing a single interface to the administrator and by abstracting the administrator from many of the commands needed to create and manage volumes, disks groups, and file systems.

You can download the Simple Admin utility for Veritas Storage Foundation from the following URL:

[http://www.symantec.com/business/products/agents\\_options.jsp?pcid=2245&pvid=203\\_1](http://www.symantec.com/business/products/agents_options.jsp?pcid=2245&pvid=203_1)

## About Veritas Operations Services

Veritas Operations Services (VOS) is a Web-based application that is designed specifically for Veritas CommandCentral and Veritas Storage Foundation and



High Availability products. VOS increases operational efficiency and helps improve application availability.

VOS automates and simplifies administrator tasks, including:

- Determining if systems are ready to install or upgrade Veritas products
- Gathering deployment and usage information on Veritas products
- Receiving notifications about the latest updates for:
  - Patches
  - Hardware Compatibility Lists (HCLs)
  - Array Support Libraries (ASLs)
  - Array Policy Modules (APMs)
- Determining whether your Veritas product configurations conform to best practices
- Managing server and environmental configuration data from a single Website
- Interpreting Unified Message Identifier (UMI) codes and their solutions
- Identifying and downloading patches for Veritas products

To access VOS, go to:

<http://vos.symantec.com/>

## Changes in Storage Foundation Cluster File System

This section describes the changes in Veritas Storage Foundation 5.1.

### Installation and upgrade

Storage Foundation Cluster File System installation and upgrade includes the following changes in 5.1:

#### Veritas keyless licensing

This release of the Veritas products introduces the option to install without a license key. A license key is used during the installation of a software to identify that the user has the right to use the software. Previous releases of Veritas products required that you obtain a license key prior to installation. The installer required that you enter a valid license key before the Veritas software was installed.

The keyless license strategy does not eliminate the need to obtain a license. A software license is a legal instrument governing the usage or redistribution of

copyright protected software. The administrator and company representatives must ensure that a server or cluster is entitled to the license level for the products installed. Symantec reserves the right to ensure entitlement and compliance through auditing.

In this release of the Veritas products, the product installer does not require that you enter a license key. The installer prompts you to select one of the following licensing methods:

- Install a license key for the product and features that you want to install.
- Continue to install without a license key.  
The installer prompts for the product modes and options that you want to install, and then sets the required product level.  
Within 60 days of choosing this option, you must install a valid license key corresponding to the license level entitled or continue with keyless licensing by managing the server or cluster with a management server. If you do not comply with the above terms, continuing to use the Veritas product is a violation of your end user license agreement, and results in warning messages.  
For more information about keyless licensing, see the following URL:  
<http://go.symantec.com/sfhakeyless>

If you upgrade to this release from a prior release of the Veritas software, the product installer does not change the license keys that are already installed. The existing license keys may not activate new features in this release.

If you upgrade with the product installer, or if you install or upgrade with a method other than the product installer, you must do one of the following to license the products:

- Run the `vxkeyless` command to set the product level for the products you have purchased. This option also requires that you manage the server or cluster with a management server.
- Use the `vxlicinst` command to install a valid product license key for the 5.1 products you have purchased.

You can also use the above options to change the product levels to another level that you are authorized to use.

Symantec recommends updating to keyless licensing for the following reasons:

- it enables 5.1 functionality.
- it allows you to change the product level easily.

For information about setting or changing the product level, see the Installation Guide for your Veritas product.

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

## Packaging updates

Table 1-1 lists the updates related to packages for this release.

**Table 1-1** List of packages

5.0 Package Name	5.1 Package name	Explanation of changes	Package description
N/A	VRTScps	New package.	Veritas Cluster Server Coordination Point Server
N/A	VRTSvcsea	New package.	Veritas Cluster Server Enterprise Agents
N/A	VRTSsfmh	New package.	Veritas Storage Foundation Managed Host
N/A	VRTSaslapm	New package.	Volume Manager ASL/APM
SYMClma	N/A	Obsolete in 5.0MP3. Functionality dropped.	Symantec License Inventory Agent
VRTSaa	VRTSsfmh	Consolidated into VRTSsfmh.	Veritas Enterprise Administrator action agent
VRTSacclib	N/A	Obsolete in 5.1. Not available for fresh installation. Only available to upgrade customers.	Veritas Cluster Server ACC Library 5.0 by Symantec
VRTSalloc	N/A	Obsolete in 5.1. Functionality dropped.	Veritas Storage Foundation Intelligent Storage Provisioning
VRTSat	VRTSat	No change.	Symantec Product Authentication Service
VRTScavf	VRTScavf	No change.	Veritas Cluster Server Agents for Storage Foundation Cluster File System
VRTSccg	VRTSsfmh	Consolidated into VRTSsfmh.	Veritas Enterprise Administrator Central Control Grid
VRTScfsdc	N/A	Obsolete in 5.0MP3. Documentation available in DVD media as PDFs.	Veritas Cluster File System Documentation

**Table 1-1** List of packages (*continued*)

5.0 Package Name	5.1 Package name	Explanation of changes	Package description
VRTScmccc	N/A	Obsolete in 5.1. Delivered with 5.x CMC release.	Veritas Cluster Management Console Cluster Connector
VRTScmcdc	N/A	Obsolete in 5.0MP3. Delivered with 5.x CMC release.	User Documentation for Veritas Cluster Management Console
VRTScmcm	N/A	Obsolete in 5.0MP3. Delivered with 5.x CMC release.	Veritas Cluster Management Console for multicluster environments
VRTScmcs	N/A	Obsolete in 5.1. Delivered with 5.x CMC release.	Veritas Cluster Management Console for single cluster environments
VRTScs	N/A	Obsolete in 5.0MP3. Delivered with SFM release.	Veritas Centralized Management for Storage Foundation Management Server
VRTScscm	N/A	Obsolete in 5.1. Available for download from <a href="http://go.symantec.com/vcsmc">http://go.symantec.com/vcsmc</a>	Veritas Cluster Server Cluster Manager
VRTScscw	N/A	Obsolete in 5.1.	Veritas Cluster Server Configuration Wizards
VRTScsdoc	N/A	Obsolete in 5.0MP3. Delivered with SFM release.	Veritas Enterprise Administrator Central Server Documentation
VRTScsocw	N/A	Obsolete in 5.1.	Veritas Cluster Server Oracle and RAC Configuration Wizards
VRTScssim	N/A	Obsolete in 5.1. Available for download from <a href="http://go.symantec.com/vcsmc">http://go.symantec.com/vcsmc</a> .	Veritas Cluster Server Simulator
VRTScutil	VRTScutil	Expanded to include few VCS packages.	Veritas Cluster Utility
VRTScweb	N/A	Obsolete in 5.0MP3. Delieverd with SFM release.	Veritas Enterprise Administrator Central Server Documentation

**Table 1-1** List of packages (*continued*)

5.0 Package Name	5.1 Package name	Explanation of changes	Package description
VRTSd2gui	N/A	Obsolete in 5.1. Functionality dropped.	Veritas Storage Foundation Graphical User Interface for DB2
VRTSdb2ed	N/A	Obsolete in 5.1. Functionality dropped.	Veritas Storage Foundation for DB2
VRTSdbac	VRTSdbac	No change.	Veritas Oracle Real Application Cluster Support Package
VRTSdbcom	VRTSdbed	Consolidated into VRTSdbed.	Veritas Storage Foundation Common Utilities for Databases
VRTSdbdoc	N/A	Obsolete in 5.0MP3. Documentation available in DVD media as PDFs.	Veritas Storage Foundation Documentation for Databases
VRTSdbed	VRTSdbed	Expanded to include DBED packages.	Veritas Storage Foundation for Oracle
VRTSdbms3	N/A	Obsolete in 5.1. Sybase ASA repository no longer used in 5.1.	Symantec Shared DBMS
VRTSdcli	N/A	Obsolete in 5.1.	Veritas Distributed Command Line Interface
VRTSdcp	N/A	Obsolete in 5.0MP3. Delieverd with SFM release.	Veritas Disk Correlator Provider
VRTSddlpr	N/A	Obsolete in 5.1. Functionality merged into VRTSob.	Veritas Device Discovery Layer Services Provider
VRTSdsa	N/A	Obsolete in 5.1. Functionality dropped.	Veritas Datacenter Storage Agent
VRTSdsm	N/A	Obsolete in 5.0MP3. Delieverd with SFM release.	Veritas Datacenter Storage Manager

**Table 1-1** List of packages (*continued*)

5.0 Package Name	5.1 Package name	Explanation of changes	Package description
VRTSfas	N/A	Obsolete in 5.0MP3. Functionality dropped.	Veritas FlashSnap Agent for Symmetrix
VRTSfasag	N/A	Obsolete in 5.0MP3. Functionality dropped.	Veritas Cluster Server Agents for Veritas FlashSnap Agent for Symmetrix
VRTSfasdc	N/A	Obsolete in 5.0MP3. Functionality dropped.	Veritas FlashSnap Agent for Symmetrix Documentation
VRTSfsdoc	N/A	Obsolete in 5.0MP3. Documentation available in DVD media as PDFs.	Veritas File System Documentation
VRTSfsman	VRTSvxf	Consolidated into VRTSvxf.	Veritas File System - Manual Pages
VRTSfsmnd	VRTSfssdk	Consolidated into VRTSfssdk.	Veritas File System SDK - Manual Pages
VRTSfspro	VRTSob	Consolidated into VRTSob.	Veritas File System Management Services Provider
VRTSfssdk	VRTSfssdk	No change.	Veritas File System SDK
VRTSfsweb	N/A	Obsolete in 5.0MP3. Delieverd with SFM release.	Veritas File System Provider Web Client Extension
VRTSgab	VRTSgab	No change.	Veritas Group Membership and Atomic Broadcast
VRTSgapms	N/A	Obsolete in 5.0MP3. Delieverd with SFM release.	Veritas Generic Array Plug-in for Mapping Services
VRTSgcscha	N/A	Obsolete in 5.0MP3. Delieverd with SFM release.	Veritas GCS high availability agents
VRTSgcspr	N/A	Obsolete in 5.0MP3. Delieverd with SFM release.	Veritas SAN Global Configuration Server Object Bus Provider

**Table 1-1** List of packages (*continued*)

5.0 Package Name	5.1 Package name	Explanation of changes	Package description
VRTSglm	VRTSglm	No change.	Veritas Global Lock Manager
VRTSgms	VRTSgms	No change.	Veritas Group Messaging Services
VRTSicsco	N/A	Obsolete in 5.1.	Symantec Infrastructure Core Services Common
VRTSjre	N/A	Obsolete in 5.0MP3.	Veritas Java Runtime Environment Redistribution
VRTSjre15	N/A	Obsolete in 5.1.	Symantec Java Runtime Environment Redistribution
VRTSllt	VRTSllt	No change.	Veritas Low Latency Transport
VRTSmapro	N/A	Consolidated into VRTSob.	Veritas Storage Mapping Provider
VRTSmh	VRTSsfmh	Consolidated into VRTSsfmh.	Veritas Storage Foundation Management host
VRTSob	VRTSob	No change.	Veritas Enterprise Administrator Service
VRTSobc33	N/A	Obsolete in 5.1. Functionality Delivered with SFM release	Veritas Enterprise Administrator Core
VRTSobgui	N/A	Obsolete in 5.1. Functionality Delivered with SFM release.	Veritas Enterprise Administrator
VRTSobweb	N/A	Obsolete in 5.1. Functionality Delivered with SFM release.	Veritas Enterprise Administrator Web Console
VRTSodm	VRTSodm	No change	Veritas Oracle Disk Manager
VRTSorgui	N/A	Obsolete in 5.1. No longer supported.	Veritas Storage Foundation Graphical User Interface for Oracle
VRTSpbx	N/A	Obsolete in 5.1.	Symantec Private Branch Exchange

**Table 1-1** List of packages (*continued*)

5.0 Package Name	5.1 Package name	Explanation of changes	Package description
VRTSperl	VRTSperl	No change.	Veritas Perl 5.8.8 redistribution
VRTSsmf	N/A	Obsolete in 5.0MP3.	Symantec Service Management Framework
VRTSspt	VRTSspt	No change.	Veritas Software Support Tools
VRTSsybed	N/A	Obsolete in 5.1. Functionality dropped.	Veritas Storage Foundation for Sybase
VRTSvail	N/A	Obsolete in 5.1. Functionality Delivered with SFM release.	Veritas Array Providers
VRTSvcsc	VRTSvcsc	Expanded to include few VCS packages.	Veritas Cluster Server
VRTSvcscag	VRTSvcscag	Expanded to include agents previously included in VRTSvcscvr.	Veritas Cluster Server Bundled Agents
VRTSvcscdb	VRTSvcscsea	Consolidated into VRTSvcscsea.	Veritas High Availability Agent for DB2
VRTSvcscdc	N/A	Obsolete in 5.0MP3. Documentation available in DVD media as PDFs.	User Documentation for Veritas Cluster Server
VRTSvcscmsg	VRTSvcsc	Consolidated into VRTSvcsc.	Veritas Cluster Server English Message Catalogs
VRTSvcscmn	VRTSvcsc	Consolidated into VRTSvcsc.	Manual Pages for Veritas Cluster Server
VRTSvcscor	VRTSvcscsea	Consolidated into VRTSvcscsea.	Veritas High Availability Agent for Oracle
VRTSvcscsy	VRTSvcscsea	Consolidated into VRTSvcscsea.	Veritas High Availability Agent for Sybase
VRTSvcscvr	VRTSvcscag	Consolidated into VRTSvcscag.	Veritas Cluster Server Agents for Veritas Volume Replicator



**Table 1-1** List of packages (*continued*)

5.0 Package Name	5.1 Package name	Explanation of changes	Package description
VRTSvdid	N/A	Obsolete in 5.1.	Veritas Device Identification API
VRTSvlic	VRTSvlic	No change.	Symantec License Utilities
VRTSvmdoc	N/A	Obsolete in 5.0MP3. Documentation available in DVD media as PDFs.	User Documentation for Veritas Volume Manager
VRTSvmman	VRTSvxvm	Consolidated into VRTSvxvm.	Manual Pages for Veritas Volume Manager
VRTSvmpro	N/A	Consolidated into VRTSob.	Veritas Volume Manager Management Services Provider
VRTSvmweb	N/A	Obsolete in 5.0MP3. Delivered with SFM release.	Veritas Volume Manager Management Services Web Client Extensions
VRTSvrdoc	N/A	Obsolete in 5.0MP3. Documentation available in DVD media as PDFs.	User Documentation for Veritas Volume Replicator
VRTSvrpro	N/A	Consolidated into VRTSob.	Veritas Volume Replicator Management Services Provider
VRTSvrw	N/A	Obsolete in 5.1. Delivered with SFM release.	Veritas Volume Replicator Web Console
VRTSsvsc	N/A	Obsolete in 5.0MP3.	Veritas Volume Server and Client Provider
VRTSvxfen	VRTSvxfen	No change.	Veritas I/O Fencing
VRTSvxfs	VRTSvxfs	Expanded to include VRTSfsman (man pages). On Linux: VRTSvxfs-common and VRTSvxfs-platform packages are consolidated into single VRTSvxfs package.	Veritas File System

**Table 1-1** List of packages (*continued*)

5.0 Package Name	5.1 Package name	Explanation of changes	Package description
VRTSvxmsa	N/A	Obsolete in 5.1. Functionality dropped.	Veritas VxMS Mapping Service, Application Libraries
VRTSvxvm	VRTSvxvm	Expanded to include VRTSvxman (man pages). On Linux: VRTSvxvm-common and VRTSvxvm-platform packages are consolidated into single VRTSvxvm package.	Veritas Volume Manager binaries
VRTSweb	N/A	Obsolete in 5.1.	Symantec Web Server

## Install options for Storage Foundation High Availability and the Storage Foundation Cluster File System High Availability

The product installation programs now prompt you for whether you want to install the high availability packages when you are installing Storage Foundation or Storage Foundation Cluster File System. This change enables you to explicitly choose which functionality is installed. In previous releases, the installed license key determined what functionality was installed.

The product installer displays Storage Foundation High Availability and Storage Foundation Cluster File System High Availability on the product selection menu.

## Improved response file generation

You can now create response files without performing a live installation, using the installation simulator.

## Option to install only the minimal packages

The product installer now provides several options for which packages to install. For each product, you can install the minimal packages, the recommended packages or all of the packages.

When you install with the product installer, you can select from one of the following install options:

- Minimal packages: installs only the basic functionality for the selected product.
- Recommended packages: installs the full feature set without optional packages.

- All packages: installs all available packages.

When you install with a product install script, such as `installsf`, you can use the following options to the install script:

- `-minpkgs`: displays the packages and patches required for basic functionality.
- `-recpkgs`: displays the recommended packages and patches.
- `-allpkgs`: displays all available packages and patches.

## Veritas extension for Oracle Disk Manager package is installed by default for Storage Foundation and Storage Foundation Cluster File System

The Veritas extension for Oracle Disk Manager package is supported with a Storage Foundation license.

In this release, the product installer now installs the required package for ODM by default when Storage Foundation is installed.

For Storage Foundation Cluster File System, the GMS `VRTSgms.pkg` package is also installed.

## Change in Storage Foundation Cluster File System packaging standard on Solaris

With this release, the Storage Foundation Cluster File System packages on Solaris use the Solaris single file package standard and not the compressed packages. This change eliminates the need to copy the packages to a temporary directory, unzip and extract these packages, and then install. You can now directly install the packages from the product disc.

## Rootpath option to uninstall scripts

The `-rootpath` option is used to specify the path from where the packages must be uninstalled. You must use this option if you did not install the packages on the default location.

On Solaris, `-rootpath` passes `-R <root_path>` to `pkgrm`.

## Option to create response file templates

You can use the `-makeresponsefile` option of the installer to create response file templates.

The installer also generates a response file after each successful installer task, such as installation, configuration, uninstallation, or upgrade. These response

files contain the details that you provided to the installer questions in the form of values for the response file variables. The response file also contains descriptions and explanations of the variables and their values.

See the *Veritas Storage Foundation Cluster File System Installation Guide*.

## **Option to start or stop Storage Foundation Cluster File System HA**

After the installation and configuration is complete, the installer starts the processes that the installed products use. You can use the product installer to stop or start the processes and load or unload the drivers, if required.

See the *Veritas Storage Foundation Cluster File System Installation Guide* for more details.

## **Support for installer resilience**

If an installation or upgrade of Storage Foundation Cluster File System is interrupted, the next time you re-run it the installer discovers the presence of an installer instance. The installer then gives an option to resume the installation or upgrade.

See the *Veritas Storage Foundation Cluster File System Installation Guide* for more details.

## **Installer does not proceed with installation in RSH/SSH disabled environments**

In the previous releases of Storage Foundation Cluster File System, in certain secure enterprise environments where RSH or SSH communication was not enabled, the installer installed and configured Storage Foundation Cluster File System only on the local system and the systems with which it could communicate. The installer also generated a response file that you could copy to the other systems in the cluster to identically install and configure Storage Foundation Cluster File System on other systems.

With this release of Storage Foundation Cluster File System, the installer mandates the availability of either RSH or SSH communication between the systems to perform any installer task.

## **Support for Web-based installer**

This release supports an interactive installation using the Web-based installer. You can use a Web-interface to install and configure Storage Foundation Cluster File System HA.

The Web-installer can perform the following functions:

- Install Storage Foundation Cluster File System HA
- Uninstall Storage Foundation Cluster File System HA
- Configure Storage Foundation Cluster File System HA
- Upgrade Storage Foundation Cluster File System HA
- Start and stop Storage Foundation Cluster File System HA
- Perform an installation precheck

## The installer program's default answer is no to configure optional features

The installer's default answer to configure optional features is now no. You must enter y if you want to configure certain optional features.

## Gathering requirements using the installer program

You can use the `-requirements` option of the installer to gather the installation requirements. Web-based installer also provides you with a similar option.

The following information is displayed:

- Required operating system level
- Required patches
- Required disk space
- Other requirements

## Support to continue installation after a successful precheck

The installer program has more sophisticated precheck, installation, and configuration options, which follow in outline:

- When you perform a successful precheck, you have the option to continue with the installation.
- After a successful installation, you have the option to continue with the configuration, or you can return to the configuration later.

## Selecting default systems for installation

From the local system, the installer program checks for the `/etc/llthosts` for node names. When found, the installer program presents these as default nodes for

installation. If the `llhosts` file is not present, then no default node names are provided.

## Communication modes

By default, the installer program uses SSH for communication. The installer program switches to RSH if password-less SSH is not enabled.

For RSH communication, the `-rsh` option is available.

The installer programs supports mixed RSH and SSH modes on nodes in a cluster. The installation program can install on systems which may have heterogeneous (RSH and/or SSH) communication modes enabled.

## IPv6 support for the installer programs

You can now use the installer to install and configure Storage Foundation Cluster File System HA on systems with IPv4, IPv6, or mixed stack configurations.

## Adding a node using the `-addnode` option

The `-addnode` option has been added to the installer to add a node to a running cluster. Based on the existing cluster configuration, the installer also configures the new node to use Symantec Product Authentication service and to use I/O fencing.

The installer also supports adding a node to a single node cluster, but stops the cluster during the addition of the node.

## Installer support for alternate boot disk

The installer program supports install, uninstallation, and upgrades on alternate boot disks for Solaris.

Refer to the *Veritas Storage Foundation Cluster File System Installation Guide's* section on Live Upgrade.

## Silent and automated installation enhancements for response files

The installer program supports silent installations using response files.

Operations that you can perform using response files follow:

- Fresh installations
- Configurations
- Uninstallations

- Upgrades from previous supported releases

## Using aggregate links during installation

The installer program asks if you want to use an aggregate NIC, if so it configures the llttab file for you. Note that the installer program does not detect aggregate links.

## Command options to help troubleshoot installations

You can run the installer with the `-debug` option and the `-trace` option to troubleshoot an installation.

## Supported paths for SFCFS upgrades that do not require a system reboot

When you perform a typical upgrade using the installer program from SFCFS version 5.0 MP3 to SFCFS version 5.1, a system reboot is not required.

Upgrades that follow any other upgrade paths require a reboot.

## Changes related to the installer for cross-product upgrades

This release includes the following change related to the cross-product upgrades.

If you try to perform a cross-product upgrade, the installer now gracefully exits with an error message.

For example, if you choose to upgrade SFCFS 5.0 MP3 to SF Oracle RAC 5.1, the installer displays the following error message:

```
SFCFS 5.0.30.00 is installed.  
Upgrading SFCFS 5.0.30.00 directly to SFRAC 5.1 is not supported.
```

The installer does not support a direct upgrade from a previous SFCFS version to SF Oracle RAC version 5.1. You must upgrade SF or SFHA to version 5.1, and then install the 5.1 version of the stack product.

See the appropriate product Installation Guides for upgrade instructions.

See the *Veritas Storage Foundation Cluster File System Installation Guide* for supported upgrade paths.

# Storage Foundation Cluster File System

Storage Foundation Cluster File System includes the following changes in 5.1:

## Veritas Enterprise Administrator Graphical User Interface

The Veritas Enterprise Administrator (VEA) console is no longer packaged with Storage Foundation products. Symantec recommends use of Storage Foundation Manager to manage, monitor and report on Storage Foundation product environments. You can download this utility at no charge at <http://go.symantec.com/vom>. If you wish to continue using VEA, a version is available for download from <http://go.symantec.com/vom>.

## Addition of Storage Foundation for Databases (SFDB) functionality

Storage Foundation for Cluster File System previously provided enhanced I/O methods to improve database performance and a set of tools for ease of management of storage in a database environment:

- Veritas extension for Oracle Disk Manager (ODM)
- Veritas extension for Cached Oracle Disk Manager (Cached ODM)
- Veritas Quick I/O
- Veritas Cached Quick I/O
- Storage Checkpoints
- FlashSnap
- Dynamic Storage Tiering

For information on the I/O and database management features available with a Standard license:

See the *Veritas Storage Foundation Advanced Features Guide*.

For release 5.1, the Storage Foundation for Databases (SFDB) feature for enhanced management of Oracle databases is included with Enterprise licensing for Storage Foundation Cluster File System and Storage Foundation Cluster File System HA.

The SFDB tools provide enhanced ease-of-use commands which can be run by a database administrator without root privilege to optimize storage for an Oracle database environment. This extended functionality is supported for configurations with single instance Oracle and includes the following:

- Database Checkpoints
- Database FlashSnap
- Database Cloning
- Database Dynamic Storage Tiering



For information on using SFDB tools, see the *Veritas Storage Foundation: Storage and Availability Management for Oracle Databases* guide.

### SFDB new features

New features in the Storage Foundation for Databases tools package for database storage management for release 5.1:

- SQLite repository
- Multiple disk group support for FlashSnap
- Mapped mount points for individual volumes for Database Flashsnap clones
- Oracle Dataguard support
- Oracle Enterprise Manager (OEM) Plugin
- Cached ODM support

### SFDB feature changes

If you are upgrading from Storage Foundation for Oracle (HA) 4.x or 5.0 to Storage Foundation for Cluster File System 5.1, the following changes in functionality will apply.

Commands which have changed:

- `sfua_db_config` functionality is changed: this command is no longer needed to create a SFDB repository. The functionality of `sfua_db_config` is now used to set user and group access to various SFDB directories.
- Use the `dbed_update` command to create a new SQLite SFDB repository.
- `sfua_rept_adm` was used in release 5.0 to perform repository backup and restore and this command will be obsolete in release 5.1.
- The `sfua_rept_util` command is used to perform SQLite repository backup and restore.
- The `sfua_rept_migrate` command is added for migrating the SFDB repository from the 4.x or 5.0 release to the 5.1 release.

Commands which continue to be supported:

- `dbed_update`
- Database Storage Checkpoint commands: `dbed_ckptcreate`, `dbed_ckptdisplay`, `dbed_ckptmount`, `dbed_ckptquota`, `dbed_ckptremove`, `dbed_ckptrollback`, `dbed_clonedb`, `dbed_ckptumount`
- Quick I/O commands: `qio_getdbfiles`, `qio_recreate`, `qio_convertdbfiles`

- **Database Flashsnap commands:** `dbed_vmchecksnap`, `dbed_vmclonedb`, `dbed_vmsnap`
- **Database Dynamic Storage Tiering commands:** `dbdst_addvol`, `dbdst_admin`, `dbdst_classify`, `dbdst_convert`, `dbdst_file_move`, `dbdst_partition_move`, `dbdst_preset_policy`, `dbdst_rmvol`, `dbdst_show_fs`, `dbdst_tbs_move`, `dbdst_report`

### SFDB features which are no longer supported

Commands which are no longer supported in release 5.1:

- **ORAMAP** (`libvxoramap`)
- **Storage mapping commands** `dbed_analyzer`, `vxstorage_stats`
- **DBED providers (DBEDAgent), Java GUI, and `dbed_dbprocli`.**  
The SFDB Oracle features can only be accessed through the command line interface. However, Veritas Storage Foundation Manager 2.1 (a separately licensed product) can display Oracle database information such as tablespaces, database to LUN mapping, and tablespace to LUN mapping.
- **Storage statistics: commands** `dbdst_makelbfs`, `vxdbs_fstatsummary`, `dbdst_fiostat_collector`, `vxdbs_get_datafile_stats`
- `dbed_saveconfig`, `dbed_checkconfig`
- `dbed_ckptplan`, `dbed_ckptpolicy`
- `qio_convertdbfiles -f` option which is used to check for file fragmentation
- `dbed_scheduler`

The following features are longer supported in release 5.1:

- Storage Foundation for DB2 tools
- Storage Foundation for Sybase tools

### Storage Foundation Cluster File System complies with Solaris 10 Service Management Facility (SMF)

Storage Foundation Cluster File System 5.1 complies with Solaris Service Management Facility (SMF). For more information about SMF, refer to the Sun website.

## Clustered NFS Support

This new Clustered NFS (CNFS) feature is expected to gracefully handle failure of any node and reclaim the advisory locks taken by NFS clients in such a way as to not accidentally lose any existing lock grants without notification.

See the *Veritas Storage Foundation Cluster File System Administrator's Guide* for more information.

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

## Storage Foundation Cluster File System supports mixed cluster environments

In previous releases, all nodes in a Storage Foundation Cluster File System must have the same operating system version and update level. In this release, you must have the same architecture, but can have mixed cluster environments with Solaris 9 and Solaris 10 SPARC operating systems.

## Oracle Disk Manager driver

Prior to this release, the `VRTSodm` package has the `/etc/init.d/odm` script that is used to manage the ODM driver and mount point. The script is applicable to Solaris 9 and 10 on SPARC and Solaris 10 x86\_64.

In the `/etc/init.d/odm` script, it has the `start`, `stop`, `restart`, and `status` options. For example, the `start` option starts the ODM driver by loading the driver into the running Solaris kernel and creates a mount point (`/dev/odm`).

On a system where the `VRTSodm` package is installed, you can execute the `/etc/init.d/odm` script as user `root`.

```
# /etc/init.d/odm start
```

On Solaris 10 SPARC and x86-64, Sun Microsystems implemented a new facility called the Service Management Facility (SMF). One of the services in the SMF is a new interface to replace the scripts or tasks that are located in the `/etc/init.d` directory. When a driver or application is brought under the SMF management, the SMF user interface must be used. The corresponding scripts in the `/etc/init.d` directory must be removed from the system.

In this release, the ODM driver on Solaris 10 is converting the management of the ODM driver to use the SMF. In SMF, the ODM driver is identified as `vxodm`.

On Solaris 9, where `VRTSodm` package is supported, you should continue to use the `/etc/init.d/odm` script.

On Solaris 10 systems, after you installed the SMF aware `VRTSsodm` package and rebooted the system, the `svcs(1)` command is used to list the status of the ODM driver.

To perform operations using the SMF interface on Solaris 10 in non-global zones:

See the *Veritas Storage Foundation High Availability Virtualization Guide* for more information on Veritas extension for Oracle Disk Manager.

To display the status of the ODM driver, type:

```
# /usr/bin/svcs vxodm
STATE      STIME      FMRI
online     15:29:07  svc:/system/vxodm:default
```

The `svcs vxodm` is equivalent to `/etc/init.d/odm status`.

To stop the ODM driver, type:

```
# /usr/sbin/svcadm disable vxodm
# /usr/bin/svcs vxodm
STATE      STIME      FMRI
disabled   14:02:45  svc:/system/vxodm:default
```

The `svcadm disable vxodm` is equivalent to `/etc/init.d/odm stop`.

To start the ODM driver, type:

```
# /usr/sbin/svcadm enable vxodm
# /usr/bin/svcs vxodm
STATE      STIME      FMRI
online     15:29:24  svc:/system/vxodm:default
```

The `svcadm enable vxodm` is equivalent to `/etc/init.d/odm start`.

The `restart` option is used to disable and then enable the ODM driver.

To restart the ODM driver, type:

```
# /usr/sbin/svcadm restart vxodm
# /usr/bin/svcs vxodm
STATE      STIME      FMRI
online     15:30:56  svc:/system/vxodm:default
```

The `svcadm restart vxodm` is equivalent to `/etc/init.d/odm restart`.

In SMF, there is also a `refresh` option that is used to re-read the ODM service configuration file that is found in the `/var/svc/manifest/system/vxodm/odm.xml` file.

To refresh the ODM service configuration file, type:

```
# /usr/sbin/svccadm refresh vxodm
```

On standalone and cluster environment, the same SMF commands are used. There is no change to the ODM's GAB port d implementation in the cluster environment.

The ODM driver is dependent on the VxFS driver. The VxFS's SMF service is identified by the name `vxfsldlic`. The `vxfsldlic` SMF service must be online before the `vxodm` SMF service can come online. In a cluster environment, the `vxodm` SMF service is dependent on the GAB's SMF service. The GAB SMF service is identified by the name `gab`. You can use the `svcs(1)` command to list the status for the `vxfsldlic` and the `gab` SMF services.

To display the status for the `vxfsldlic` SMF service, type:

```
# svcs vxfsldlic
STATE          STIME          FMRI
online         Apr_01        svc:/system/vxfs/vxfsldlic:default
```

To display the status for the `gab` SMF service, type:

```
# svcs gab
STATE          STIME          FMRI
online         Apr_01        svc:/system/gab:default
```

## Storage Foundation for Databases supported features

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**Note:** Storage Foundation Cluster File System supports running SFDB tools with Oracle databases only.

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For the most current information on Storage Foundation Cluster File System products and single instance Oracle versions supported, see:

<http://entsupport.symantec.com/docs/331625>

## System requirements

This topic includes system requirements for 5.1

## Hardware and software requirements

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://entsupport.symantec.com/docs/330441>

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

## Supported Solaris operating systems

This release of the Veritas products is supported on the following Solaris operating systems:

- Solaris 9 (SPARC Platform 32-bit and 64-bit)
- Solaris 10 (SPARC or x64 Platform 64-bit)

If necessary, upgrade Solaris before you install the Veritas products.

Install all the latest required Solaris patches listed in the product *Release Notes*.

See “Required Solaris patches” on page 30.

For information about the use of this product in a VMware Environment on Solaris x64, refer to <http://entsupport.symantec.com/docs/289033>

For important updates regarding this release, review the Late-Breaking News TechNote on the Symantec Technical Support website:

<http://entsupport.symantec.com/docs/334829>

## Required Solaris patches

Before installing Veritas Storage Foundation, ensure that the correct Solaris patches are installed.

See <http://sunsolve.sun.com> for the latest Solaris patch updates.

The following patches are required for Solaris SPARC:

**Table 1-2** Solaris SPARC patches

Operating system	Sun patch number
Solaris 9	114477-04 122300-29 - required for Live Upgrade

**Table 1-2** Solaris SPARC patches (*continued*)

Operating system	Sun patch number
Solaris 10	118833-36
	118918-24
	119254-70
	119578-30
	120011-14
	120272-25
	123839-07
	125503-02
	125547-02
	125731-05
	125891-01
	126419-02
	126540-02
	126897-02
	127127-11
127755-01	

The following patches are required for Solaris x64:

**Table 1-3** Solaris x64 patches

Operating system	Sun patch number
Solaris 10	118344-14
	118855-36
	119043-11
	119131-33
	120012-14
	125732-05
	127128-11

## Veritas File System requirements

Veritas File System requires that the values of the Solaris variables `lwp_default_stksize` and `svc_default_stksize` are at least 0x6000. When you install the Veritas File System package, `VRTSvxfs`, the `VRTSvxfs` packaging scripts check the values of these variables in the kernel. If the values are less than the required values, `VRTSvxfs` increases the values and modifies the `/etc/system` file with the required values. If the `VRTSvxfs` scripts increase the values, the installation proceeds as usual except that you must reboot and restart the installation program. A message displays if a reboot is required.

To avoid an unexpected need for a reboot, verify the values of the variables before installing Veritas File System. Use the following commands to check the values of the variables:

```
# echo "lwp_default_stksize/X" | mdb -k
lwp_default_stksize:
lwp_default_stksize:          6000

# echo "svc_default_stksize/X" | mdb -k
svc_default_stksize:
svc_default_stksize:          6000
```

If the values shown are less than 6000, you can expect a reboot after installation.

---

**Note:** The default value of the `svc_default_stksize` variable is 0 (zero), which indicates that the value is set to the value of the `lwp_default_stksize` variable. In this case, no reboot is required, unless the value of the `lwp_default_stksize` variable is too small.

---

To avoid a reboot after installation, you can modify the `/etc/system` file with the appropriate values. Reboot the system prior to installing the packages. Appropriate values to the `/etc/system` file are shown in the following examples:

```
set lwp_default_stksize=0x6000
set rpcmod:svc_default_stksize=0x6000
```

## Storage Foundation Cluster File System node requirements

Solaris Storage Foundation 5.1 Cluster File System supports mixed cluster environments with Solaris 9 and Solaris 10 SPARC operating systems as long as all the nodes in the cluster have the same CPU architecture.

## Disk space requirements

Before installing any of the Veritas Storage Foundation products, confirm that your system has enough free disk space.

Use the "Perform a Preinstallation Check" (P) menu or the `-precheck` option of the product installer to determine whether there is sufficient space.

```
# ./installer -precheck
```



## Storage Foundation and High Availability Solutions 5.1 patches

Symantec strongly recommends that you install Storage Foundation and High Availability Solutions (SFHA) 5.1 Patch 1 immediately after you install SFHA 5.1.

The patch for Solaris SPARC is available at the following URL:

<https://vos.symantec.com/patch/detail/2960>

The patch for Solaris x64 is available at the following URL:

<https://vos.symantec.com/patch/detail/2961>

## Component product release notes

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

The component product release notes for this release are included as PDF files on the software disc:

- *Veritas Storage Foundation Release Notes* (`sf_notes.pdf`)
- *Veritas Storage Foundation for Oracle RAC Release Notes* (`sfrac_notes.pdf`)
- *Veritas Cluster Server Release Notes* (`vcs_notes.pdf`)

## Software limitations

The following sections describe Storage Foundation Cluster File System software limitations that exist in this release.

See the *Veritas Cluster Server Release Notes* for VCS software limitations.

### Veritas Storage Foundation Cluster File System software limitations

There are no Veritas Storage Foundation Cluster File System software limitations in the 5.1 release.

### Veritas Volume Manager software limitations

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

## **Cluster Volume Manager (CVM) fail back behavior for non-Active/Active arrays (1441769)**

This describes the fail back behavior for non-Active/Active arrays in a CVM cluster. This behavior applies to A/P, A/PF, APG, A/A-A, and ALUA arrays.

When all of the Primary paths fail or are disabled in a non-Active/Active array in a CVM cluster, the cluster-wide failover is triggered. All hosts in the cluster start using the Secondary path to the array. When the Primary path is enabled, the hosts fail back to the Primary path. However, suppose that one of the hosts in the cluster is shut down or brought out of the cluster while the Primary path is disabled. If the Primary path is then enabled, it does not trigger failback. The remaining hosts in the cluster continue to use the Secondary path. When the disabled host is rebooted and rejoins the cluster, all of the hosts in the cluster will continue using the Secondary path. This is expected behavior.

For A/P,APG, A/A-A, and ALUA arrays, if the disabled host is rebooted and rejoins the cluster before the Primary path is enabled, enabling the path does trigger the failback. In this case, all of the hosts in the cluster will fail back to the Primary path.

## **Volume Manager object names cannot include non-ASCII characters (Japanese and Chinese locales)**

Volume Manager object names cannot include any non-ASCII characters. The limitation applies to both Japanese and Chinese locales.

## **Veritas File System software limitations**

The following are software limitations in this release of Veritas File System

### **Cached ODM**

You can enable Cached ODM only for files on local file systems. It can not be enabled for files on Cluster File System.

## **Veritas Storage Foundation and High Availability features not supported on Solaris x64**

The following Storage Foundation and High Availability features that are supported on Solaris SPARC and not supported on Solaris x64:

- Application Templates
- Disk layout versions 4 and 5

- Data Management Application Programming Interface (DMAPI)
- Veritas Cluster Server (VCS) gabdisk support
- Storage Foundation Manager (SFM) client only
- Storage Foundation database editions for DB2
- Localization (L10N)

## Fixed issues

The following sections describe Storage Foundation Cluster File System issues that were fixed in this release.

See the *Veritas Cluster Server Release Notes* for VCS fixed issues.

## Veritas Storage Foundation Cluster File System fixed issues

All Veritas Storage Foundation Cluster File System 5.1 includes fixed issues from 5.0 and later unless otherwise noted.

[Table 1-4](#) describes fixed issues in the Veritas Storage Foundation Cluster File System 5.1 release.

**Table 1-4** Veritas Storage Foundation Cluster File System 5.1 fixed issues

Incident	Description
1414489	Fixed an issue in ODM related to post commit transaction.
1512161	Improved <code>mmap</code> shared performance on SFCFS.
1544221	Fixed CFS: <code>getattr</code> call optimization to speedup the case when binaries are being <code>mmap</code> d from many nodes on CFS.
1663269	Fixed a panic that was due to bad inode errors in an SFCFS environment.
1714229	Fixed the duplicate mount entries found for a VxFS file system in a cluster.
1792136	Fixed a deadlock that occurred in IGLOCK.
1805983	Fixed a panic in <code>vxfs:vx_loadedele</code> that was due to a NULL pointer dereference.
1854700	Fixed the cause of inode errors on SFCFS file systems.

[Table 1-5](#)

**Table 1-5** Veritas Storage Foundation Cluster File System 5.0 MP3 RP2 fixed issues

Incident	Description
1286525	Fixed an issue in which Java threads hung on SFCFS functions.
1518713	The <code>vxfsckd -n</code> command now initializes the <code>nthrs</code> variable.
1531031	Fixed an issue in which quota hard limits could be exceeded on a clustered file system.
1539892	Fixed an issue in which a clustered file system that was mounted on one node required <code>fsck</code> to be run.
1556159	Fixed an issue in which adding a file system to a diskgroup caused the monitor to label the <code>cvmvoldg</code> resource as offline, which in turn caused other CFS file systems to become offline.
1591783	Optimized <code>getattr()</code> to operate faster when binaries are mmapped from many nodes.
1600241	Fixed the cause of a hang that occurred after another node in the cluster crashed.

**Table 1-6**

**Table 1-6** Veritas Storage Foundation Cluster File System 5.0 MP3 RP1 fixed issues

Incident	Description
1447197	Fixed an issue after a 5.0 MP3 upgrade, CFSMountAgent restarts and is not sending alive messages.

## Veritas Volume Manager and Veritas Volume Replicator fixed issues

The Storage Foundation Cluster File System 5.1 includes cumulative fixes for Veritas Volume Manager and Veritas Volume Replicator since the 5.0MP3 release. The following tables describe these fixed issues.

[Table 1-7](#) describes fixed issues in the Veritas Volume Manager 5.1 release.

**Table 1-7** Veritas Volume Manager and Veritas Volume Replicator 5.1 fixed issues

Incident	Description
1822681	memory leak in vxio/voldr1_cleansio_start. [SUN bug ID: 6846549]
1822200	VRAS:Diff sync failed when remaining sync size is 4TB.
1819777	Panic issue in voldiosio_start() as race window exists while handling duplicate DA records
1810749	CR 6874695 - vxlustart -V deleted existing BEs [SUN bug ID: 6874695]
1805826	panic in vol_klog_clear_trans on Solaris x86
1804262	VVR:File system I/O of size bigger than 256k fails with error ENXIO after 2TB(>2G blocks)offset.
1797540	VxVM: vxdisk resize intermittently causes vxconfigd to dump core.
1795541	vxddladm disablelvscsi does not work for this customer
1782036	Sun: SC cannot open libvxvmc.so after upgrade to 5.1 [SUN bug ID: 6864609]
1779257	VVR:Disable Secondary logging through a tunable.
1765779	Man Page change for vxiod
1764972	vxdiskadm option 5 fails with "/usr/lib/vxvm/voladm.d/bin/disk.repl"
1762561	DMP: System panic when perform excludearray operation with powerpath
1762534	vxdctl settz and vxconfigd core dump if TZ environment variable is not set.
1755869	tunable addition: gabmaxsend and receiver flowcontrol watermark
1755830	kmsg: sender: the logic for resend of messages needs to be optimized
1755810	kmsg: sender thread is woken up unnecessarily during flowcontrol
1755788	for a broadcast message, sender thread may end up sending the same message multiple times (not resend)
1755735	recovery I/Os get broken down to voliomem_chunk_size

**Table 1-7** Veritas Volume Manager and Veritas Volume Replicator 5.1 fixed issues (*continued*)

Incident	Description
1755707	vxtask list shows the same taskid for parent and child tasks
1755689	During recovery, -o delayrecover option does not work as expected for value of 0
1755628	kmsg layer: with heavy messaging in the cluster the receiver thread slows down processing
1755519	kmsg layer: receiver side flowcontrol is not supported
1755466	vol_find_ilock: searching of ilock is inefficient
1745992	CVR:I/O hang in 4 node CVR cluster
1744672	Oakmont::Primary slave hangs in volcvm_rvgrecovery_send_iocont() TC remote_write_reconfigure_2.tc
1744224	FMR3: multiple vxplex attach cmds running in parallel on a volume lead to clearing DCO map and subsequently lead to corruption
1742702	vxvmconvert fails, probably due to wrong disk capacity calculation
1739513	while mirroring 1 tb storage,after 800gb all VM commands hangs
1733811	System panic on voldco_isdirty code path while doing vxsnap make operation after upgrading from DCO version 10
1732200	[DMP][Usability] When NEW dmp_native_multipathing tunable is set to 'on' - unlabelled LUNs vanish from format until turned off
1728587	VVR: Replication started with a checkpoint remains inconsistent/cant_sync after SRL is drained if the replication is interrupted
1728269	Incorrect cur_pri_path updation for A/PG arrays leading to dmp database inconsistency
1725041	VVR: VRAS: vradm admin addsec fails with "V-5-52-502 Host name or IP XXX.YYY.ZZZ is not configured or available on the Primary."
1722984	Memory leak in vold_dg_get_clone_disks() .
1718008	Unable to initialize EFI LUNs controlled by EMC Powerpath driver, vxprtvtoc "Syntax Error" occurs.
1715889	Unable to encapsulate an unmanaged EMC DMX PP LUN

**Table 1-7** Veritas Volume Manager and Veritas Volume Replicator 5.1 fixed issues (*continued*)

Incident	Description
1711269	System hang showing kmsg receiver thread hogging CPU
1710030	AIX: Issue with LUN size more than TB
1678370	VM_VVR: RLINK disconnected and "vx" commands hung on Secondary while load in progress
1678292	[SxRT sparc/x64] vxdmpadm get tpdnodename error [SUN bug ID: 6850933]
1677217	DMP does not autofailback to the Primary paths following LCC card restoration.
1676061	System panic'd after 2 out of 4 paths to disk were removed.
1674847	Fixed an issue with vxconfigd not starting after a system reboot.
1673764	vxconfigd loses licensing information
1673002	Need to remove thousands of empty /tmp/vx.* directories.
1653972	VxVM volume device permissions change after running 'scgdevs' (Suncluster) command [SUN bug ID: 6835347]
1638494	VVR:vxnetd stop causing 100% CPU & vx commands hanging
1638174	oakmont:vxconfigd memory leak found
1637514	Issues with tentative evacuation of disks, when aborted in between using vxevac
1594928	Avoid unnecessary retries on error buffers when disk partition is nullified.
1592700	cvmvoldg monitor failed due to awk: Input line cannot be longer than 3,000 bytes - VRTScavf 5.0.31.0
1591146	mirrored volume grow doesn't works well if "mirror=enclosure" option is used, it leads to data corruption issue.
1589018	num_retries field is getting re-initialized to initial value leading to looping and delay in error handling time.

**Table 1-7** Veritas Volume Manager and Veritas Volume Replicator 5.1 fixed issues (*continued*)

Incident	Description
1588978	vxdmpadm getattr arrayname <array> partitionsize misreports DEFAULT partitionsize for subsequent entries
1555461	DMP did not handle the failure in one half of the customer SAN
1545999	Oracle hangs from time to time - VxVM 5.0 MP3 on RHEL5
1545835	vxconfigd core dump during system boot after VxVM4.1RP4 applied.
1543908	While running vxevac command, Oracle process thread stuck into ogetblk() which leads to i/o hang.
1541662	System panicked in DRL code when running flashsnap
1538053	CVM_MSG_REQ_GSLOCK repeatedly resent resulting in hang
1537821	VxVM private buffer's b_fsid field is not set properly, which breaks PRM
1531406	Race condition between Dynamic Reconfiguration thread and DMP error analysis code path lead to panic in gendmpiodone.
1530126	DMP : dmplinux_unplug() panic on linux, for no associated node in dmpnode
1517760	VRAS: vradmind core dump if stats collection is enabled
1510252	I/Omem chunks are not combined, causing panic at module unload time
1506690	VxVM utility scripts assume DA name is a valid path name.
1505434	VxVM:LDOM: Volume becomes inaccessible from the guest in the event of primary domain reboot [SUN bug ID: 6795836]
1503309	VxVM: DMP doesn't log error returned from below driver/SCSI.
1483298	Man page for vxdctl does not include all options that are listed in -H. [SUN bug ID: 6790194]
1480102	dmp disabled all paths of EVA8100 even though just unplugged primay FC cables



**Table 1-7** Veritas Volume Manager and Veritas Volume Replicator 5.1 fixed issues (*continued*)

Incident	Description
1475710	For VxVM patches the postinstall script must not copy /usr/lib/libthread to /etc/vx/slib/ [SUN bug ID: 6716991]
1475703, 1369599	Export API libvxvm_get_disks() and libvxvm_get_subpaths() should return the same path for the same device [SUN bug ID: 6399937]
1475697	Provide an API for checking multi- ownership and status of a diskgroup [SUN bug ID: 6308791]
1475692	The size of large VxVM volumes must be reported correctly to Solaris utilities [SUN bug ID:6571880]
1475691	VxVM should recognize disks in use by ZFS or SVM [SUN bug ID: 6672721, 670507, 6715158]
1471821	'initdmp' section in vxdctl manpage still incorrect
1471784	[5.0MP3RP1 x64] vm can not create stripe-mirror/mirror-stripe/mirror volume with maxsize. [SUN bug ID: 6844425]
1471771	vxdisksetup should call 'mount' with complete pathname
1471606	Solaris: patch/package scripts needs to sync boot archive for sparc as well x86 for 2.10u6. [SUN bug ID: 1471606]
1471581	vxconfigd may hang if no SCSI timeout value is set while issuing various SCSI commands
1471487	Critical Minimum Queue and Round-robin Improvements
1471263	machine has panicked when added the disk from dg as a foreign device using "vxdmpadm addforeign". [SUN bug ID: 6884813]
1470732	5.0MP3 : vxconfigd dumps core if all paths are excluded.
1470251	volslabd utilized 100% cpu time

**Table 1-7** Veritas Volume Manager and Veritas Volume Replicator 5.1 fixed issues (*continued*)

Incident	Description
1470102	vxdmpadm getattr for failoverpolicy and tpdmode is giving usage error.
1469351	User confused about snap operations when split to new DG
1468647	vxdmpdebug fails to find ugettxt
1463197	no path disable event occurs during I/O error analysis in dmp when pulling a FC cable out with 5.0MP3
1460101	[VxVM]Proper handling of DMP PGR ioctl's in case of errors/warnings from below driver.
1443748	In a clustered environment the recovery of volumes having DCO v20 taking lots of time with no I/O load
1443046	System panic in vxio:voldr1_trans_copy
1441123	VxFS Corruption Detected when DCM log plex are attached with mirrored volume and VVR is not configured.
1437869	Need to examine package dependencies, especially wrt SUNWscpu...
1437006	DMP: Evaluation of DMP I/O statistics and TC development to verify correctness of the values displayed
1433535	DDL: Data corruption protection activated message should be reported by vxdisk scandisks and vxdctl enable CLI
1430001	VM: VVR: Not able to modify any of the volume manager kernel tunable on 4.1MP3 perf.
1425250	vx commands are hanging in EDC testing
1424194	vxclustadm reinit doesn't allow new nodes to join CVM cluster
1422008	After installed vm patch on AIX, "install-db" would be created if the vxio in "Defined" state.
1421752	High kernel CPU usage when DRL is turned on
1415547	Tool request - Verification tool to detect corrupted DCO.
1409031	VVR: Rlink fail to connect due to failure of memory allocation for incoming message buffer

**Table 1-7** Veritas Volume Manager and Veritas Volume Replicator 5.1 fixed issues (*continued*)

Incident	Description
1402599	VVR: Print warning message in syslog if it hit high water mark for latency protection
1398914	Support cdsdisk format on devices that do not support scsi modesense on page 3 and page 4.
1396566	Permissions set using vxedit is not consistent
1391652	No path disable event and I/O hang occurred when pulled out both paths of A/PG array with 4.0MP2RP8
1388324	Unresolved symbols in libvxvmso [SUN bug ID: 6737054]
1386592	tmp files not cleaned up after running vxdisksetup
1369610	Error message from vxdg import misleading/incorrect when disk is write-protected [SUN bug ID: 6264161]
1369597	vxlufinish uses wrong solaris command for unmounting alternate root environment - should use luumount [SUN bug ID: 6446847]
1361625	with use_all_paths=yes, get a reservation conflict
1321282	vxdisk scandisk hung in site failure scenario (EDC Testing)
1317186	Security: Remove tmp files in scripts before using them
1299512	incorrect vxdg free output and vxconfigd core dump
1293910	vxdmproot man page needs correction on arrays supported by DMP for SAN booting
1292633	PFTO value is set for only one paths though the DMP node has multiple paths.
1288413	Revisit our copy to /etc/vx/slib for Sol 10/11 [SUN bug ID: 6716991]
1277808	VVR: Write testcase for link-breakoff snapshot with RVG.
1274204	vxbrk_rootmir fails if a volume name = end of another vol name

**Table 1-7** Veritas Volume Manager and Veritas Volume Replicator 5.1 fixed issues (*continued*)

Incident	Description
1235023	V-5-1-4597 vxdg join failed. Transaction aborted waiting for io drain
1230827	vxdisksetup init succeeds but both prtvtoc & vxdiskunsetup fail with error "No Such Device"
1224778	Write disable R2 device(SRDF)not seen after boot
1222625	VCS 5.x CVMCluster Agent doesn't handle non-C locales.
1212256	Panic in uphysdone due to double Iodone on the buffer
1183283	vxconfigstore -p returns with syntax error
1176510	Enhance vxdiskadm to handle custom-made rootdisk and rootmirror
1172961	AIX: VxVM should call uphysio() with a proper value for bufcnt argument
1153020	CVM master's behavior with dgfailpolicy=leave in 5.0 differs from the description of manual
1123203	vxconfigd hang in transaction commit while acquiring rwsleep write lock
1114870	System panic in voliorem_seek() due to wrong calculation of no of dco I/O extents.
1082431	During VCS During cluster shutdown of a node, vxconfigd died requiring a reboot
1082149	vxconvert command fails to convert for VPATH devices
1068259	VVR:Primary hang in case of TCP replication, secondary not sending ack
1060336	vxresize should not roll back if fsadm failed but disabled vxfs
1057239	Support of raw device in Solaris local zones [SUN bug ID: 6326200]
1037289	IO Errors during SVC node add/remove test sequence
1020554	Diskgroup are not importing on every second or 3rd reboot. Needs to manually import it and mount the volumes

**Table 1-7** Veritas Volume Manager and Veritas Volume Replicator 5.1 fixed issues (*continued*)

Incident	Description
1016617	vxsnap refresh on SOSS fails with "VxVM vxvol WARNING V-5-1-10070 Failed to synchronize the volume(s)"
1012999	APIs needed for checking whether diskgroup is shared and status of diskgroup [SUN bug ID: 6308791]
996429	Unable to set no limit for cmd logs using vxcmdlog -n no_limit
990338	FMR Refreshing a snapshot should keep the same name for the snap object
963951	INSTSNAPTMP marked dco log not getting deleted during vxrecover or volume restart
818389	a scsi-2 release is causing a panic [SUN bug ID: 6569995]
795129	cmhaltcl on one of the cluster nodes causes one of the disk groups to lose shared flag
786357	Request to make voldrl_volumemax_drtregs a tunable
597517	unable to initialize EFI labeled >1tb PP devices
543638	vxdkmpadm/vxdiskunsetup doesn't work well if tpdmode=native
339282	RFE : Failed to create more than 256 config copies in one DG [SUN bug ID: 6284604]
339187	CVM activation tag in vxprint -m output breaks vxprint
314738	vxdg split fails if the cvm master changes
298072	vxio reports "Illegal vminor encountered" even when there is no rootability
248925	If vxdg import returns error, parse it

**Table 1-8** describes fixed issues in the Veritas Volume Manager 5.0MP3 RP1 release.

**Table 1-8** Veritas Volume Manager and Veritas Volume Replicator 5.0MP3 RP1 fixed issues

Incident	Description
1444425	The vxsnap prepare manual page includes support for the mirror=attribute.
1443748	Fixed an issue in a clustered environment the recovery of volumes having DCO v20 taking lots of time with no I/O load.
1443706 1443679	Fixed an issue in FMR3, I/Os initiating DCO updates for clearing DRL async clear region may not wait for its completion.
1442369 1224659	Fixed a bug in vxconfigbackupd script leading to 0 byte binconfig file being created.
1441003	Fixed a secondary panic due to double free of message with TCP protocol and 16 connection.
1435681	Fixed an issue with vxesd looping using 100% of one CPU.
1435470	Fixed an issue with cluster nodes panicking after installing 5.0 MP3.
1433120	Fixed an issue with after a reboot site read policy is not honored. [SUN bug ID: 6765037]
1269468	Fixed an issue with vxconfigd core dumps.
	Fixed a system panic in vxio:voldr1_trans_copy.
1424479	Fixed an issue with vxdmpadm dumped core when executing vxdmpadm list dmpnode command. [SUN bug ID: 6765037]
1425338	Fixed an issue with CVR fails to connect rlinks followed by vxconfigd hangs on secondary.
1421088	Fixed a secondary panic due to a corrupted volsioq_start.
1416930	Fixed an issue with the vxvm daemon that comes online when the system is rebooted. [SUN bug ID: 6747492, 6787315]
1414451	The vxsnap manual page includes mirror=enclosure parameter to avoid being mirrored on the same enclosure.
1385126	Fixed an issue with VVR I/O hanging due to the wrong generation number assignment after recovery.

**Table 1-8** Veritas Volume Manager and Veritas Volume Replicator 5.0MP3 RP1 fixed issues (*continued*)

Incident	Description
1413700	Fixed an issue with the wrong label on a device lead VxVM to calculate the wrong public region size.
1412784	Fixed an issue with the system hanging while creating volumes in a guest Ldom. [SUN bug ID: 6744348]
1410216	Fixed a secondary log error causing rlink disconnect after IBC unfreeze.
1409991	Fixed an issue with vxclust configuration caused the cluster to panic. [SUN bug ID: 6745612]
1409986	Fixed a segmentation fault on x64 system when running the vxdmpadm list dmpnode all command. [SUN bug ID: 6744469]
1403370 1401188	Fixed a system panic after running the vxctl enable or vxconfigd -k commands.
1288468	Fixed an issue with vxconfigd sleeping and no vx commands were responding.
1402144	Fixed a system panic due to invalid pointer being passed to bcopy() by volkio_to_kio_copy. [SUN bug ID: 6742479]
1397877	Enhanced the vxresize manual page to run from non-CVM master.
1397540	Fixed an issue with the vxsnap restore manual page is unable to properly freeze or thaw file systems in a CVM environment.
1393570	Fixed a FC-Switch port failure resulting in the loss one of four paths.
1393030	Fixed an issue with the vxdiskunsetup manual page failing when the dmpnode is not the primary path.
1389511	Fixed issue that was unable not to force import diskgroup version 80 in VxVM 5.0.
1373432	Fixed a system panic in bcopy() due to null passed in from volioctl_copyin()
1386980	Fixed a system panic in vol_putdisk() code.

**Table 1-8** Veritas Volume Manager and Veritas Volume Replicator 5.0MP3 RP1 fixed issues (*continued*)

Incident	Description
1385996	Fixed a rootdisk with B0 subdisk rendering unbootable after its removed and replaced with itself.
1382977	Fixed a system panic due to memory allocation.
1375354	Fixed an issue with vxcached never deletes old snaps when cache hits HWM.
1374927	Fixed an issue with vxvm-startup2 does not set VISSWAP flag if swap device is encapsulated and mirrored.
1368752	Fixed an issue when there are no mirrors to read, VOL_READ_MIRRORS ioctl returns -1 instead of 1.
	Fixed an issue with VSCSI: A/P LBI/O policy not working with enabled DMP support on boot devices.
1281274	Fixed an issue with vxplex core dumps during vxassist addlog due to DRL log length being less than 33 blocks. [SUN bug ID: 6510589, 1-19025230]
1114699	Fixed the vxtask command to display the resync progress subtask for shared volumes with DRL.
1230351	Fixed a system panic in vol_klog_start() due to accessing freed mv read_sio. [SUN bug ID: 6775184]
	Fixed the vxdg -n [newdg] deport [origdg] command causing a memory leak.
1135462	Fixed issue that was unable not to import disk group.
1058665	Fixed the vxdiskunsetup command failing when disk access name does not match the physical path name.
853207	Fixed an issue with 4.1 vxclust reconfig step 2 timed out on joining; node, reconfiguration looping. [SUN bug ID: 6439209]
424397	Fixed an issue with VVR RU thread not starting nio after it is created from than waiting for all replicas to have NIO's created.



[Table 1-9](#) describes fixed issues in the Veritas Volume Manager 5.0MP3 RP2 release.

**Table 1-9** Veritas Volume Manager and Veritas Volume Replicator 5.0 MP3 RP2 fixed issues

Incident	Description
850816	You can now delete snap objects from a mounted volume.
1097258	The vxconfigd daemon no longer hangs when an array is disconnected.
1108839	Turning on the dmp_cache_open tunable no longer slows down the vxconfigd daemon when run with 2048 dual path LUNs.
1184280	Added additional debug messages around the VE_BADPROTOV error message to improve debugging.
1189199	Fixed the cause of a system panic that occurred when you unloaded the vxdmp driver. [SUN bug ID: 6633627]
1195591	Fixed the cause of a panic when a cluster had an empty RVG.
1224659	Fixed an issue in which the vxconfigbackup -p script sometimes created a zero-length .binconfig file.
1259467	Fixed an issue in which the accept() call entered an infinite loop. [SUN bug ID: 6529218]
1286298	Fixed an issue in which proper locks were not taken in all necessary places while modifying last_sent_seqno.
1287975	The vxclustadm command has a segmentation fault when the main.cf file contains lines that are greater than 512 characters.
1302064	Fixed an issue in which EFI disks could not be initialized or set up after formatting the disks.
1321272	Fixed the an issue in which some VxVM commands hung after disconnecting, then reconnecting to the FC site link.
1321298	Fixed the cause of a vxconfigd daemon core dump that occurred after reconnecting the FC site link and heartbeat link.
1370927	Fixed an issue in which the VTOC of disks in a cluster became corrupted.
1374603	Fixed a cause of data corruption in the dmp_bypass_iodone() call.

**Table 1-9** Veritas Volume Manager and Veritas Volume Replicator 5.0 MP3 RP2 fixed issues (*continued*)

Incident	Description
1380386	The appropriate number of I/O threads are now created for systems with more than 8 CPUs.
1388883	Fixed an issue in which rebooting a controller caused the diskgroups to be disabled.
1402443	Fixed the cause of a system panic in the <code>kmsg_udp_payload()</code> call. [SUN bug ID: 6730498]
1408367	Fixed the cause of a system panic when <code>mutex_panic()</code> was called from <code>vol_rwsleep_wrlock()</code> .
1414336	Fixed an issue in which some disk devices did not appear in the <code>vxdisk list</code> command output.
1414469	Fixed an issue in which the <code>vxddladm listsupport all</code> did not display up-to-date information.
1416080	Fixed the cause of a system panic in the <code>vol_change_disk()</code> routine that was due to NULL pointer dereference.
1418659	Fixed an issue in which a Jumpstart installation of the 4.1 MP2 and 4.1 MP2 RP3 patches created duplicate entries in the <code>/var/svc/profile/upgrade</code> file.
1421353	Fixed an issue in which I/O got stuck in the <code>drl_logbusy</code> queue due to corruption of the age node LRU list.
1425338	Fixed an issue in which <code>connect rlinks</code> failed to be connected, followed by <code>vxconfigd</code> hanging on a secondary node.
1437281	Fixed the cause of an error with the <code>vxdmadm -v getdmpnode enclosure=&lt;name&gt;</code> command when a LUN was removed incorrectly.
1446208	Changed message V-5-1-2140 from an error message to an informational message.
1450348	Fixed a potential hang/panic that was due to a race condition between an RU thread and a volume read completing during DCM replay.
1452957	Fixed a panic in the <code>bcopy()</code> call from <code>dmp_recv_scsipkt()</code> .
1457132	Fixed the cause of data corruption when running the <code>vxdmadm disable path</code> and <code>vxdmadm disable ctlr</code> commands.

**Table 1-9** Veritas Volume Manager and Veritas Volume Replicator 5.0 MP3 RP2 fixed issues (*continued*)

Incident	Description
1457758	Fixed an issue in which the vxdiskadm command failed to replace a disk that was removed.
1458792	Fixed in issue in which the *unit_io and *pref_io tunables became set to 32 MB after upgrading from the Storage Foundation 5.0 MP1 release to the 5.0 MP3 release.
1459831	Fixed an issue in which replication hung due to a deadlock on a secondary that had a TCP multiconnection and was managed by nmcom.
1461314	DMP no longer uses the SCSI bypass on single path disks for path-suppressing TPD. [SUN bug ID: 6887215]
1461717	Fixed an issue in which the vxsnap make command caused the vxconfigd daemon to hang.
1463547	Fixed the cause of a vxconfigd core dump that occurred when dynamically reconfiguring a LUN.
1469487	The I/O buffer start time is no longer modified as part of error analysis. [SUN bug ID: 6778439]
1471658	Fixed the cause of a vxconfigd daemon core dump that occurred in the priv_get_all_udid_entry() call. [SUN bug ID: 6827895]
1471763	Fixed the cause of the following error: build_devlink_list: readlink failed for /dev/vx/rdisk/ludg: Invalid argument [SUN bug ID: 6741762]
1472736	Fixed the cause of a system panic in the vxdmp module that was due to a NULL pointer dereference. [SUN bug ID: 6761745, 1-24676247]
1473638	Fixed the cause of a failover in the IOCTL context for coordinator disks.
1475707	Added an error message for attempting to import unwritable disks. [SUN bug ID: 6264161]

**Table 1-9** Veritas Volume Manager and Veritas Volume Replicator 5.0 MP3 RP2 fixed issues (*continued*)

Incident	Description
1477143	The cluster volume manager failback protocol is now triggered when cur_pri is null and at least one DMP node of the same LUN group is DMPNODE_SHARED.
1479729	Fixed the cause of an I/O hang on the primary node after a secondary node crashed.
1479735	Fixed the cause of an I/O hang on a slave if the master (logowner) crashed with a data change map active.
1480315	Fixed an issue in which VxVM performed a full re-sync of a volume that was created in the background when the volume's diskgroup was imported.
1483164	Fixed an issue in which disks with the NOLABEL state were usable via the CLI.
1483201	Fixed an issue in which the Device Discovery Layer (DDL) sometimes set the unique disk identifier (UDID) value to INVALID. Multiple disks set to INVALID resulted in the following error: VxVM vxio V-5-0-1056 new disk disk_id has a non-unique UDID
1483643	Fixed an issue in which a raid 5 volume would not start on 3PAR Thin Provisioning LUNs.
1484919	Fixed an issue in which a system that was upgraded to the 5.0 MP3 release could not be booted. 1485379 Fixed an issue in which the vxtask -l list command displayed incorrect progress of the vxsnap addmir command, which was used to link a snapshot volume to the source volume.
1488084	Fixed an issue in which the vxmpadm iostat command reported different amounts of read/write blocks than the vxstat, iostat, and sar -d commands.
1500389	The vxrootadm command now automatically enables the use-nvramrc? variable. [SUN bug ID: 6792686]
1501165	Changed the V-5-1-2140 message from an error to a warning. [SUN bug ID: 6761748]

**Table 1-9** Veritas Volume Manager and Veritas Volume Replicator 5.0 MP3 RP2 fixed issues (*continued*)

Incident	Description
1502842	Fixed an issue in which the dmppolicy.info file did not get updated after upgrading the packages from Storage Foundation (SF) 5.0 MP3 RP1 to SF 5.1.
1503168	Fixed an issue in which the diskgroup for disks without a private region (nopriv disks) could not be imported.
1507291	Fixed an issue in which setting the dmp_monitor_fabric value to ON triggered unexpected offlining of paths on a DMX4 array.
1508462	Fixed the cause of a vxconfigd hang that occurred due to a split brain condition on a cluster.
1512352	Fixed an issue in which the vxconfigstore command failed with the following error: VxVM vxconfigstore ERROR V-5-2-3706 Diskgroup configuration [SUN bug ID: 6822234]
1515581	Fixed an issue in which recreating a shared diskgroup put CVMVolDg in an empty KSTATE and offlined clustered file systems.
1525121	Fixed an issue in which EFI disks were in an error state after installing the Storage Foundation 5.0 MP3 RP1 patches.
1525819	Fixed an issue in which the vxconfigbackup command failed to work on a diskgroup that had 2 TB LUNs.
1527247	Fixed an issue in which the vxstat command showed twice the I/O activity on a mirror volume compared to the source volume.
1528368	Fixed the cause of an I/O hang during the data change map transition after performing vxresize operations on the primary node.
1534038	Fixed an issue in which DMP stats sometimes used invalid I/O stats entries, which led to a panic on the host.
1534379	Fixed an issue in which the vxdg split command failed with the following error: Internal configuration daemon error
1544051	Fixed an issue in which the incorrect bit was being checked for an EMC Symmetrix thin device.
1586879	Improved performance of the vxdisk online command when used on large configurations.

**Table 1-9** Veritas Volume Manager and Veritas Volume Replicator 5.0 MP3 RP2 fixed issues (*continued*)

Incident	Description
1589022	Fixed the cause of an infinite loop in the DMP error handling code path with a CLARIION array, which led to an I/O hang.
1589172	Fixed an issue in which the vxdisksetup and vxdiskunsetup commands sometimes failed for EFI disks.
1589881	Fixed an issue in which the dump device was changed to none (dumps disabled) after encapsulating a boot disk.
1590314	The vxdmppadm getsubpaths dmpnodename command now validates the dmpnodename value before getting the subpath information.
1597868	Fixed an issue in which, on a secondary node, rlink paused and generated the “Incorrect magic number or unexpected upid” error message, and the secondary_log_err flag got set.
1598706	Fixed the cause of a system crash that occurred while mirroring the rootdisk.

## Veritas File System fixed issues

The Storage Foundation Cluster File System 5.1 includes cumulative fixes for Veritas File System since the 5.0MP3 release. The following tables describe these fixed issues.

[Table 1-10](#) describes fixed issues in the Veritas File System 5.1 release.

**Table 1-10** Veritas File System 5.1 fixed issues

Incident	Description
1477763	The <code>qiostat -l</code> command now shows accurate hit percentages.
1518001	Fixed a panic in during a <code>vx_do_putpage()</code> call.
1556692	Fixed a <code>pagezero()</code> panic that occurred when the <code>vmodsort</code> parameter was enabled. [SUN bug ID: 6815195]
1603264	Fixed a panic that occurred while removing Storage Checkpoints, which requires a very long full <code>fsck</code> .
1744587	Fixed a mount failure that occurred while mounting file systems that are greater than 10 TB.

**Table 1-10** Veritas File System 5.1 fixed issues (*continued*)

Incident	Description
1745875	Fixed a hang issue with the <code>fsckptadm create</code> command.
1804512	Fixed a <code>umount</code> failure that returned <code>EBUSY</code> .
1834048	Fixed a panic that occurred in the <code>page_unlock()</code> call.

[Table 1-11](#) describes fixed issues in the Veritas File System 5.0 MP3 RP2 release.

**Table 1-11** Veritas File System 5.0 MP3 RP2 fixed issues

Incident	Description
1370823	Fixed an issue in which running a full <code>fsck</code> did not fix a file system.
1401516	Fixed the cause of a hang that occurred after locking a file system, disconnecting the storage cable, then using <code>fsadm</code> to unlock the file system.
1412465	Fixed an issue in which the <code>vxresize</code> command failed to resize the volume, even though the file system was successfully resized.
1426951	Fixed some badly formed <code>printf()</code> statements in <code>vxm_getinfo()</code> that caused a system panic.
1441487	Changed GMS to use the standard <code>gab_api_init()</code> call to avoid a possible GAB panic.
1445511	The <code>vx_cds_control()</code> call now releases active level 1 on an error path.
1468377	You can now shrink a file system regardless of where the structural files reside on that file system.
1484888	Fixed an issue in which the cache hit percentage shown by <code>qiostat -l</code> command was inaccurate.
1517415	Fixed the cause of a core dump when running the <code>ncheck</code> command.
1526581	<code>vx_tflush_map()</code> no longer disables the file system if a map is marked as bad, but there is no I/O error.
1588199	Fixed an issue in which <code>dm_get_allocinfo()</code> failed with the EIO error for ext4 inodes with indirect pointers.
1601187	Reverted default <code>max_seqio_extent_size</code> to 2048, from 104857.

**Table 1-11** Veritas File System 5.0 MP3 RP2 fixed issues (*continued*)

Incident	Description
1634788	Fixed an issue in which the <code>fsadm</code> command dumped core intermittently when trying to defragment a file system.

[Table 1-12](#) describes fixed issues in the Veritas File System 5.0 MP3 RP1 release.

**Table 1-12** Veritas File System 5.0 MP3 RP1 fixed issues

Incident	Description
1413494	Fixed a failure of the <code>umount -f</code> command to unmount a VxFS file system.
1414175	Improved VxFS performance.
1414178	Fixed an issue with VxFS using too much CPU while looking for odd-sized extents ( <code>vxi_alloc_fail</code> ).
1415188	Fixed a full <code>fsck</code> core dump that was caused by running out of swap space, which resulted in a malloc failure.
1417973	Eliminated a benign error that occurred on globally- mounted VxFS file systems in a SunCluster environment when using the <code>scswitch</code> command or <code>mount</code> command.
1423867	Optimized <code>vx_convnode_data_files()</code> .
1428661	Improved the performance of <code>fsadm resize</code> on SFCFS.
1433066	Fixed a case of looping in <code>vx_do_putpage()</code> due to having a page beyond <code>i_wsize</code> .
1434438	Fixed a panic in <code>vx_unlockmap()</code> due to a null <code>ml_tranp</code> pointer.
1437490	The <code>fsclustadm</code> command's <code>lltdb.c</code> is now mult-threaded safe for CFSSMountAgent.

## Known issues

The following are known issues in this release of Storage Foundation Cluster File System.

See the *Veritas Cluster Server Release Notes* for VCS known issues.



## Veritas Storage Foundation Cluster File System known issues

The following are known issues in this release of Veritas Storage Foundation Cluster File System.

### **The `cfsshare share` command may result in duplicate monitoring of the volumes (1871316)**

When you run the `cfsshare share` command to NFS-export a file system that is already present in VCS configuration, there may be a case where multiple CVMVolDg resources get created to monitor different volumes within the same disk group. However, the CVMVolume attribute of each of the multiple CVMVolDg resources gets populated with more volumes than those required within the disk group. This results in duplicate monitoring of the volumes.

#### **Workaround**

Manually edit the CVMVolume attribute in the `main.cf` file to include only the specific volumes that are relevant to each CVMVolDg resource.

### **The CVMVolDg and CFMount resources may go to faulted state (1437947)**

If the timezone of a system is changed on the fly where there is CVMVolDg resources already in ONLINE state with the cluster running, the CVMVolDg resources will be reported as OFFLINE in the next monitor cycle. Then in turn CVMVolDg and CFMount resources will go to faulted state.

#### **Workaround**

Bring down the cluster using the `hastop -all` command before changing the timezone and then start the cluster by entering `hastart` on all the nodes.

### **SFCFS license keys are installed instead of SFCFSHA license keys if you aborted SFCFSHA installation at the licensing stage (1864906)**

For keyless licensing, if you abort the installation process at the licensing stage for SFCFSHA or if you manually remove the license keys for SFCFSHA, then during configuration, SFCFS license keys are installed instead of the SFCFS HA license keys.

#### **Workaround**

Before configuring SFCFS HA, you must take either of the following actions:

- Manually add the license key for SFCFSHA with the following command:

```
# vxkeyless set SFCFSHAENT
```

- Run the installer, and license SFCFSHA by selecting **L** at installer task selection.

## Not all the objects are visible in the SFM 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
```

## VPM interfaces should provide multiple pagelength mappings per request (1809601)

There is an issue with VPM interface not providing pagelength mappings per request on Solaris 10 x86 Update 7 or prior releases.

Sun will provide a fix for this known issue. Sun's Solaris 10 Update 8 release may work, but it has not been tested or released yet.

Sun bug ID is: 6811473 (VPM interfaces should provide multiple pagelength mappings per request )

Refer to Sun's Web site for details:

[http://bugs.opensolaris.org/bugdatabase/view\\_bug.do?bug\\_id=6811473](http://bugs.opensolaris.org/bugdatabase/view_bug.do?bug_id=6811473)

## If you modify resource names, Cluster Volume Manager cannot start (1444545)

If you modify the `main.cf` configuration file, do not change the CVM or CFS resource names. These names must appear in lower case. If you change them, CVM/CFS fails to start or go online.

A Symantec technical note describes this issue in more detail.

<http://atlas.veritas.com/avf/aca-1/dispatch.exe/mynotes/lookup/309236/0>

## When master node loses access to complete storage, detached sites remain in RECOVER state even after reattaching and recovering the sites

In a campus cluster environment, if the master node loses access to complete storage, all but one of the sites is detached and the DCO volumes may get detached if the `dgfailpolicy` is set to `dgdisable`. If the detached sites are reattached and recovered, the site still remains in RECOVER state. [1828142]

Workaround: Change the status of the site as described in the following procedure to resolve the issue.

### To change the status of the site

1 Log onto the CVM master node.

2 Reattach the detached sites:

```
# vxdg -g dg_name reattachsite site_name
```

The site remains in RECOVER state.

3 Restore DCO volumes by unpreparing and preparing the volumes.

Unprepare the volumes:

```
# vxsnap -g dg_name -f unprepare vol_name
```

Prepare the volumes:

```
# vxsnap -g dg_name prepare vol_name dnl=on
```

4 Reattach the detached sites:

```
# vxdg -g dg_name reattachsite site_name
```

5 Verify that the state of the detached sites is now ACTIVE:

```
# vxprint
```

## Rare console hangs during Live Upgrade from Solaris 9 to Solaris 10 (1728047)

When you perform a Live Upgrade from Solaris 9 to Solaris 10, the first reboot into the alternate root environment is a configuring reboot. In some very rare cases, the console may hang. The cause is usually a Solaris configuring process that is waiting for user input.

Workaround:

If there is no configuration change occurring for the Live Upgrade, select F2 (or esc-2) to respond to the configuring process.

## Veritas Storage Foundation for Databases (SFDB) tools known issues

The following are known issues with Storage Foundation for Databases (SFDB) tools.

### Removing the VRTSodm 5.1 package may leave /dev/odm mounted in non-global zones preventing the odm module from unloading (1857357)

If you remove the VRTSodm 5.1 package, /dev/odm may be left mounted in non-global zones that prevents the odm module from being unloaded. This occurs if you uninstall 5.1 or if you use the `pkgrm` command to remove the VRTSodm 5.1 package manually with non-global zones configured.

#### Workaround

Ensure /dev/odm is unmounted in each non-global zone before you uninstall 5.1 or if remove the VRTSodm 5.1 package manually using the `pkgrm` command.

#### To unmount /dev/odm

- ◆ Unmount /dev/odm in each non-global zone:

```
global# zlogin myzone
myzone# umount /dev/odm
```

### Reverse Resync not supported if database is created using Oracle Managed Files (1192729)

If an Oracle database is created with Oracle Managed Files (OMF), then `reverse_resync` operations would fail.

The following errors are displayed:

```
oracle@swlx07:~> /opt/VRTSdbed/bin/dbed_vmsnap -S $ORACLE_SID \
-f sp4 -o
```

```
reverse_resync_begin
dbed_vmsnap started at 2007-12-28 12:02:42
```

```
SFORA dbed_vmsnap WARNING V-81-5725 After reverse_resync_commit
is performed, you need to recreate the Authentication Password
File using the ORAPWD utility.
```

```
SFORA dbed_vmsnap ERROR V-81-4882 An error occurred while
reconfiguring Oracle instance 'sfora'.
```

```
SFORA dbed_vmsnap ERROR V-81-4881 Log file is at
/tmp/dbed_vmclonedb.12313/nomount.log.
SFORA dbed_vmsnap ERROR V-81-4918 Database sfora has not been
correctly recovered.
SFORA dbed_vmsnap ERROR V-81-4881 Log file is at
/tmp/dbed_vmclonedb.12313/recover.log.
```

### Workaround

The `reverse_resync` operation for a database created with OMF is not supported in the 5.1 release.

There is no workaround for this issue.

### **dbed\_vmclonedb -p failed to create clonedb with modified pfile (852188)**

If you are running the `dbed_vmclonedb -p` or the `dbed_clonedb -p` command, the pfile modification will fail if there is an unquoted or unescaped special character in the primary instance's pfile. The following error will be displayed:

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

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

### Workaround

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

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

---

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

---

### Clone command fails on an Oracle RAC database (1399393)

The commands `dbed_vmclonedb` and `dbed_clonedb` will fail on an Oracle RAC database when the clone SID name contains the primary SID name in the beginning.

For example, the following commands, which have “Prod” as the primary SID and “Prod1” as the clone SID, produce the following error message:

```
# dbed_vmclondb -S Prod -o recoverdb \  
new_sid=Prod1,server_name=srv_name -f snapplan -r relocate_path  
# dbed_vmclondb -S Prod -o mountdb \  
new_sid=Prod1,server_name=srv_name -f snapplan -r relocate_path  
# dbed_clonedb -S Prod1 -m mount_point -c ckpt_name  
ERROR V-81-4882 An error occurred while reconfiguring Oracle instance  
'clone_SID'
```

### Database fails over during Flashsnap operations (1469310)

In an SFHA environment, if the database fails over during Flashsnap operations such as the `dbed_vmsnap -o resync` command and various error messages appear. This issue occurs because Flashsnap commands do not create a VCS resource for the SNAP disk group. As such, when the database fails over, only the primary disk group is moved to another node.

### Storage Foundation for Databases (SFDB) tools support for using Oracle Data Guard with Oracle RAC (1801265)

Storage Foundation for Databases (SFDB) tools do not support use of Data Guard with Oracle RAC in this release.

### Clone command fails for instant checkpoint on Logical Standby database (1736516)

The `dbed_clonedb` command does not work on Logical standby database when using instant checkpoint.

### Flashsnap reverse resync command fails on offhost flashsnap cloning (1810711)

Performing `dbed_vmsnap -o reverse_resync_begin` fails if an off-host clone has been created on the snapshot before.

### Clone command fails if archive entry is spread on 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`.

### Reattach command fails in a multiple disk group environment if the snapshot operation fails (1840672)

In a multiple disk group environment, if the snapshot operation fails then `dbed_vmssnap` fails to reattach all the volumes. This operation must be performed as root user.

### DBED features are not integrated with GCO

DBED features are not integrated with Global Cluster Option (GCO). After GCO migration, be aware that DBED features will not be functional. [1241070]

### Database FlashSnap snapplan creation and validation failed for standby database if standby redo log is mislocated (1873738)

Mislocated standby redo log files may cause errors during Database FlashSnap snapplan creation and validation for standby database in a Oracle Data Guard environment.

The `dbed_vmchecksnap` command may fail with the following error messages:

```
$ dbed_vmchecksnap -S stand \  
-H $ORACLE_HOME -f snp -o setdefaults -t dblxxeon02  
SFORA vxsnapadm ERROR V-81-5907 open() /snap_data11r1/FLAS11r1/redo01.log  
failed (No such file or directory).  
SFORA vxsnapadm ERROR V-81-5526 Empty or open file  
/snap_data11r1/FLAS11r1/redo01.log failed.  
Snapplan snp for stand.
```

### Workaround

Create empty redo log files by using the `touch` command so that `dbed_vmchecksnap` can succeed without any errors.

For example:

```
$ touch /snap_data11r1/FLAS11r1/redo01.log  
$ touch /snap_data11r1/FLAS11r1/redo02.log  
$ touch /snap_data11r1/FLAS11r1/redo03.log
```

## Veritas Volume Manager known issues

The following are known issues in this release of Veritas Volume Manager (VxVM).

## **Performing Thin Reclamation on sliced format disk causes data corruption (1834848)**

This issue occurs only for the Thin Reclamation feature on a sliced format disk. When reclaiming the thin disks within the disk group, this issue occurs if the thin disks are initialized using sliced format. The `vxdisk reclaim` command or `fsadm -R` command option corrupts the data on the file system.

### **Workaround**

Avoid performing any reclaim operation on the disk group with thin reclamation disk on it.

If performing the reclaim is required, initialize the thin reclaim disk as `cdsdisk` format.

Existing disk groups and file systems will not be affected, because the thin reclamation feature is only supported from Storage Foundation Cluster File System 5.0MP3 release and onwards.

## **The path failure due to filer panic in the netapp array may occasionally cause longer path failover time or longer I/O delay (1835139)**

The path failure due to filer panic in the netapp array may occasionally cause longer path failover time or the longer I/O delay which varies from 100 seconds to 400 seconds. The long failover time is due to the race between the I/O code path and the path failover code path, which is more likely to happen with heavy I/O load.

### **Workaround**

There is no workaround for this issue. The poor path failover time is not avoidable at this time.

## **The requestleave policy is not supported if disk cache objects (DCOs) or dirty region logs (DRLs) are configured (1796617)**

When disk cache objects (DCOs) or dirty region logs (DRLs) are configured, the `dgfailpolicy` should not be set to `requestleave`. This release 5.1 does not support this scenario because it could result in data corruption or compromise application availability.



## VxVM might report false serial split brain under certain scenarios (1834513)

VxVM might detect and report a false serial split brain when all 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, run the following command:

```
/etc/vx/diag.d/vxprivutil set <device-path> ssbid=<dm id>
```

The <dm id>, which is also the ssbid, can be retrieved from the config copy by running the following command:

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

## VxVM starts before OS device scan is done (1635274)

While working with some arrays, VxVM may start before all devices are scanned by the OS. This slow OS device discovery may result in malfunctioning of VM, fencing and VCS due to partial disks seen by VxVM.

Workaround

After the fabric discovery is finished, issue the `vxdisk scandisks` command to bring newly discovered devices into the VxVM configuration.

## CDS disks fail due to Solaris x86 bug regarding writes on the last sector of a LUN (1846165)

Solaris x86 has a bug [SUN bug ID: 6342431] where last sector of a LUN cannot be written. This causes failure with CDS disks because actual geometry cannot be set to use full capacity. It can lead to small data corruption because backup labels get written to wrong location. This bug does not exist on SPARC.

Symantec provides a workaround for SUN bug IDs 6847000 and 6844425.

### Workaround

Use sliced disks for any LUN exhibiting above behavior.

<http://entsupport.symantec.com/docs/331654>

## Dynamic Lun Expansion of a sliced disk can fail to resize (1850166)

Dynamic Lun Expansion of a sliced disk can fail to resize. This issue occurs because cylinder size is not kept constant for the resize. This issue occurs only with sliced disks

[SUN bug ID: 6889095]

### Workaround

Use CDS disks.

## After installing Volume Manager, you may be prompted to reinstall it (1704161)

If you remove pre-5.1 Volume Manager packages and then install 5.1 Volume Manager without using the product installer, the following message is displayed:

```
The Volume Manager appears to be installed already. You should use vxdiskadm to add more disks to the system. Installation with vxinstall will attempt to reinstall the Volume Manager from the beginning. Depending upon how your system is currently configured, a reinstallation may fail and could leave your system unusable.
```

```
Are you sure you want to reinstall [y,n,q,?] (default: n)
```

### Workaround

When you are prompted to reinstall, enter **y**.

---

**Note:** This message is not displayed if you install Volume Manager with the product installer.

---

## To display localized characters on the VEA interface, you need to change your language preferences (1666997)

If you change the locale in your operating system, the Veritas Enterprise Administrator (VEA) interface displays messages half in the new language and half in the previous language.

### Workaround

To correct this issue, change the language on your VEA Preferences screen.

## Veritas File System known issues

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

### Possible error during an upgrade and when there is a local zone located on a VxFS file system(1675714)

During an upgrade and when there is local zone located on VxFS, you may receive an error message similar to the following:

```
Storage Foundation Uninstall did not complete successfully  
VRTSvxvm package failed to uninstall on pilotv240-1
```

### Workaround

You must reboot after the upgrade completes.

### Possible write performance degradation with VxFS local mounts

Some applications that allocate large files without explicit preallocation may exhibit reduced performance with the VxFS 5.1 release compared to the VxFS 5.0 MP3 release due to a change in the default setting for the tunable `max_seqio_extent_size`. One such application is DB2. Hosting DB2 data on a single file system extent maximizes the potential for sequential pre-fetch processing. When DB2 detects an application performing sequential reads against database data, DB2 begins to read ahead and pre-stage data in cache using efficient sequential physical I/Os. If a file contains many extents, then pre-fetch processing is continually interrupted, nullifying the benefits. A larger `max_seqio_extent_size` value reduces the number of extents for DB2 data when adding a data file into a tablespace without explicit preallocation.

The `max_seqio_extent_size` tunable controls the amount of space that VxFS automatically preallocates to files that are allocated by sequential writes. Prior to the 5.0 MP3 release, the default setting for this tunable was 2048 file system blocks. In the 5.0 MP3 release, the default was changed to the number of file system blocks equaling 1 GB. In the 5.1 release, the default value was restored to the original 2048 blocks.

The default value of `max_seqio_extent_size` was increased in 5.0 MP3 to increase the chance that VxFS will allocate the space for large files contiguously, which

tends to reduce fragmentation and increase application performance. There are two separate benefits to having a larger `max_seqio_extent_size` value:

- Initial allocation of the file is faster, since VxFS can allocate the file in larger chunks, which is more efficient.
- Later application access to the file is also faster, since accessing less fragmented files is also more efficient.

In the 5.1 release, the default value was changed back to its earlier setting because the larger 5.0 MP3 value can lead to applications experiencing "no space left on device" (ENOSPC) errors if the file system is close to being full and all remaining space is preallocated to files. VxFS attempts to reclaim any unused preallocated space if the space is needed to satisfy other allocation requests, but the current implementation can fail to reclaim such space in some situations.

If your workload has lower performance with the VxFS 5.1 release and you believe that the above change could be the reason, you can use the `vxtunefs` command to increase this tunable to see if performance improves.

#### To restore the benefits of the higher tunable value

- 1 Increase the tunable back to the 5.0 MP3 value, which is 1 GB divided by the file system block size.

Increasing this tunable also increases the chance that an application may get a spurious ENOSPC error as described above, so change this tunable only for file systems that have plenty of free space.

- 2 Shut down any application that are accessing any large files that were created using the smaller tunable setting.
- 3 Copy those large files to new files, which will be allocated using the higher tunable setting.
- 4 Rename the new files back to the original names.
- 5 Restart any applications were shut down earlier.

## No longer supported

This section describes Storage Foundation Cluster File System features that are not supported in this release.

The following features are not supported in this release of Storage Foundation Cluster File System products:

- The `seconly` feature in SFCFS
- Storage Expert

- The use of the `vxvoladm` command line utility
- Intelligent Storage Provisioning (ISP)
- FlashSnap Agent for Symmetrix (VxFAS), which was previously named the TimeFinder ToolKit (TFTK)

## VVR will use TCP as default protocol from next release

In Storage Foundation Cluster File System 5.1 and previous releases, VVR uses UDP as the default transport protocol for communicating between the primary and secondary. In future releases, the default protocol will be switched to TCP. Users will have the option to manually switch back to UDP.

## Documentation

Product guides are available on the software disc in PDF format. Symantec's Veritas Storage Foundation Cluster File System documentation is also available on the Symantec website.

Symantec's Veritas Storage Foundation Cluster File System 5.1 documentation set is available at the following URL:

<http://www.symantec.com/business/support/overview.jsp?pid=15107>

## Relevant component product release notes

Read the relevant component product release notes before installing any version of Veritas Storage Foundation.

The following documents are relevant component product release notes:

- *Veritas Cluster Server Release Notes* (`vcs_notes.pdf`)
- *Veritas Storage Foundation for Oracle RAC Release Notes* (`sfrac_notes.pdf`)
- *Veritas Storage Foundation Release Notes* (`sf_notes.pdf`)

## Storage Foundation guides

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

**Table 1-13** describes the guides in the Veritas Storage Foundation documentation set.

**Table 1-13** Guides in Veritas Storage Foundation documentation set

Guide Title	Filename
<i>Veritas Storage Foundation and High Availability Getting Started Guide</i>	getting_started.pdf
<i>Veritas Storage Foundation JumpStart read me</i>	jumpstart_readme.txt
<i>Veritas Storage Foundation read me first</i>	readme_first.txt
<i>Veritas Storage Foundation Release Notes</i>	sf_notes.pdf
<i>Veritas Storage Foundation Installation Guide</i>	sf_install.pdf
<i>Veritas Storage Foundation and High Availability Solutions Virtualization Guide</i>	sfha_virtualization.pdf
<i>Veritas Storage Foundation: Storage and Availability Management for Oracle Databases</i>	sf_adv_ora.pdf
<i>Veritas Storage Foundation Advanced Features Administrator's Guide</i>	sf_advanced_admin.pdf
<i>Veritas File System Administrator's Guide</i>	vxfs_admin.pdf
<i>Veritas File System Programmer's Reference Guide</i>	vxfs_ref.pdf
<i>Veritas Volume Manager Administrator's Guide</i>	vxvm_admin.pdf
<i>Veritas Volume Manager Troubleshooting Guide</i>	vxvm_tshoot.pdf

## Veritas Storage Foundation Cluster File System documentation

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

[Table 1-14](#) describes the Veritas Storage Foundation Cluster File System (CFS) documentation set.

**Table 1-14** Guides in Veritas Storage Foundation Cluster File System documentation set

Guide Title	Filename
<i>Veritas Storage Foundation Cluster File System Release Notes</i>	sf_cfs_notes.pdf
<i>Veritas Storage Foundation Cluster File System Installation Guide</i>	sf_cfs_install.pdf

**Table 1-14** Guides in Veritas Storage Foundation Cluster File System documentation set (*continued*)

Guide Title	Filename
<i>Veritas Storage Foundation Cluster File System Administrator's Guide</i>	sfcfs_admin.pdf
<i>Veritas Storage Foundation: Storage and Availability Management for Oracle Databases</i>	sf_adv_ora.pdf
<i>Veritas Storage Foundation Advanced Features Administrator's Guide</i>	sf_advanced_admin.pdf

## Veritas Cluster Server documentation

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

[Table 1-15](#) describes the Veritas Cluster Server documentation set.

**Table 1-15** Guides in Veritas Cluster Server documentation set

Guide Title	Filename
<i>Veritas Cluster Server Release Notes</i>	vcs_notes.pdf
<i>Veritas Cluster Server Installation Guide</i>	vcs_install.pdf
<i>Veritas Cluster Server Agent Developer's Guide</i>	vcs_agent_dev.pdf
<i>Veritas Cluster Server Bundled Agents Reference Guide</i>	vcs_bundled_agents.pdf
<i>Veritas Cluster Server Agents for Veritas Volume Replicator Configuration Guide</i>	vcs_vvr_agent.pdf
<i>VCS Enterprise Agent for Oracle Installation and Configuration Guide</i>	vcs_oracle_install.pdf
<i>VCS Enterprise Agent for DB2 Installation and Configuration Guide</i>	vcs_db2_install.pdf
<i>VCS Enterprise Agent for Sybase Installation and Configuration Guide</i>	vcs_sybase_install.pdf
<i>Dynamic Reconfiguration for Sun Enterprise Servers</i>	vcs_dynamic_reconfig.pdf

## Veritas Volume Replicator documentation

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

[Table 1-16](#) describes the Veritas Volume Replicator documentation set.

**Table 1-16** Guides in Veritas Volume Replicator documentation set

Guide Title	Filename
<i>Veritas Volume Replicator Administrator's Guide</i>	vvr_admin.pdf
<i>Veritas Volume Replicator Planning and Tuning Guide</i>	vvr_planning.pdf
<i>Veritas Volume Replicator Advisor User's Guide</i>	vvr_advisor_users.pdf

## Veritas Storage Foundation for Oracle RAC documentation

The following Storage Foundation for Oracle RAC documentation is available with all Veritas Storage Foundation HA product suites:

[Table 1-17](#) describes the Storage Foundation for Oracle RAC documentation set.

**Table 1-17** Guides in Storage Foundation for Oracle RAC documentation set

Guide Title	Filename
<i>Veritas Storage Foundation™ for Oracle RAC Installation and Configuration Guide</i>	sfrac_install.pdf
<i>Veritas Storage Foundation™ for Oracle RAC Release Notes</i>	sfrac_notes.pdf
<i>Veritas Storage Foundation™ for Oracle RAC Administrator's Guide</i>	sfrac_admin.pdf
<i>Veritas Storage Foundation: Storage and Availability Management for Oracle Databases</i>	sf_adv_ora.pdf

## Manual Pages

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

If the `MANPATH` environment variable does not include `/opt/VRTS/man`, you can view the desired manual page by entering the following command:



```
# man -M /opt/VRTS/man manual_page_name
```

