

Veritas Storage Foundation™ Cluster File System for Oracle® RAC Release Notes

Linux

5.1



Veritas Storage Foundation™ Cluster file System for Oracle RAC Release Notes

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350 Ellis Street
Mountain View, CA 94043
<http://www.symantec.com>

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Before contacting Technical Support, make sure you have satisfied the system requirements that are listed in your product documentation. Also, you should be at the computer on which the problem occurred, in case it is necessary to replicate the problem.

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

- Product release level
- 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
 - Recent software configuration changes and network changes

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

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sfha_docs@symantec.com

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Asia-Pacific and Japan	customercare_apac@symantec.com
Europe, Middle-East, and Africa	semea@symantec.com
North America and Latin America	supportolutions@symantec.com

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To access more information about Enterprise services, please visit our Web site at the following URL:

www.symantec.com

Select your country or language from the site index.

About this release

This document includes the following topics:

- [About Veritas Storage Foundation Cluster File System for Oracle RAC](#)
- [About SFCFS RAC Release Notes](#)
- [New in this release](#)
- [Installation requirements](#)
- [No longer supported](#)
- [Fixed issues](#)
- [Known issues](#)
- [Software limitations](#)
- [Documentation](#)

About Veritas Storage Foundation Cluster File System for Oracle RAC

Veritas Storage Foundation™ for Oracle® RAC (SFCFS RAC) leverages proprietary storage management and high availability technologies to enable robust, manageable, and scalable deployment of Oracle RAC on the Linux platform. The solution uses Veritas Cluster File System technology that provides the dual advantage of easy file system management as well as the use of familiar operating system tools and utilities in managing databases.

For the latest patches available for this release, go to:

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

The solution stack comprises the Veritas Cluster Server (VCS), Veritas Cluster Volume Manager (CVM), Veritas Cluster File System (CFS), and Veritas Storage Foundation, which includes the base Veritas Volume Manager (VxVM) and Veritas File System (VxFS).

Benefits of SFCFS RAC

SFCFS RAC provides the following benefits:

- Support for file system-based management. SFCFS RAC provides a generic clustered file system technology for storing and managing Oracle data files as well as other application data.
- Use of volume management technologies for placement of Oracle Cluster Registry and voting disks. Volume management technologies provide robust shared block and raw interfaces for placement of Oracle Cluster Registry and voting disks. In the absence of SFCFS RAC, separate LUNs need to be configured for OCR and voting disks.
- Support for a standardized approach toward application and database management. A single-vendor solution for the complete SFCFS RAC software stack lets you devise a standardized approach toward application and database management. Further, administrators can apply existing expertise of Veritas technologies toward SFCFS RAC.
- Increased availability and performance using dynamic multi-pathing (DMP). DMP provides wide storage array support for protection from failures and performance bottlenecks in the HBAs and SAN switches.
- Easy administration and monitoring of SFCFS RAC clusters from a single web console.
- Support for many types of applications and databases.
- Improved file system access times using Oracle Disk Manager (ODM).
- Ability to configure ASM disk groups over CVM volumes to take advantage of dynamic multi-pathing (DMP).
- Enhanced scalability and availability with access to multiple Oracle RAC instances per database in a cluster.
- Support for backup and recovery solutions using volume-level and file system-level snapshot technologies. SFCFS RAC enables full volume-level snapshots for off-host processing and file system-level snapshots for efficient backup and rollback.
- Ability to failover applications without downtime using clustered file system technology.

- Support for sharing all types of files, in addition to Oracle database files, across nodes.
- Fast disaster recovery with minimal downtime and interruption to users. Users can transition from a local high availability site to a wide-area disaster recovery environment with primary and secondary sites. If a node fails, clients that are attached to the failed node can reconnect to a surviving node and resume access to the shared database. Recovery after failure in the SFCFS RAC environment is far quicker than recovery for a failover database.
- Verification of disaster recovery configuration using fire drill technology without affecting production systems.
- Support for block-level replication using VVR.

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/>

About SFCFS RAC Release Notes

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/linux/sfcfsrac_notes.pdf

This is document version 5.1.0.

This document provides important information regarding SFCFS RAC 5.1.

Review this document before you install or upgrade SFCFS RAC.

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

<http://entsupport.symantec.com/docs/335001>

For information regarding software features, limitations, fixed issues, and known issues of Veritas Cluster Server (VCS):

See *Veritas Cluster Server Release Notes (5.1)*.

For information regarding software features, limitations, fixed issues, and known issues of Storage Foundation (SF):

See *Veritas Storage Foundation Release Notes (5.1)*.

For information regarding software features, limitations, fixed issues, and known issues of Storage Foundation Cluster File System (SFCFS):

See *Veritas Storage Foundation Cluster File System Release Notes (5.1)*.

New in this release

This section describes the list of new features and changes in SFCFS RAC 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.

Support for 16 nodes in a cluster

SFCFS RAC now supports 16 nodes in a cluster.

Installation and upgrade without manual rebooting of nodes

You no longer need to reboot the nodes in the cluster manually after you install SFCFS RAC 5.1 or upgrade from version 5.0x and later. The installer automatically starts SFCFS RAC 5.1 after the installation or upgrade without requiring a reboot of the nodes.

Adding nodes to a cluster

The SFCFS RAC installer enables you to add nodes to an existing SFCFS RAC cluster using the `-addnode` option with the installer script. The applications running on the cluster continue to be available as new nodes join the cluster.

Options to install minimum, recommended, or all SFCFS RAC packages

The installer now provides the following options for installing SFCFS RAC:

- **Minimal**
Install only the basic functionality of SFCFS RAC.
To view the list of packages for this option, use `-minpkgs` option with the installer script.
- **Recommended**
Installs SFCFS RAC without optional packages.
To view the list of packages for this option, use `-recpkgs` option with the installer script.
- **All**
Installs all SFCFS RAC packages.
To view the list of packages for this option, use `-allpkgs` option with the installer script.

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 SFCFS 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 SFCFS RAC 5.1 is not supported.
```

The installer does not support direct upgrade from a previous SFCFS or SFHA version to SFCFS RAC 5.1. You must upgrade SFCFS or SFHA to version 5.1, then install SFCFS RAC 5.1.

Installation requirements

Make sure that each node on which you want to install or upgrade SFCFS RAC meets the following installation requirements:

- [Hardware requirements](#)
- [Supported Linux operating systems](#)
- [Required operating system patches](#)
- [Recommended SFCFS RAC 5.1 patch](#)
- [Supported database software](#)
- [Supported high availability, volume manager, and file system software](#)
- [Supported replication technologies for global clusters](#)
- [License requirements](#)

Hardware requirements

Make sure that you have the correct equipment to install SFCFS RAC:

- Review the current compatibility list to confirm compatibility of your hardware: <http://entsupport.symantec.com/docs/283161>
- Review the Oracle documentation for additional requirements pertaining to your version of Oracle.

Table 1-1 lists the hardware requirements for SFCFS RAC.

Table 1-1 Hardware requirements for basic clusters

Item	Description
SFCFS RAC systems	Two to sixteen systems with two or more CPUs at 2GHz or higher.
DVD drive	A DVD drive on one of the nodes in the cluster.

Table 1-1 Hardware requirements for basic clusters (*continued*)

Item	Description
Disk space	<p>You can evaluate your systems for available disk space by running the following command:</p> <p>RHEL 5(x86_64):</p> <pre># cd /dvd_mount/rhel5_x86_64/\ storage_foundation_cluster_file_system_for_oracle_rac</pre> <p>SLES 10 (x86_64):</p> <pre># cd /dvd_mount/sles10_x86_64/\ storage_foundation_cluster_file_system_for_oracle_rac</pre> <pre># ./installsfcfsrac -precheck node_name</pre> <p>For details on the additional space that is required for Oracle, see the Oracle documentation.</p>
RAM	<p>Each SFCFS RAC system requires at least 2 GB.</p> <p>Symantec recommends RAM at least twice the Oracle SGA size.</p>
Network links	<p>Two or more private links and one public link.</p> <p>Links must be 100BaseT or gigabit Ethernet directly linking each node to the other node to form a private network that handles direct inter-system communication. These links must be of the same type; you cannot mix 100BaseT and gigabit.</p> <p>Symantec recommends gigabit Ethernet using enterprise-class switches for the private links.</p> <p>You can also configure aggregated interfaces.</p>
Fibre Channel or SCSI host bus adapters	<p>At least one built-in SCSI adapter per system to access the operating system disks.</p> <p>At least one additional SCSI or Fibre Channel Host Bus Adapter per system for shared data disks.</p>

Supported Linux operating systems

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

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

<http://entsupport.symantec.com/docs/335001>

The Veritas 5.1 release operates on the following operating systems and hardware:

- Red Hat Enterprise Linux 5 (RHEL 5) with Update 3 (2.6.18-128.el5 kernel) or later on AMD Opteron or Intel Xeon EM64T (x86_64)
- SUSE Linux Enterprise Server 10 (SLES 10) with SP2 (2.6.16.60-0.21 kernel) on AMD Opteron or Intel Xeon EM64T (x86_64)
- Oracle Enterprise Linux (OEL 5) with Update 3 (2.6.18-128.el5 kernel) or later on AMD Opteron or Intel Xeon EM64T (x86_64)

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

Symantec supports only Oracle, Red Hat, and SUSE distributed kernel binaries.

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

Information about the latest supported Red Hat erratas and updates and SUSE service packs is available in the following TechNote. Read this TechNote before you install Symantec products.

<http://entsupport.symantec.com/docs/335001>

Required operating system patches

The following patch is required for systems running SLES10 SP2: kernel 2.6.16.60-0.39.3

Recommended SFCFS RAC 5.1 patch

Symantec strongly recommends installing the SFCFS RAC 5.1 Patch 1 immediately after installing SFCFS RAC 5.1.

The patch for RHEL 5 (x86_64) is available at the following URL:

<https://vos.symantec.com/patch/detail/2957>

The patch for SLES 10 (x86_64) is available at the following URL:

<https://vos.symantec.com/patch/detail/2958>

Supported database software

For the latest information on supported Oracle database versions, see the following Technical Support TechNote:

Note: SFCFS RAC supports only 64-bit Oracle.

The following database versions are supported:

- Oracle RAC 10g Release 2
- Oracle RAC 11g Release 1

Supported high availability, volume manager, and file system software

Use only those versions of VCS, VxVM, VxFS, and VVR that are provided on the software disc. Remove other versions from your systems before you install the software from the SFCFS RAC product disc.

Supported replication technologies for global clusters

SFCFS RAC supports the software replication technology Veritas Volume Replicator (VVR) for global cluster configurations.

License requirements

You need to obtain the appropriate licenses to install and configure SFCFS RAC. For more information on the available licensing options and the required licenses, see the *Veritas Storage Foundation Cluster File System for Oracle RAC Installation and Configuration Guide*.

No longer supported

This section lists software versions and features that are no longer supported. Symantec advises customers to minimize the use of these features.

SFCFS RAC does not support the following:

- Dissimilar version upgrades of SFCFS RAC components
For example, if you have SFCFS RAC 5.0 MP3 installed with Oracle RAC 10g Release 2, you can not upgrade only VCS to version 5.1.
- Option `hawizard -rac` for configuring service groups
- 32-bit Oracle architectures

- Oracle RAC 9i, Oracle RAC 10g Release 1
- Use of crossover cables
Oracle does not support the use of crossover cables for cluster interconnects due to the possibility of data corruption and other software limitations.

Note: Crossover cables are however known to function without any issues in SFCFS RAC. While the SFCFS RAC Technical support team may continue to provide support on related issues for existing deployments, this support may be constrained in some respects as it is no longer a supported configuration by Oracle.

The use of crossover cables is discouraged for new deployments.

Fixed issues

For the list of issues fixed in Veritas Cluster Server:

See *Veritas Cluster Server Release Notes (5.1)*.

For the list of issues fixed in Storage Foundation:

See *Veritas Storage Foundation Release Notes (5.1)*.

For the list of issues fixed in Storage Foundation Cluster File System:

See *Veritas Storage Foundation Cluster File System Release Notes (5.1)*.

Known issues

This section lists the known issues in SFCFS RAC 5.1.

For Oracle issues:

See “[Oracle issues](#)” on page 17.

For SFCFS RAC issues:

See “[SFCFS RAC issues](#)” on page 18.

Oracle issues

This section describes the known issues of Oracle in this release.

Oracle VIP Configuration Assistant fails with an error message

During Oracle RAC 10g Release 2 installation, the VIP Configuration Assistant may fail with the following error message:

```
The given interface(s), "eth0" is not public.  
Public interfaces should be used to configure virtual IPs.
```

This message appears only when the VIP is not from the regular public IP range (for example, 200.). [1182220]

Workaround: Invoke the `vipca` utility manually as the superuser.

```
# export DISPLAY=nebula:0.0  
# $CRS_HOME/bin/vipca
```

Oracle Cluster Verification utility displays a warning message

During the final stage of Oracle RAC 10g Release 2 installation, you may receive a warning message with the Oracle Cluster Verification utility.

For example:

```
Utility  
=====
```

OUI-25031: Some of the configuration assistants failed. It is strongly recommended that you retry the configuration assistants at this time. Not successfully running any "Recommended" assistants means your system will not be correctly configured.

1. Check the Details panel on the Configuration Assistant Screen to see the errors resulting in the failures.
2. Fix the errors causing these failures.
3. Select the failed assistants and click the 'Retry' button to retry them.

```
=====
```

Workaround: You may safely ignore this message if the cluster is operating satisfactorily.

SFCFS RAC issues

This section lists the known issues in SFCFS RAC for this release.

Deporting issues with shared disk groups

If you manually deport a shared disk group, the CVMVolDg agent does not automatically reimport it as a shared disk group. You must manually reimport it as a shared disk group.

Kernel warning messages when Veritas modules load

For SLES 10, a warning message resembling the following may be displayed in the console or the system log when Veritas modules are loaded into the kernel.

```
Warning: module not supported by Novell, setting U taint flag.  
module license 'Proprietary. Send bug reports to  
support@symantec.com' taints kernel.
```

These warning messages are displayed because the Veritas modules are proprietary. They can safely be ignored.

Netdump - Network console and crash dump facility

Symantec advises that netdump be installed and configured on all Red Hat and SUSE installations. This is not specifically for the Veritas product stack, but because this is recommended as good systems administration practice.

For information on netdump installations for Red Hat systems, see:

<http://www.redhat.com/support/wpapers/redhat/netdump/>

For information on netdump installations for SUSE systems, see:

</usr/share/doc/packages/lkcdutils/README.SuSE>

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>

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 CFSMount 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.

CVM nodes detect jeopardy state and leave cluster unnecessarily (1857558)

For SFCFS RAC 5.1, I/O fencing is provided by Oracle CRS and the Symantec fencing component is disabled.

The issue occurs if the cluster membership goes into jeopardy state; that is, there is only a single surviving heartbeat link between two sets of nodes. While in this state, if a node leaves the CVM cluster, then the other set of nodes in jeopardy membership attempt to avoid a potential split brain by gracefully stopping all of the SFCFS/RAC applications and exiting the cluster. This action is not required, because the Oracle CRS provides I/O fencing to detect and handle a split brain situation.

Workaround

In order to avoid the node in jeopardy state leaving the cluster, disable jeopardy notification from GAB by adding the `-s` option to the `/sbin/gabconfig` command in the `/etc/gabtab` file on each of the cluster nodes.

Before example of the original `/etc/gabtab` file:

```
# cat /etc/gabtab
/sbin/gabconfig -c -n4
```

Example of the new, changed `/etc/gabtab` file:

```
# cat /etc/gabtab
/sbin/gabconfig -cs -n4
```

It is recommended to reboot the cluster nodes for this change to take effect. You can reboot one cluster node at a time.

Software limitations

The following limitations apply to this release.

Volume Manager does not support RAID 5 in a cluster environment

Volume Manager does not support software RAID 5 in a shared disk environment.

Oracle Disk Manager (ODM) limitation

Oracle Disk Manager (ODM) uses the Quick I/O driver for asynchronous I/O. Do not turn off the Quick I/O mount option, which is the default.

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.

Documentation

Product guides are available on the software disc in PDF format. Symantec's Veritas SFCFS RAC documentation is also available on the Symantec website.

Symantec's Veritas SFCFS RAC 5.1 documentation set is available at the following URL:

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

Storage Foundation guides

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

Table 1-2 describes the guides in the Veritas Storage Foundation documentation set.

Table 1-2 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 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: Storage and Availability Management for Oracle Databases</i>	sf_adv_ora.pdf

Table 1-2 Guides in Veritas Storage Foundation documentation set (*continued*)

Guide Title	Filename
<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 1-3](#) describes the Veritas Storage Foundation Cluster File System (CFS) documentation set.

Table 1-3 Guides in Veritas Storage Foundation Cluster File System documentation set

Guide Title	Filename
<i>Veritas Storage Foundation Cluster File System Installation Guide</i>	sf_cfs_install.pdf
<i>Veritas Storage Foundation Cluster File System Administrator's Guide</i>	sf_cfs_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 Storage Foundation Cluster File System for Oracle RAC documentation

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

[Table 1-4](#) describes the Veritas Storage Foundation Cluster File System for Oracle RAC (SFCFS RAC) documentation set.

Table 1-4 Guides in Veritas Storage Foundation Cluster File System for Oracle RAC documentation set

Guide Title	Filename
<i>Veritas Storage Foundation Cluster File System for Oracle RAC Release Notes</i>	sfcfsrac_notes.pdf
<i>Veritas Storage Foundation Cluster File System Installation Guide</i>	sfcfsrac_install.pdf
<i>Veritas Storage Foundation Cluster File System Administrator's Guide</i>	sfcfs_admin.pdf

Veritas Cluster Server documentation

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

[Table 1-5](#) describes the Veritas Cluster Server documentation set.

Table 1-5 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

Veritas Volume Replicator documentation

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

[Table 1-6](#) describes the Veritas Volume Replicator documentation set.

Table 1-6 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 Databases documentation Changes

The 5.0 release introduces changes to the documentation for Veritas Storage Foundation for Databases. The `VRTSordoc` and `VRTSd2doc` packages no longer exist. All database guides are now in one package, `VRTSdbdoc`. New guides have been created for the GUI documentation and the PDF names have changed for existing guides.

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
```