

# Symantec™ Storage Foundation 6.1 Release Notes - Solaris

February 2015



# Symantec™ Storage Foundation Release Notes

The software described in this book is furnished under a license agreement and may be used only in accordance with the terms of the agreement.

Product version: 6.1

Document version: 6.1 Rev 9

## Legal Notice

Copyright © 2015 Symantec Corporation. All rights reserved.

Symantec, the Symantec Logo, the Checkmark Logo, Veritas, Veritas Storage Foundation, CommandCentral, NetBackup, Enterprise Vault, and LiveUpdate are trademarks or registered trademarks of Symantec Corporation or its affiliates in the U.S. and other countries. Other names may be trademarks of their respective owners.

The product described in this document is distributed under licenses restricting its use, copying, distribution, and decompilation/reverse engineering. No part of this document may be reproduced in any form by any means without prior written authorization of Symantec Corporation and its licensors, if any.

THE DOCUMENTATION IS PROVIDED "AS IS" AND ALL EXPRESS OR IMPLIED CONDITIONS, REPRESENTATIONS AND WARRANTIES, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT, ARE DISCLAIMED, EXCEPT TO THE EXTENT THAT SUCH DISCLAIMERS ARE HELD TO BE LEGALLY INVALID. SYMANTEC CORPORATION SHALL NOT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES IN CONNECTION WITH THE FURNISHING, PERFORMANCE, OR USE OF THIS DOCUMENTATION. THE INFORMATION CONTAINED IN THIS DOCUMENTATION IS SUBJECT TO CHANGE WITHOUT NOTICE.

The Licensed Software and Documentation are deemed to be commercial computer software as defined in FAR 12.212 and subject to restricted rights as defined in FAR Section 52.227-19 "Commercial Computer Software - Restricted Rights" and DFARS 227.7202, "Rights in Commercial Computer Software or Commercial Computer Software Documentation", as applicable, and any successor regulations, whether delivered by Symantec as on premises or hosted services. Any use, modification, reproduction release, performance, display or disclosure of the Licensed Software and Documentation by the U.S. Government shall be solely in accordance with the terms of this Agreement.

Symantec Corporation  
350 Ellis Street  
Mountain View, CA 94043

<http://www.symantec.com>

# Technical Support

Symantec Technical Support maintains support centers globally. Technical Support's primary role is to respond to specific queries about product features and functionality. The Technical Support group also creates content for our online Knowledge Base. The Technical Support group works collaboratively with the other functional areas within Symantec to answer your questions in a timely fashion. For example, the Technical Support group works with Product Engineering and Symantec Security Response to provide alerting services and virus definition updates.

Symantec's support offerings include the following:

- A range of support options that give you the flexibility to select the right amount of service for any size organization
- Telephone and/or Web-based support that provides rapid response and up-to-the-minute information
- Upgrade assurance that delivers software upgrades
- Global support purchased on a regional business hours or 24 hours a day, 7 days a week basis
- Premium service offerings that include Account Management Services

For information about Symantec's support offerings, you can visit our website at the following URL:

[www.symantec.com/business/support/index.jsp](http://www.symantec.com/business/support/index.jsp)

All support services will be delivered in accordance with your support agreement and the then-current enterprise technical support policy.

## Contacting Technical Support

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

[www.symantec.com/business/support/contact\\_techsupp\\_static.jsp](http://www.symantec.com/business/support/contact_techsupp_static.jsp)

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 technical support Web page at the following URL:

[www.symantec.com/business/support/](http://www.symantec.com/business/support/)

## Customer service

Customer service information is available at the following URL:

[www.symantec.com/business/support/](http://www.symantec.com/business/support/)

Customer Service is available to assist with non-technical questions, such as the following types of issues:

- Questions regarding product licensing or serialization
- Product registration updates, such as address or name changes
- General product information (features, language availability, local dealers)
- Latest information about product updates and upgrades
- Information about upgrade assurance and support contracts
- Information about the Symantec Buying Programs
- Advice about Symantec's technical support options
- Nontechnical presales questions
- Issues that are related to CD-ROMs or manuals

## Support agreement resources

If you want to contact Symantec regarding an existing support agreement, please contact the support agreement administration team for your region as follows:

Asia-Pacific and Japan [customercare\\_apac@symantec.com](mailto:customercare_apac@symantec.com)

Europe, Middle-East, and Africa [semea@symantec.com](mailto:semea@symantec.com)

North America and Latin America [supportolutions@symantec.com](mailto:supportsolutions@symantec.com)

## Documentation

Product guides are available on the media in PDF format. Make sure that you are using the current version of the documentation. The document version appears on page 2 of each guide. The latest product documentation is available on the Symantec website.

<https://sort.symantec.com/documents>

Your feedback on product documentation is important to us. Send suggestions for improvements and reports on errors or omissions. Include the title and document version (located on the second page), and chapter and section titles of the text on which you are reporting. Send feedback to:

[doc\\_feedback@symantec.com](mailto:doc_feedback@symantec.com)

For information regarding the latest HOWTO articles, documentation updates, or to ask a question regarding product documentation, visit the Storage and Clustering Documentation forum on Symantec Connect.

<https://www-secure.symantec.com/connect/storage-management/forums/storage-and-clustering-documentation>

## About Symantec Connect

Symantec Connect is the peer-to-peer technical community site for Symantec's enterprise customers. Participants can connect and share information with other product users, including creating forum posts, articles, videos, downloads, blogs and suggesting ideas, as well as interact with Symantec product teams and Technical Support. Content is rated by the community, and members receive reward points for their contributions.

<http://www.symantec.com/connect/storage-management>

# Storage Foundation Release Notes

This document includes the following topics:

- [About this document](#)
- [Component product release notes](#)
- [About Symantec Storage Foundation](#)
- [About Symantec Operations Readiness Tools](#)
- [Important release information](#)
- [Changes introduced in 6.1](#)
- [No longer supported](#)
- [System requirements](#)
- [Fixed issues](#)
- [Known issues](#)
- [Software limitations](#)
- [Documentation](#)

## About this document

This document provides important information about Symantec Storage Foundation (SF) version 6.1 for Solaris. Review this entire document before you install or upgrade SF.

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

This is "Document version: 6.1 Rev 9" of the *Symantec Storage Foundation Release Notes*. Before you start, make sure that you are using the latest version of this guide. The latest product documentation is available on the Symantec Web site at:

<https://sort.symantec.com/documents>

## Component product release notes

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

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

`/docs/product_name`

Symantec recommends copying the files to the `/opt/VRTS/docs` directory on your system.

## About Symantec Storage Foundation

Symantec Storage Foundation by Symantec (SF) is a storage management solution to enable robust, manageable, and scalable storage deployment. SF maximizes your storage efficiency, availability, agility, and performance across heterogeneous server and storage platforms.

Symantec Storage Foundation consists of product components and features that can be used individually and together to improve performance, resilience and ease of management for your storage and applications.

[Table 1-1](#) describes the components of Symantec Storage Foundation.

**Table 1-1** Symantec Storage Foundation components

Component	Description
Dynamic Multi-Pathing (DMP)	<p>Manages the I/O performance and path availability of the physical devices that are configured on the system.</p> <p>DMP creates DMP metadevices for all of the paths to each LUN. DMP uses the DMP metadevices to manage path failover and load balancing across the paths to the physical devices.</p> <p>DMP metadevices provide the foundation for Veritas Volume Manager (VxVM) and Veritas File System (VxFS). DMP also supports native operating system volumes and file systems on DMP devices.</p>
Veritas Volume Manager (VxVM)	<p>Provides a logical layer between your operating system devices and your applications.</p> <p>VxVM enables you to create logical devices called volumes on the physical disks and LUNs. The applications such as file systems or databases access the volumes as if the volumes were physical devices but without the physical limitations.</p> <p>VxVM features enable you to configure, share, manage, and optimize storage I/O performance online without interrupting data availability. Additional VxVM features enhance fault tolerance and fast recovery from disk failure or storage array failure.</p>
Veritas File System (VxFS)	<p>Provides a high-performance journaling file system.</p> <p>VxFS is designed for use in operating environments that deal with large amounts of data and that require high performance and continuous availability.</p> <p>VxFS features provide quick-recovery for applications, scalable performance, continuous availability, increased I/O throughput, and increased structural integrity.</p>
Volume Replicator (VVR)	<p>Enables you to maintain a consistent copy of application data at one or more remote locations.</p> <p>VVR replicates data to remote locations over any standard IP network to provide continuous data availability. VVR can replicate existing VxVM configurations, and can be transparently configured while the application is active. VVR option is a separately-licensable feature of Symantec Storage Foundation.</p>
I/O fencing	<p>Protects the data on shared disks when nodes in a cluster detect a change in the network cluster membership with a potential split brain condition.</p>

A related product, Veritas Operations Manager, provides a centralized management console that you can use with Symantec Storage Foundation and High Availability products.

## About Symantec Operations Readiness Tools

Symantec Operations Readiness Tools (SORT) is a website that automates and simplifies some of the most time-consuming administrative tasks. SORT helps you manage your datacenter more efficiently and get the most out of your Symantec products.

SORT can help you do the following:

- |                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|--------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Prepare for your next installation or upgrade          | <ul style="list-style-type: none"><li>■ List product installation and upgrade requirements, including operating system versions, memory, disk space, and architecture.</li><li>■ Analyze systems to determine if they are ready to install or upgrade Symantec products and generate an Installation and Upgrade custom report.</li><li>■ List patches by product or platform, and in the order they need to be installed. Display and download the most recent patches or historical patches.</li><li>■ Display Array Support Library (ASL) details by vendor, platform, or Storage Foundation and High Availability (SFHA) version. ASLs make it easier to manage arrays that are connected to SFHA-based servers.</li><li>■ List VCS and ApplicationHA agents, documentation, and downloads based on the agent type, application, and platform.</li></ul> |
| Identify risks and get server-specific recommendations | <ul style="list-style-type: none"><li>■ Analyze your servers for potential environmental risks. Generate a Risk Assessment custom report with specific recommendations about system availability, storage use, performance, and best practices.</li><li>■ Display descriptions and solutions for thousands of Symantec error codes.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

- Improve efficiency
- Get automatic email notifications about changes to patches, array-specific modules (ASLs/APMs/DDIs/DDLs), documentation, product releases, Hardware Compatibility Lists (HCLs), and VCS/ApplicationHA agents.
  - Quickly gather installed Symantec product and license key information from across your production environment. Generate a License/Deployment custom report that includes product names, versions, and platforms, server tiers, Symantec Performance Value Units (SPVUs), and End of Service Life dates.
  - List and download Symantec product documentation including product guides, manual pages, compatibility lists, and support articles.
  - Access links to important resources on a single page, including Symantec product support, SymConnect forums, customer care, Symantec training and education, Symantec FileConnect, the licensing portal, and my.symantec.com. The page also includes links to key vendor support sites.
  - Use a subset of SORT features from your iOS device. Download the application at:  
<https://sort.symantec.com/mobile>

---

**Note:** Certain features of SORT are not available for all products. Access to SORT is available at no extra cost.

---

To access SORT, go to:

<https://sort.symantec.com>

## Important release information

- For important updates regarding this release, review the Late-Breaking News TechNote on the Symantec Technical Support website:  
<http://www.symantec.com/docs/TECH211540>
- For the latest patches available for this release, go to:  
<https://sort.symantec.com/>
- The hardware compatibility list contains information about supported hardware and is updated regularly. For the latest information on supported hardware, visit the following URL:  
<http://www.symantec.com/docs/TECH211575>

- The software compatibility list summarizes each Storage Foundation and High Availability (SFHA) Solutions product stack and the product features, operating system versions, and third-party products it supports. For the latest information on supported software, visit the following URL:  
<http://www.symantec.com/docs/TECH213121>

---

**Note:** Before you install or upgrade SFHA Solutions products, review the current compatibility lists to confirm the compatibility of your hardware and software.

---

## Changes introduced in 6.1

This section lists the changes in Symantec Storage Foundation 6.1.

### Changes related to installation and upgrades

The product installer includes the following changes in 6.1.

#### **Support for SFHA 6.1 installations from any supported operating system to any other supported operating system**

You can use the Deployment Server or the web-based installer to install your 6.1 Symantec products on a target system that runs any supported UNIX or Linux platform, even if the source system and target system are running on different UNIX or Linux platforms. Prior to 6.1, releases still require the same platform, architecture, distribution, and version of the operating system.

See the *Installation Guide* for more information.

#### **Support for Solaris 11 Live Upgrade**

You can use Live Upgrade on Solaris 11 systems to perform an upgrade of the product and the Solaris operating system. For the Live Upgrade process, an alternate boot environment is created on the primary boot disk by ZFS storage application. All boot environments are saved in the current disk. Thus, an alternate boot disk is not needed anymore.

See the *Installation Guide* for more information.

#### **Improved patching and updating process**

You can now download product maintenance releases and public hot fix releases directly from the Symantec Operations Readiness Tools (SORT) website using the installer. When you use the `installer` command with the `-version` option, the

installer now lists the available GA releases, maintenance releases, and hot fix releases. If you have Internet access, you can follow the installer prompts to download available patches and hot fixes to your local system.

Downloading patches and hot fixes requires the installer to make outbound networking calls. If you know your systems are behind a firewall, or do not want the installer to make outbound networking calls, you can disable external network attempts by running the installer using the no Internet patch center (`-noipc`) option. When using the `-noipc` option, the installer does not try to connect to SORT website. For example:

```
# ./installer -version -noipc system1 system2
```

See the *Installation Guide* for more information.

## Automatic download of installer hot fixes

If you are running the 6.1 product installer, and your system has Internet access, the installer automatically imports any needed installer hot fix, and begins using it.

If your system does not have Internet access, you can still download installer hot fixes manually using the [Symantec Operations Readiness Tools](#) patch finder tool.

Automatic downloading of installer hot fixes requires the installer to make outbound networking calls. If you know your systems are behind a firewall, or do not want the installer to make outbound networking calls, you can disable external network attempts by running the installer using the no Internet patch center (`-noipc`) option.

See the *Installation Guide* for more information.

## Support for centralized installations using the Deployment Server

The Deployment Server is a script that makes it easier to install or upgrade SFHA releases. The Deployment Server lets you store multiple release images in one central location and deploy them to systems of any supported UNIX or Linux operating system (6.1 or later). Prior to 6.1, releases still require the same platform, architecture, distribution, and version of the operating system. You can use the Deployment Server if you want to install or upgrade multiple releases and or multiple platforms.

The Deployment Server lets you do the following as described in [Table 1-2](#).

**Table 1-2** Deployment Server functionality

Feature	Description
Manage release images	<ul style="list-style-type: none"> <li>■ View available Storage Foundation releases.</li> <li>■ Download maintenance and hot fix release images from the Symantec Operations Readiness Tools (SORT) website into a repository.</li> <li>■ Load the downloaded release image files from FileConnect and SORT into the repository.</li> <li>■ View and remove release image files stored in the repository.</li> </ul>
Check versions	<ul style="list-style-type: none"> <li>■ Discovers packages and patches installed on designated systems and informs you of the product and version installed, including installed hot fixes.</li> <li>■ Identify base, maintenance, and hot fix level upgrades to your system and download maintenance and hot fix releases.</li> <li>■ Query SORT for the most recent updates.</li> </ul>
Install or upgrade systems	<ul style="list-style-type: none"> <li>■ Install or upgrade a release stored in the repository on selected systems.</li> <li>■ In release 6.1 and later: <ul style="list-style-type: none"> <li>■ Install hot fix level releases.</li> <li>■ Install SFHA from any supported UNIX or Linux operating system to any other supported UNIX or Linux operating system.</li> <li>■ Automatically load the script-based installer hot fixes that apply to that release.</li> </ul> </li> </ul>

**Note:** The Deployment Server is available only for the script-based installer, not the web-based installer.

See the *Installation Guide* for more information.

## Support for simultaneously installing or upgrading base releases, maintenance patches, and hot fixes

Beginning with version 6.1, Symantec offers you a method to easily install or upgrade your systems directly to a base, maintenance, or hot fix level in one step using Install Bundles. Install Bundles is the ability for installers to merge so customers can install or upgrade directly to maintenance or hot fix levels in one execution. Install Bundles consists of executing the installer from a GA release with a pointer to a higher maintenance or hot fix release. The installer installs them both as if they were combined in the same release image. The various scripts, packages, and

patch components are merged and multiple releases are installed together as if they are one install entity.

---

**Note:** This feature is not supported by the Deployment Server.

---

There are five possible methods of integration. All upgrades must be executed from the highest level script.

- Base + maintenance
- Base + hot fix
- Maintenance + hot fix
- Base + maintenance + hot fix
- Base or maintenance + multiple hot fixes

See the *Installation Guide* for more information.

## Changes related to Symantec Storage Foundation (SF)

Symantec Storage Foundation includes the following changes in 6.1:

### Changes related to Veritas Volume Manager

Veritas Volume Manager (VxVM) includes the following changes in 6.1:

#### DMP support for thin reclamation commands

In this release, Dynamic Multi-Pathing (DMP) adds support for the `UNMAP` command for thin reclamation. The Array Support Library (ASL) for each array uses the most suitable reclamation method supported for the array. In previous releases, DMP performed reclamation with the `WRITE_SAME` method for SCSI and the `TRIM` method for SSD devices. You can use the `vxdisk -p list` command to show the reclaim interface that is supported for a particular device.

For more information, see the *Administrator's Guide*.

#### DMP support for ZFS root on Solaris

Starting with this release, Dynamic Multi-Pathing (DMP) supports the ZFS root file system. When you install DMP with native support enabled, or enable native support with the tunable `dmp_native_support`, DMP also migrates the ZFS root pool to DMP. Reboot the system for the change to take effect.

DMP support for ZFS root requires Solaris 11 update 1 or later.

See [“Supported Solaris operating systems”](#) on page 22.

For more information about configuring ZFS root, see the *Symantec Dynamic Multi-Pathing Administrator's Guide - Solaris*.

## Enhancements to the disk cloning operations

In this release, the following enhancements are made to the VxVM support for hardware clone disks:

- When you import a disk group, the disks with the `udid_mismatch` flag display the `clone_disk` flag regardless of whether the system sees the original source disks. In previous releases, the `clone_disk` flag was hidden if the source disks were not visible to the system.
- By default, VxVM now prevents the import of a partial set of disks in a clone disk group when the `-o updateid` option is specified. This behavior prevents the missing disks from being permanently detached from the new disk group. You can specify the `-f` option to partially import the clone disk group with `-o updateid`.
- When you import a set of clone disks with the `-o updateid` option and specify a new disk group name, the disk group becomes a standard disk group with updated disk and disk group identifiers. This operation clears the `udid_mismatch` flag or the `clone_disk` flag from the disks.
- When you import a set of clone disks with the `-o updateid` option, you can use the `vxvg import` with the `-c` option to convert the existing disk group to a standard disk group with updated disk and disk group identifiers. This operation clears the `udid_mismatch` flag or the `clone_disk` flag from the disks. You cannot perform this operation if the source disk group is already imported on the same host.
- You can now update the UDID for a disk and remove the `udid_mismatch` flag and the `clone_disk` flag with a single operation. Updating the UDID aligns it with the UDID detected by the DDL.  

```
vxdisk -c updateudid diskname
```
- You cannot create disk groups on `udid_mismatch` or `clone_disk` disks.
- If disks are falsely marked as `udid_mismatch`, you can use `vxvg -c init` option to create disk groups on them.
- If the disk group has multiple clone copies, and you import the disk group with a tagname, the disks that have tags set will be selected. The tag-based import operation gives higher priority to disks with the tags set rather than the set of disks that were last imported. In previous releases, if multiple clone copies had the same disk group id, the import operation gave preference to the last import time.

## Enhancements to the Dynamic Reconfiguration tool

This section describes enhancements to the Dynamic Reconfiguration tool in this release. The Dynamic Reconfiguration tool now:

- Enables you to remove stale entries from the OS device tree.
- Prompts you to rename devices during a Dynamic Reconfiguration operation, if appropriate, and if `avid=no` in the naming scheme. If you agree, the tool renames the devices and refreshes the device list.  
For example, if you have removed the LUN named `xyz_8`, which leaves the entries `xyz_7` and `xyz_9`. The DR tool prompts you whether you want to rename the LUNs. If you agree, `xyz_9` is renamed to `xyz_8`.
- Logs messages for each use of the tool, in the format `dmpdr_yyyymmdd_HHMM.log`.
- Accepts a file containing a list of devices as input to the removal operation.
- Displays all LUNs that are not operating as candidates for removal.
- Supports pattern matching to select disks for removal. For example, you can use an asterisk (\*) to match multiple characters and a question mark (?) to match a single character. This functionality replaces the option to specify a range of devices.
- If you quit a disk removal operation without physically removing the disks, the Dynamic Reconfiguration tool prompts you to run `vxdisksetup` over the selected disks to avoid data corruption.

## Changes related to Veritas File System

Veritas File System (VxFS) includes the following changes in 6.1:

### Support for 64-bit quotas

Starting in release 6.1, 64-bit quotas are supported on disk layout Version 10. Users were earlier limited to set quota usage limits only up to 1 terabyte, restricting functionality in high data usage environments. With the support for 64-bit quotas, the quota usage limit can be set up to 4 exabytes.

As for 32-bit quotas, this continues to be supported on disk layout Version 9 or earlier. The same quota commands can be used for both 32-bit and 64-bit quotas.

As for 64-bit quotas, there are two new quotas files. For group quotas the file name is `quotas.grp.64` and for user quotas the file name is `quotas.64`. These files will be created on each file system after the disk layout version upgrade is completed.

See the *Administrator's Guide* for more information on quota files on Veritas File System.

See the *Installation Guide* for more information on upgrading disk layout versions.

### **maxlink support**

Added support for more than 64K sub-directories. If maxlink is disabled on a file system, the sub-directory limit will be 32K by default. If maxlink is enabled on a file system, this allows you to create up to  $4294967295(2^{32} - 1)$  sub-directories.

By default maxlink is enabled.

See the *Administrator's Guide*.

### **Disk layout Version 10**

In this release, disk layout Version 10 is now the default version.

Version 10 disk layout enables support for maxlink.

See the *Administrator's Guide*.

### **vxfsstat command can display per file system memory and VOP statistics**

The `vxfsstat` command can now display per file system memory and VOP statistics. The following options display the statistics:

- B Displays per file system metadata buffer cache statistics.
- I Displays per file system inode cache and DNLC statistics.
- x An already existing option that displays per file system statistics, and now additionally displays the newly added memory and VOP counters. VOP counters include VOP time and VOP count.

## **Changes related to SFDB tools**

The following sections describe the changes related to Storage Foundation for Databases (SFDB) tools in 6.1.

### **Reverse Resync for Oracle database recovery**

In this release, the SFDB tools reintroduce the Reverse Resync feature for Oracle database recovery.

Reverse Resynchronization or Reverse Resync process helps in recovering a database from its volume snapshots using FlashSnap service.

Storage Foundation Database FlashSnap service is used to reverse resynchronize an online point-in-time copies image of a database in an Oracle environment.

Reverse Resync feature was supported in 5.X release. This feature was discontinued for 6.0 and 6.0.1 releases. In the current release, Reverse Resync feature is reintroduced with the following changes:

- You can perform ReverseResyncBegin operation after ReverseResyncAbort operation
- You can control the database recovery in ReverseResyncBegin operation using the new (optional) parameters:

```
Reverse_Resync_Recovery
```

```
Reverse_Resync_Archive_Log
```

Use the following commands for reverse resynchronization of the snapshot volume:

- `vxsfdm -o rrbegin` to start the Reverse Resync operation
- `vxsfdm -o rrcommit` to commit the Reverse Resync changes
- `vxsfdm -o rrabort` to abort or cancel the Reverse Resync operation and to go back to the original data volumes

---

**Note:** Reverse resync is not supported for RAC databases.

---

### Supported Oracle configurations

In 6.1 release, SFDB tools support Oracle 12c release for Oracle databases.

---

**Note:** For Oracle 12c, the SFDB tools do not support the Multitenant database features, including the CDB and PDB databases.

---

### Support for instant mode snapshots for Oracle RAC databases

In 6.1, the SFDB tools support instant mode snapshots for Oracle RAC databases.

### Changes related to replication

Symantec Storage Foundation and High Availability Solutions includes the following changes related to replication in 6.1:

#### VVR replication performance improvements using bulk transfer

To effectively use network bandwidth for replication, data is replicated to a disaster recovery (DR) site in bulk at 256 KB. This bulk data transfer reduces Volume Replicator (VVR) CPU overhead and increases the overall replication throughput. With compression enabled, bulk data transfer improves the compression ratio and

reduces the primary side CPU usage. Bulk data transfer is not supported with bunker replication, and in cross-platform replication.

### VVR I/O throughput improvements using batched writes

Batched writing of multiple application writes to the SRL increases application I/O throughput and lowers VVR CPU utilization. This is achieved by allocating a log location for a set of application writes, and then batching the writes together to form a single write to the SRL, and therefore replacing the multiple writes to the SRL at the primary RVG.

## Changes related to product name branding

Beginning with the 6.1 release, Storage Foundation and High Availability Solutions product names are rebranded.

[Table 1-3](#) lists the rebranded Storage Foundation and High Availability Solutions products.

**Table 1-3** Rebranded Storage Foundation and High Availability Solutions products

Old product name	New product names with Symantec branding
Veritas Storage Foundation	Symantec Storage Foundation (SF)
Veritas Dynamic Multi-Pathing	Symantec Dynamic Multi-Pathing (DMP)
Veritas Replicator Option	Symantec Replicator Option
Veritas Volume Replicator	Symantec Volume Replicator (VVR)
Veritas Storage Foundation Cluster File System HA	Symantec Storage Foundation Cluster File System HA (SFCFSHA)
Veritas Storage Foundation for Oracle RAC	Symantec Storage Foundation for Oracle RAC (SFRAC)
Veritas Storage Foundation HA	Symantec Storage Foundation HA (SFHA)
Veritas Cluster Server	Symantec Cluster Server (VCS)
Veritas Disaster Recovery Advisor	Symantec Disaster Recovery Advisor (DRA)
Veritas Storage Foundation and High Availability Solutions	Symantec Storage Foundation and High Availability Solutions (SFHAS)
Veritas High Availability Agent Pack	Symantec High Availability Agent Pack

**Table 1-3** Rebranded Storage Foundation and High Availability Solutions products (*continued*)

Old product name	New product names with Symantec branding
Veritas File System Software Development Kit	Symantec File System Software Development Kit

Symantec rebranding does not apply to the following:

- Product acronyms
- Command names
- Error messages
- Alert messages
- Modules and components
- Feature names
- License key description
- Veritas Operations Manager product branding

## No longer supported

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

- The `fsspmk` command is deprecated and can no longer be used to create SmartTier placement policies.

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

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

- Storage Checkpoint policy and Storage Checkpoint quotas
- Interactive modes in clone and rollback

## Cluster Volume Manager (CVM) no longer supported for Solaris Clusters

In this release, Cluster Volume Manager (CVM) no longer supports Solaris Clusters.

# System requirements

This section describes the system requirements for this release.

## Supported Solaris operating systems

This section lists the supported operating systems for this release of Symantec products. For current updates, visit the Symantec Operations Readiness Tools Installation and Upgrade page: [https://sort.symantec.com/land/install\\_and\\_upgrade](https://sort.symantec.com/land/install_and_upgrade).

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

**Table 1-4** Supported operating systems

Operating systems	Levels	Chipsets
Solaris 10	Update 9, 10, and 11	SPARC
Solaris 11	Solaris 11.1 and up to Support Repository Updates (SRU) 11.1.21.4.1	SPARC

This release (version 6.1) is not supported on the x86-64 architecture.

This release (version 6.1) supports Solaris and Solaris10 branded zones on the Solaris 11 operating system and native brand zones on the Solaris 10 operating system.

## Supported Oracle VM Server for SPARC

Supported Oracle VM Server for SPARC (OVM) versions are OVM 2.0, OVM 2.1, OVM 2.2, OVM 3.0 and OVM 3.1.

For supported OS version for Oracle VM Server for SPARC, refer to *Oracle VM server for SPARC Release Notes*.

The version of the Oracle Solaris operating system (OS) that runs on a guest domain is independent of the Oracle Solaris OS version that runs on the primary domain. Therefore, if you run the Oracle Solaris 10 OS in the primary domain, you can still run the Oracle Solaris 11 OS in a guest domain. Likewise if you run the Oracle Solaris 11 OS in the primary domain, you can still run the Oracle Solaris 10 OS in a guest domain.

The only difference between running the Oracle Solaris 10 OS or the Oracle Solaris 11 OS on the primary domain is the feature difference in each OS.

## Storage Foundation for Databases features supported in database environments

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

**Table 1-5** SFDB features supported in database environments

Symantec Storage Foundation feature	DB2	Oracle	Oracle RAC	Sybase	Sybase ASE CE
Oracle Disk Manager	No	Yes	Yes	No	No
Cached Oracle Disk Manager	No	Yes	No	No	No
Quick I/O	Yes	Yes	Yes	Yes	Yes
Cached Quick I/O	Yes	Yes	Yes	Yes	Yes
Concurrent I/O	Yes	Yes	Yes	Yes	Yes
Storage Checkpoints	Yes	Yes	Yes	Yes	Yes
Flashsnap	Yes	Yes	Yes	Yes	Yes
SmartTier	Yes	Yes	Yes	Yes	Yes
Database Storage Checkpoints <b>Note:</b> Requires Enterprise license	No	Yes	Yes	No	No
Database Flashsnap <b>Note:</b> Requires Enterprise license	No	Yes	Yes	No	No
SmartTier for Oracle <b>Note:</b> Requires Enterprise license	No	Yes	Yes	No	No

### Notes:

- SmartTier is an expanded and renamed version of Dynamic Storage Tiering (DST).
- Storage Foundation for Databases (SFDB) tools Database Storage Checkpoint, Database Flashsnap, and SmartTier for Oracle are supported with an Enterprise product license.

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

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

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

## Symantec Storage Foundation memory requirements

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

## Fixed issues

This section covers the incidents that are fixed in this release.

### Installation and upgrades fixed issues

This section describes the incidents that are fixed related to installation and upgrades in this release.

**Table 1-6** Fixed issues related to installation and upgrades

Incident	Description
2016346	Installed 5.0 MP3 without configuration, then upgrade to 6.0.1, installer cannot continue.
3098297	Uninstalling Symantec Storage Foundation does not remove the vxddl service from the svcs database.

## Symantec Storage Foundation fixed issues

Issues fixed for Symantec Storage Foundation (SF) includes issues fixed for Veritas File System and Veritas Volume Manager.

See [“Veritas File System fixed issues”](#) on page 24.

See [“Veritas Volume Manager fixed issues”](#) on page 29.

## Veritas File System fixed issues

This section describes the incidents that are fixed in Veritas File System (VxFS) in this release.

**Table 1-7** Veritas File System fixed issues

Incident	Description
3331134	File system hangs due to a race condition when inodes are re-used from the delicache list.
3331125	Enhancement to handle partial compressed extents during dedupe operation.
3331109	Additional checks in <code>fsck</code> to prevent file system metadata corruption with <code>filesnap</code> .
3331105	The <code>fsck</code> command does not validate if multiple reorg inodes point to the same source inode.
3331095	The <code>fsppadm</code> utility dumps core when an incorrect policy is specified during enforcement.
3331071	The <code>fsppadm</code> query and enforcement should honor the <code>-P</code> option to exclude private files.
3331045	The system panics in <code>vx_unlockmap</code> due to null pointer dereference.
3331032	If a sparse zone is configured on the system and is in running state, the installation of <code>VRTSvxfs</code> package fails and the <code>vxfsdlic</code> SMF service inside the local zones goes into maintenance state.
3331010	File system full <code>fsck</code> fails as it erroneously accesses freed memory during RCT processing.
3330982	The VxFS-AMF integration needs to be enhanced to support mounts inside the non-global zone.
3310755	<code>fsck</code> fix to handle ZFOD extents while processing the <code>VX_RCQ_OP_DEC_ALL</code> operation.
3308673	A fragmented FS may get disabled when delayed allocations are enabled.
3298041	With the delayed allocation feature enabled on a locally mounted file system, observable performance degradation might be experienced when writing to a file and extending the file size.
3291635	The file system hangs when RCQ is full.

**Table 1-7** Veritas File System fixed issues (*continued*)

Incident	Description
3261462	Mapbad corruption due to buffer overrun of VX_TYPED_4 to VX_TYPED_DEV8 conversion.
3253210	The file system hangs when it has reached the space limit.
3252983	During the test after having ported from 2486597, you see a dead loop situation where CPU is taken 100%, and the system barely responds.
3249958	When /usr is mounted as a separate file system, the VxFS fails to load.
3233284	The <code>fsck</code> (1M) command hangs while checking Reference Count Table (RCT).
3228955	Some <code>fsck</code> enhancements to check that invalid extops are not present in older file system layouts.
3224101	After the optimization is enabled for updating the <code>i_size</code> across the cluster nodes lazily, the system panics.
3214816	With the DELICACHE feature enabled, frequent creation and deletion of the inodes of a user may result in corruption of the user quota file.
3194635	File system metadata corruption involving ZFOD extents and filesnap or compression.
3189562	Oracle daemons get hang with the <code>vx_growfile()</code> kernel function.
3164418	Data corruption happens due to the ZFOD split during ENOSPC conditions.
3153919	The <code>fsadm</code> shrink may hang, waiting for the hlock ownership while structural file set reorg is in progress.
3152313	With the Partitioned Directories feature enabled, removing a file may panic the system.
3150368	The <code>vx_writesuper()</code> function causes the system to panic in <code>evfsevol_strategy()</code> .
3142045	With Oracle 12c version, Veritas ODM library gives a version mismatch error.

**Table 1-7** Veritas File System fixed issues (*continued*)

Incident	Description
3140990	Requirement for the ability to turn off VxFS's invalidation of pages for some Network File System (NFS) workloads.
3137886	Thin Provisioning Logging does not work for reclaim operations triggered via <code>fsadm</code> .
3101418	The current time returned by the operating system (Oracle error code ORA-01513) during Oracle startup is invalid.
3096834	Intermittent <code>vx_disable</code> messages display in the system log.
3089211	When you add or remove CPUs, Veritas File System (VxFS) may crash with the Data Storage Interrupt (DSI) stack trace.
3069695	Default Access Control Lists (ACLs) are handled on named attributes.
3068902	In case of stale NFS mounts, the <code>statfs()</code> function calls on non-VxFS file systems may cause <code>df</code> commands to hang.
3066116	The system panics due to the NULL pointer dereference at the <code>vx_worklist_process()</code> function.
3042485	The fix to address file system metadata corruption involves named attribute directories.
3040944	The file system hangs due to a deadlock between the <code>dalloc</code> flusher thread and <code>dalloc</code> freeze under ENOSPC conditions.
3029093	The <code>fsck</code> command fails to repair a file system with inconsistencies in RCT/RCQ records.
3011959	The system may panic because of the file system locking or unlocking using the <code>fsadm(1M)</code> or the <code>vxumount(1M)</code> command.
3003679	When you run the <code>fsppadm(1M)</code> command and remove a file with the named stream attributes ( <code>nattr</code> ) at the same time, the file system does not respond.
2999493	The file system check validation fails after a successful full <code>fsck</code> during the internal testing with the following message: <code>run_fsck : First full fsck pass failed, exiting.</code>

**Table 1-7** Veritas File System fixed issues (*continued*)

Incident	Description
2983248	The <code>vxrepquota(1M)</code> command dumps core.
2977697	A core dump is generated while the clone is being removed.
2966277	The high file system activities like read, write, open and lookup may panic the system.
2926684	In rare cases, the system may panic while performing a logged write.
2924447	Full <code>fsck</code> performance needs to be improved to reduce the amount of disk I/O.
2923105	Removal of the VxFS module from the kernel takes a longer time.
2916691	The <code>fsdedup</code> command hangs with an infinite loop in <code>vx_dedup_extents</code> .
2908391	It takes a long time to remove checkpoints from the VxFS file system, when there are a large number of files present.
2906018	The <code>vx_iread</code> errors are displayed after successful log replay and mount of the file system.
2905820	If the file is being read via the NFSv4 client, then removing the same file on the NFSv4 server may hang if the file system is VxFS.
2885592	The <code>vxdump</code> operation is aborted on file systems which are compressed using the <code>vxcompress</code> command.
2881211	File ACLs are not preserved in checkpoints properly if the file has a hardlink.
2878164	VxFS consumes too much pinned heap.
2864471	The file system hangs during clone removal with Partition directory turned on.
2858683	For files greater than 8192 bytes, the <code>reserve-extent</code> attribute is changed after you run the command <code>vxrestore</code> .
2841059	The file system is marked for a full <code>fsck</code> operation and the attribute <code>inode</code> is marked as <code>bad ondisk</code> .

**Table 1-7** Veritas File System fixed issues (*continued*)

Incident	Description
2839871	On a system with DELICACHE enabled, several file system operations may hang.
2833450	The <code>fstyp</code> command returns a negative value for the ninode on file systems larger than 2 TB.
2827751	High kernel memory allocation occurs when Oracle Disk Manager (ODM) is used with non-VxVM devices.
2825125	VxFS does not support for sub-directories larger than 64K.
2781552	Mount detects the file system not being clean and hence sets the <code>fullfsck</code> flag. <code>fsck</code> is not able to clean the system.
2750860	Performance of the write operation with small request size may degrade on a large file system.
2720034	The <code>vxfsckd</code> daemon does not restart after being manually killed.
2667658	The <code>fscdsconv_endian</code> conversion operation fails because of a macro overflow.
2624262	System panics while executing dedup operation.
2444146	The Oracle Disk Manager read returns EINTR while running unspecified Oracle jobs.
2417858	VxFS quotas do not support 64 bit limits.

## Veritas Volume Manager fixed issues

This section describes the incidents that are fixed in Veritas Volume Manager (VxVM) in this release. This list includes Volume Replicator fixed issues.

**Table 1-8** Veritas Volume Manager fixed issues

Incident	Description
2715124	The <code>vxrecover</code> command does not handle RAID5 volumes correctly.
2866299	The <code>vxrecover</code> command does not automatically recover layered volumes in an RVG
3325371	When using snapshots, there is a panic in <code>vol_multistepsio_read_source</code> .

**Table 1-8** Veritas Volume Manager fixed issues (*continued*)

Incident	Description
3312162	VVR:DV: Verification of the remote volumes found differences with <code>vradmin verifydata</code> .
3283525	Data Change Object (DCO) corruption after volume resize leads to <code>vxconfigd</code> hang.
3271595	VxVM should not allow turning off disk reclaim flag when there are pending reclaims on the disk.
3261601	<code>dmp_destroy_dmpnode</code> trying to free an already freed address.
3258276	DMP paths keep huge layer open number which causes SSD driver's total open number overflows (0x80000000).
3254311	The system panics when reattaching the site to a site-consistent disk group having a volume larger than 1 TB.
3249264	Disks get into the <code>ERROR</code> state after being destroyed with the command <code>vxdbg destroy dg-name</code> .
3240858	The <code>/etc/vx/vxesd/.udev_lock</code> file may have different permissions at different instances.
3237503	System hang may happen after creating space-optimized snapshot with large size cache volume.
3236773	Multiple error messages of format <code>vxndmp V-5-3-0 dmp_indirect_ioctl: Ioctl Failed</code> can be seen during set/get failover-mode for EMC ALUA disk array.
3235350	System panic by <code>vxiod</code> process.
3218013	Dynamic Reconfiguration (DR) Tool does not delete stale OS (operating system) device handles.
3199398	Output of the command <code>vxndmpadm pgrereg</code> depends on the order of DMP node list where the terminal output depends on the last LUN (DMP node).
3199056	Veritas Volume Replicator (VVR) primary system panics in the <code>vol_cmn_err</code> function due to the VVR corrupted queue.
3194358	Continuous I/O error messages on OS device and DMP node can be seen in the syslog associated with the EMC Symmetrix not-ready (NR) LUNs.
3188154	<code>vxconfigd</code> is down after enabling native support on and reboot.

**Table 1-8** Veritas Volume Manager fixed issues (*continued*)

Incident	Description
3185471	iSCSI Luns visible to the host triggers VM to import every disk group visible to the host, regardless of the <code>autoimport</code> flag. VCS imported disk groups on another host and triggered a split-brain situation.
3182350	If there are more than 8192 paths in the system, the <code>vxassist(1M)</code> command hangs when you create a new VxVM volume or increase the existing volume's size.
3182175	The <code>vxdisk -o thin, fssize list</code> command can report incorrect file system usage data.
3178029	The value of "different blocks" is more than 100% while syncing the <code>rvg</code> .
3162418	The <code>vxconfigd(1M)</code> command dumps core due to an incorrect check in the <code>ddl_find_cdevno()</code> function.
3160973	The <code>vxlist(1M)</code> command hangs while executing on Extensible Firmware Interface (EFI) formatted disk is attached to host.
3152769	DMP Path failover takes time in Oracle VM Server for SPARC environments when one I/O domain is down.
3146715	Rlinks do not connect with Network Address Translation (NAT) configurations on Little Endian Architecture.
3138849	Sometimes <code>es_rcm.pl</code> is triggered before <code>vxconfigd</code> is up.
3131071	The Veritas Volume Manager (VxVM) patch installation in Solaris Alternate Boot Environment (ABE) results in data corruption.
3130379	The <code>vxplex</code> command core dumped under random memory allocation failures.
3126204	[VVR] : machine panics when SRL is full.
3125631	With latest train snapshot fails for <code>dbdst</code> setup with error <code>vxsnap ERROR V-5-1-6433 Component volume has changed</code> .
3116990	The syslog is filled with extra write protected messages.
3114999	An operating system boot fails after an encapsulated upgrade of SF 6.0.1.
3114134	Smart(sync) Autosync fails to work and instead replicates the entire volume size for larger sized volumes.
3111062	Make the <code>vxrsync</code> socket connection mechanism more robust.

**Table 1-8** Veritas Volume Manager fixed issues (*continued*)

Incident	Description
3107741	<code>vxrvrg snapdestroy</code> fails with a Transaction aborted waiting for io drain error and <code>vxconfigd</code> hangs for about 45 minutes.
3090667	System panics/hangs while executing <code>vxdisk -o thin,fssize list</code> as part of VOM SF discovery.
3087893	EMC PowerPath pseudo device mappings change with each reboot with VxVM.
3086627	The VxVM <code>vxdisk ERROR V-5-1-16282 Cannot retrieve stats: Bad address</code> error message displays while using <code>vxdisk -o thin,fssize list</code> for hitachi_usp-vm0 enclosure on the array configured for truecopy P-VOLs.
3076093	The patch upgrade script <code>installrp</code> can panic the system while doing a patch upgrade.
3063378	Some VxVM commands run slowly when EMC PowerPath presents and manages "read only" devices such as EMC SRDF-WD or BCV-NR.
3046560	<code>loctl DKIOCGVTOC</code> to raw character volume fails.
3041014	Beautify error messages which are seen on the execution of <code>relayout</code> command.
3038382	The <code>vxlufinish(1M)</code> command runs <code>fuser -k</code> on non-root file systems, which is unexpected.
3026977	Dynamic Reconfiguration (DR) operation of <code>vxdiskadm</code> removes LUNs even those which are not in Failing/Unusable state.
3012929	<code>vxconfigbackup</code> keeps old disk names in its files and gives errors, when disk names are changed.
3011405	The <code>vxtune -o export</code> command failed with V-5-1-8826 (EXDEV).
3010191	Previously excluded paths are not excluded after upgrade to VxVM 5.1SP1RP3.
3002770	While issuing a SCSI inquiry command, NULL pointer dereference in DMP causes system panic.
3002498	When a disk is initialized with the <code>vxdisk -f init daname</code> command, <code>vxconfigd(1M)</code> dumps core.
2994976	BAD TRAP panic in <code>vxio:vol_mv_pldet_callback</code> .

**Table 1-8** Veritas Volume Manager fixed issues (*continued*)

Incident	Description
2992667	When new disks are added to the SAN framework of the Virtual Intelligent System (VIS) appliance and the Fibre Channel (FC) switcher is changed to the direct connection, the <code>vxdisk list</code> command does not show the newly added disks even after the <code>vxdisk scandisks</code> command is executed.
2979824	The <code>vxdiskadm(1M)</code> utility bug results in the exclusion of the unintended paths.
2970368	Enhance handling of SRDF-R2 Write-Disabled devices in DMP.
2969844	The device discovery failure should not cause the DMP database to be destroyed completely.
2964547	Cannot load module 'misc/tesd' during system reboot.
2959733	Handling the device path reconfiguration in case the device paths are moved across LUNs or enclosures to prevent the <code>vxconfigd(1M)</code> daemon coredump.
2959325	The <code>vxconfigd(1M)</code> daemon dumps core while performing the disk group move operation.
2957556	The 'vxdisksetup' command fails when <code>tpdmode</code> is native and enclosure based naming scheme is on.
2948172	Executing the <code>vxdisk -o thin,fssize list</code> command can result in panic.
2946440	Add back the support for "INF" for LSI and ENGENIO VIDs to the LSI ASL.
2940446	A full file system check (fsck) hangs on I/O in Veritas Volume Manager (VxVM) when the cache object size is very large.
2925893	Make changes to Huawei APM to skip re-registering the keys on Secondary during failover.
2919714	On a thin Logical Unit Number (LUN), the <code>vxevac(1M)</code> command returns 0 without migrating the unmounted-VxFS volumes.
2915836	<code>vxnotify</code> does not report volume enabled message.
2915751	Solaris machine panics during dynamic lun expansion of a CDS disk.
2911040	The restore operation from a cascaded snapshot leaves the volume in unusable state if any cascaded snapshot is in the detached state.
2899173	The <code>vxconfigd(1M)</code> daemon hangs after executing the <code>vradmin stoprep</code> command.

**Table 1-8** Veritas Volume Manager fixed issues (*continued*)

Incident	Description
2898547	The <code>vradmind</code> process dumps core on the Veritas Volume Replicator (VVR) secondary site in a Clustered Volume Replicator (CVR) environment, when Logowner Service Group on VVR Primary Site is shuffled across its CVM (Clustered Volume Manager) nodes
2898324	UMR errors reported by Purify tool in <code>vradmind migrate</code> command.
2882566	On Solaris, you can successfully add a disk which is removed from a disk group using the <code>vx dg rmdisk -k</code> command to another disk group without any error messages
2882312	If an SRL fault occurs in the middle of an I/O load, and you immediately issue a read operation on data written during the SRL fault, the system returns old data.
2880981	Thin Reclamation of EMC Symmetrix array with Microcode 5876 could fail with error EIO.
2878876	The <code>vxconfigd</code> daemon dumps core in <code>vol_cbr_dolog()</code> due to race between two threads processing requests from the same client.
2876706	VxVM commands hang when a LUN is changed to <code>not_ready</code> state from the array.
2875962	During the upgrade of VRTSaslapm package, a conflict is encountered with VRTSvxvm package because an APM binary is included in VRTSvxvm package which is already installed.
2869514	Issue with a configuration with large number of disks when the joining node is missing disks.
2866997	VxVM Disk initialization fails as an un-initialized variable gets an unexpected value after OS patch installation.
2866299	The <code>vxrecover</code> command does not automatically recover layered volumes in an RVG.
2859470	The Symmetrix Remote Data Facility R2 (SRDF-R2) with the Extensible Firmware Interface (EFI) label is not recognized by Veritas Volume Manager (VxVM) and goes in an error state
2857044	System crashes while resizing a volume with Data Change Object (DCO) version 30.

**Table 1-8** Veritas Volume Manager fixed issues (*continued*)

Incident	Description
2851403	System panics while unloading <code>vxio</code> module when SmartMove feature is used and the <code>vxportal</code> module is reloaded (for example, during VxFS package upgrade).
2836528	Unable to grow LUN dynamically on Solaris x86 using <code>vxdisk resize</code> command.
2815517	The <code>vxdbg adddisk</code> command allows mixing of clone and non-clone disks in a disk group.
2807158	On Solaris platform, sometimes system can hang during VM upgrade or patch installation.
2779580	The <code>vradmin repstatus</code> operation may display a configuration error after cluster reconfiguration in a CVR environment.
2762147	I/O hangs on the primary node when running the <code>vxrvsg snapstore</code> operation.
2753954	At cable disconnect on port1 of dual-port FC HBA, paths via port2 marked SUSPECT.
2751423	<code>vxconfigd</code> core dumps in <code>ddl_migration_devlist_removed</code> during execution of internal testing.
2742706	Panic due to mutex not being released in <code>vxlo_open</code> .
2737686	The <code>vxddladm list [devices hbas ports targets]</code> command shows invalid output in some platforms and in some platforms the output fields are empty.
2643506	<code>vxconfigd</code> core dumps when different LUNs of same enclosure are configured with different array modes.
2567618	The VRTSexplorer dumps core in <code>vxcheckhbaapi/print_target_map_entry</code> .
2510928	The extended attributes reported by <code>vxdisk -e list</code> for the EMC SRDF luns are reported as <code>tdev mirror</code> , instead of <code>tdev srdf-r1</code> .
2422535	Changes on the Veritas Volume Manager (VxVM) recovery operations are not retained after the patch or package upgrade.
2398954	The system panics while performing I/O on a VxFS mounted instant snapshot with the Oracle Disk Manager (ODM) SmartSync enabled.

**Table 1-8** Veritas Volume Manager fixed issues (*continued*)

Incident	Description
2366066	The VxVM (Veritas Volume Manager) <code>vxstat</code> command displays absurd statistics for READ & WRITE operations on VxVM objects.
2354560	The <code>vxvg listclone</code> command output may not list all the disks with <code>clone_disk</code> or <code>udid_mismatch</code> flag set
2165920	The <code>vxrelocd(1M)</code> daemon creates a defunct (zombie) process.
2152830	In a multilevel clone disks environment, a regular disk group import should be handled properly. In the case of a disk group import failure, it should report the correct error message.
2149922	Importing a disk group using clone disks fails with a "wrong usage" or "invalid attribute" error.
2123677	Expanding a LUN to a size greater than 1 TB fails to show the correct expanded size.
2106530	<code>vxresize(1M)</code> fails for a data volume in <code>rootdg</code> if filesystem is mounted using block device reference as <code>bootdg</code> .
2101093	A system panic is observed in the <code>dmp_signal_event()</code> function.
2000585	<code>vxrecover</code> does not start remaining volumes if one of the volumes is removed during <code>vxrecover</code> command run.
1973983	The <code>vxunreloc(1M)</code> command fails when the Data Change Object (DCO) plex is in DISABLED state.
1953257	Panic in <code>voldiodone</code> , because a disk with hung IO is moved out of the disk group.
1952197	Running <code>vxtrace</code> against a volume shows response times as negative.
1942051	I/O hangs on master node after disabling secondary paths from slave node and rebooting slave node.
1903700	Removing mirror using <code>vxassist</code> does not work.
1902483	Unique PGR key per group is not needed.
1765916	VxVM socket files do not have proper write protection.
1289985	<code>vxconfigd</code> core dumps upon running the <code>vxctl enable</code> command.

## Symantec Storage Foundation for Databases (SFDB) tools fixed issues

[Table 1-9](#) describes the Symantec Storage Foundation for Databases (SFDB) tools issues fixed in this release.

**Table 1-9** SFDB tools fixed issues

Incident	Description
2591463	Database Storage Checkpoint unmount may fail with device busy.
2534422	FlashSnap validate reports snapshot unsplitable.
2580318	dbed_vmclonedb ignores new clone SID value after cloning once.
2579929	User authentication fails.
2479901	FlashSnap resync fails if there is an existing space-optimized snapshot.
2869268	Checkpoint clone fails in a CFS environment if cloned using same checkpoint and same clone name on both nodes.
2849540	Very long off-host cloning times for large number of data files.
2715323	SFDB commands do not work with the ZHS16GBK character set.

## Known issues

This section covers the known issues in this release.

### Installation known issues

This section describes the known issues during installation and upgrade.

#### **On Solaris 11 non-default ODM mount options will not be preserved across package upgrade (2745100)**

On Solaris 11, before the package upgrade if Oracle Disk Manager (ODM) is mounted with non-default mount options such as `nocluster`, `nosmartsync`, etc., these mount options will not get preserved after package upgrade.

There is no workaround at this time.

## On Solaris 10 `xprtld` will not be started if user use jumpstart to install product (3325954)

If you install the operating system plus the Symantec product using the JumpStart method and after installation, reboot the machine then configure and start the product, all the processes will be started except for `xprtld` process.

### Workaround:

After reboot, manually execute the following command to start `xprtld`:

```
# /opt/VRTSsfmh/adm/xprtldctrl start
```

## During Live Upgrade, installer displays incorrect message about VRTSaa package removal (1710504)

If you use Live Upgrade to upgrade SF 5.0MP1 to SF 6.1, the installer may display a message that the VRTSaa package failed to uninstall.

**Workaround:** Verify whether the VRTSaa package was removed correctly from the alternate boot disk.

```
# pkginfo -R alternate_root_path -l VRTSaa
```

For example, run the following command

```
# pkginfo -R /altroot.5.10 -l VRTSaa
```

If the VRTSaa package was removed, you can ignore this error.

If the VRTSaa package was not removed, remove the package manually:

```
# pkgrm -R alternate_root_path -l VRTSaa
```

For example, run the following command

```
# pkgrm -R /altroot.5.10 -l VRTSaa
```

## Live Upgrade to Solaris 10 Update 10 fails in the presence of zones (2521348)

SFCFSHA Live Upgrade from Solaris 10 Update 7 5.1SP1 to Solaris 10 Update 10 using the `vxlustart` commands fails in the presence of zones with the following error message:

```
ERROR: Installation of the packages from this media of the media failed;
pfinstall returned these diagnostics:
Processing default locales
    - Specifying default locale (en_US.ISO8859-1)
```

```
Processing profile
ERROR: This slice can't be upgraded because of missing usr packages for
the following zones:
ERROR:     zone1
ERROR:     zone1
ERROR: This slice cannot be upgraded because of missing usr packages for
one or more zones.
The Solaris upgrade of the boot environment <dest.27152> failed.
```

This is a known issue with the Solaris `luupgrade` command.

**Workaround:** Check with Oracle for possible workarounds for this issue.

### **During upgrade from 5.1SP1 to 6.1 with an encapsulated root disk, splitting the root mirror fails if the target disk group name is used by a deported disk group (2280560)**

During an upgrade from SF 5.1 SP1 to SF 6.1 with an encapsulated root disk, splitting the root mirror fails if the target disk group name for the split operation is used by an existing deported disk group.

**Workaround:**

Specify a different disk group name as a target for the split operation.

### **On Solaris 10, a flash archive installed through JumpStart may cause a new system to go into maintenance mode on reboot (2379123)**

If a Flash archive is created on a golden host with encapsulated root disks, when this Flash archive is installed onto another host through JumpStart, the new system may go to maintenance mode when you initially reboot it.

This problem is caused by the predefined root disk mirror in the Flash archive. When the archive is applied to a clone system, which may have different hard drives, the newly cloned system may get stuck at root disk mirroring during reboot.

**Workaround:** Create the Flash archive on a golden host with no encapsulated root disks. Run `vxunroot` to clean up the mirrored root disks before you create the Flash archive.

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

If you install or configure SF and then close the Web installer, if you have other browser windows open, the Web installer does not ask for authentication in the

subsequent sessions. Since there is no option to log out of the Web installer, the session remains open as long as the browser is open on the system.

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

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

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

**Workaround:** Do one of the following:

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

### **The installer -license sys1 command does not show the check result if the system already has the SF Basic license key registered (3343592)**

For SF Basic, you can use the `installer -license sys1` command to register the SF Basic key. After the command completes, however, and you try to run the same command again, the product installer does not tell you that the system has a registered license key.

**Workaround:** You can either run the `vxlicrep` command to see the registered license keys on the system, or simply ignore the second run of the `installer -license sys1` command.

## **Symantec Storage Foundation known issues**

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

### **Not all the objects are visible in the VOM GUI (1791063, 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 Diskgroup tab in the VOM GUI.

**Workaround:**

**To resolve this known issue**

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

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

**A volume's placement class tags are not visible in the Veritas Enterprise Administrator GUI when creating a dynamic storage tiering placement policy (1880081)**

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

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

## Veritas Volume Manager known issues

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

**Creating a disk group with a large number of objects or splitting, joining, or moving such a disk group reports an out of kernel memory error (3069711)**

When you create a disk group with an extremely large number of objects (volumes, snapshots, plexes, disks), you may see the following error:

```
ERROR-V-5-1-10128 Out of kernel memory
```

You may also see the error when you perform operations like split, join, move on such a disk group.

Each object has a record which is used for its description and state. These records are stored in the private region of every disk group. The default private region size is 32 MB which can accommodate a sufficient number of objects. If the private region of disk group does not have space to create a new record, the operation fails with the above error message. Typical use cases would not hit this condition.

**Workaround:**

The best practice is not to have an extremely large number of objects in the disk group. Instead, split the disk group into multiple disk groups.

Refer to the section “Reorganizing the contents of disk groups” in the *Administrator's Guide* for information about splitting disk groups.

### **For Solaris 11.1 or later, the system can panic when system is rebooted after turning `dmp_native_support` to on (3341674)**

For Solaris 11.1 or later when more than 512 LUNs are configured, the system can panic when the system is rebooted after setting the tunable parameter `dmp_native_support` to on.

#### **Workaround:**

For Solaris 11.1 or later, DMP native support for ZFS is restricted to set-ups with no more than 512 LUNs.

### **Disk greater than 1TB goes into error state (3269099)**

If a path of a device having multiple paths is labelled with the EFI format using an operating system command such as `format`, the `vxdisk list` command output shows the device in error state.

#### **Workaround:**

This issue is a Solaris OS issue. There is no workaround for this issue.

### **Importing an exported zpool can fail when DMP native support is on (3133500)**

On Solaris, when the tunable `dmp_native_support` is set to on, importing an exported zpool using the command `zpool import poolname` can fail with following error:

```
Assertion failed: rn->rn_nozpool == B_FALSE, file
../common/libzfs_import.c,
line 1084, function zpool_open_func
Abort (core dumped)
```

#### **Workaround:**

Import the zpool using the following command, specifying the DMP device directory:

```
# zpool import -d /dev/vx/dmp poolname
```

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

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

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

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

### Workaround:

#### To recover from this situation:

- 1 Retrieve the disk media identifier (dm\_id) from the configuration copy:

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

The dm\_id is also the serial split brain id (ssbid).

- 2 Use the dm\_id in the following command to recover from the situation:

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

## Probing vxio with DTrace fails on Sparc machines. (2180635)

This issue exists because of inability of DTrace to load a module whose text size is greater than 2MB on Sparc machines. While trying to load vxio with DTrace you may see following warning messages on console:

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

There is no workaround for this issue.

## Disks on the LDOM guest are claimed under other\_disks category (2354005)

The disks on the LDOM guest are claimed under "other\_disks" enclosure, because these disks are not capable of being multi-pathed by DMP. This is expected because these devices represent VxVM volumes in the host. By design, devices under other\_disks enclosure have their name based on underlying OS path regardless of the DDL naming scheme.

## DMP uses OS device physical path to maintain persistence of path attributes from 6.0 (2410716)

From release 6.0, DMP uses OS device physical path instead of logical name to maintain persistence of path attributes. Hence after upgrading to DMP 6.0 or later releases, path attributes are reset to the default values. You must reconfigure the path-level attributes that were defined in the `/etc/vx/dmppolicy.info` file.

### Workaround:

To configure path-level attributes:

- 1 Remove the path entries from the `/etc/vx/dmppolicy.info` file.
- 2 Reset the path attributes.

## The `vxsnap print` command shows incorrect value for percentage dirty (2360780)

The `vxsnap print` command can display the percentage of regions that differ between snapshots, shown as the `%dirty`. In SF 6.1, if this command is run while the volumes are online and being actively used, the shown `%dirty` may lag from actual percentage dirty for instant snap data cache object (DCO) volumes. That is, the command output may show less `%dirty` than actual.

## After changing the preferred path from the array side, the secondary path becomes active (2490012)

For EVA arrays, DMP requires that the `prefer` bit is static. If the `prefer` bit is not static, issues like the following may occur. After changing the `prefer` path of LUN from the array side, and performing a disk discovery (`vxdisk scandisks`) from the host, the secondary path becomes active for the LUN.

### Workaround:

To work around this issue

- 1 Set the `pref` bit for the LUN.
- 2 Perform disk discovery again:

```
# vxdisk scandisks
```

## Removing an array node from an IBM Storwize V7000 storage system also removes the controller (2816589)

When using an IBM Storwize V7000 storage system, after removing one array node, the corresponding controller is also removed.

**Workaround:** The following procedure resolves this issue.

To resolve this issue

- 1 Set the `io timeout` tunable to 600:

```
# vxddmpadm setattr enclosure enc11 recoveryoption=throttle \  
io timeout=600
```

- 2 After you re-add the SAN VC node, run the `vxddctl enable` command for Dynamic Multi-Pathing (DMP) to detect the added paths:

```
# vxddctl enable
```

## Upgrading from Symantec Storage Foundation 5.x to 6.1 may fail for IBM XIV Series arrays (2715119)

Starting in the Symantec Storage Foundation 5.1 SP1 release, the Array Support Library (ASL) for the IBM XIV enclosures converts the LUN Serial Number from hexadecimal to decimal. Because of this change, the enclosure names differ from releases prior to the 5.1 SP1 releases. When you upgrade Symantec Storage Foundation from a release prior to that release to the current 6.1 release, XIV LUNs may go into an error state. Note that the latest RPs on 5.1/5.1SP1 are already modified to use the same logic for enclosure naming.

**Workaround:**

After the upgrade, run `vxddladm assign names`.

## Cannot grow Veritas Volume Manager (VxVM) disk using the `vxdisk resize` command during Dynamic LUN Expansion operation (2064510)

The following error message is displayed during the Dynamic LUN Expansion operation of a LUN with the SIMPLE format:

```
VxVM vxdisk ERROR V-5-1-8643 Device <device name>: resize failed:  
Invalid data in request
```

The `vxdisk resize` command keeps the cylinder size (number of the heads \* total number of the sectors per track) constant before and after the resize operation,

unless the number of cylinders go beyond  $2^{16}-1$  (65535). Because of the VTOC limitation of storing geometry values only till  $2^{16}-1$ , if the number of cylinders increases beyond the limit, `vxdisk resize` increases the cylinder size. If this happens, the private region will overlap with the public region data and corrupt the user data.

As a result of this LUN geometry change, VxVM is unable to complete `vxdisk resize` on simple format disks. VxVM was not designed to handle such geometry changes during Dynamic LUN Expansion operations on simple disks.

**Workaround:**

The VxVM `vxdisk resize` command behaves differently depending on whether the disk is simple, sliced, or CDS format.

The problem shown above only occurs on simple disk configurations. As a result of this difference in behavior, if the geometry changes during a Dynamic LUN Expansion operation at the LUN level, you can convert the disk to a CDS format disk. Use the `vxcdsconvert` command on the disk. Then you can issue the `vxdisk resize` command.

See <http://www.symantec.com/docs/TECH136240> for more information.

## The `vxdisksetup` command fails to initialize disks in `cdsdisk` format for disks in logical domains greater than 1 TB (2557072)

The `vxdisksetup` command fails to initialize disks in `cdsdisk` format for disks in logical domains greater than 1 TB. This issue is due to an Oracle VM Server command which fails when the number of partitions in the GUID partition table (GPT) label is greater than 9. The `cdsdisk` format requires at least 128 partitions to be compatible with Linux systems.

**Workaround:** There is no workaround for this issue.

## 1 TB luns goes in error state with Solaris x86 (2706776)

If you label a disk device as EFI using format on a subset of the paths or on the DMP device, Solaris will not be able to propagate the label to all the other paths of the LUN. This will lead the device to appear in the error state under 'vxdisk list'.

**Workaround:** There is no workaround for this issue.

## The `vxrecover` command does not handle RAID5 volumes correctly (2715124)

On Solaris 11, the `vxrecover` command calls the recovery process for the top-level volume, which internally takes care of recovering its subvolumes. The `vxrecover`

command does not handle RAID5 volumes correctly. The recovery process fails to recover the subvolumes, which remain in the NEEDSYNC state.

**Workaround:**

Manually recover the RAID5 volumes using the `vxvol` utility, as follows:

```
# vxvol -g diskgroup resync volume
```

**vxmirror to SAN destination failing when 5 partition layout is present: for example, root, swap, home, var, usr (2815311)**

The `vxmirror` command may fail with following error on a Solaris 10 host, for a thin LUN, if more than one partition excluding root and swap is present.

```
VxVM vxbootsetup WARNING V-5-2-5667 Max volume count 5 exceeded.
```

**Example**

```
# /etc/vx/bin/vxmirror" -f -g rootdg_17_23_49 rootdisk01 rootdisk02
! vxassist -g rootdg_17_23_49 mirror swapvol rootdisk02
! vxassist -g rootdg_17_23_49 mirror rootvol rootdisk02
! vxassist -g rootdg_17_23_49 mirror usr rootdisk02
! vxassist -g rootdg_17_23_49 mirror var rootdisk02
! vxassist -g rootdg_17_23_49 mirror home rootdisk02
! vxbootsetup -g rootdg_17_23_49
VxVM vxbootsetup WARNING V-5-2-5667 Max volume count 5 exceeded.
VxVM vxbootsetup ERROR V-5-2-5678 Skipping volume 'home_dcl'
because no free partitions are available on disk 'disk_0'.
Either remove the volume or make a partition available
VxVM vxbootsetup WARNING V-5-2-5667 Max volume count 5 exceeded.
VxVM vxbootsetup ERROR V-5-2-5678 Skipping volume 'usr_dcl'
because no free partitions are available on disk 'disk_0'.
Either remove the volume or make a partition available
VxVM vxbootsetup WARNING V-5-2-5667 Max volume count 5 exceeded.
VxVM vxbootsetup ERROR V-5-2-5678 Skipping volume 'var_dcl' because
no free partitions are available on disk 'disk_0'.
Either remove the volume or make a partition available
/usr/lib/vxvm/bin/vxmksdpart: 3pardata0_2492: is not an identifier
```

**Disk group import of BCV LUNs using -o updateid and -ouseclonedev options is not supported if the disk group has mirrored volumes with DCO or has snapshots (2831658)**

VxVM uses guid stored in configuration to uniquely identify all objects. The data change object (DCO) volume stores the guid of mirrors and snapshots. If the disk

group is imported with `-o updateid` and `-o useclonedev`, it changes the guid of objects in VxVM configuration database and the guids stored in the DCO volume are not updated. The operations involving DCO cannot find objects with the stored guid. This could lead to failure of certain operations involving DCO or could lead to unexpected behavior.

**Workaround:**

No workaround available.

**After devices that are managed by EMC PowerPath lose access to storage, Veritas Volume Manager commands are delayed (2757198)**

In an environment which includes devices that are managed by EMC PowerPath, a storage loss causes Veritas Volume Manager commands to be delayed. In the event of storage loss, VxVM sends SCSI inquiry to each LUN path to check the health of path, which are delayed by the presence of EMC PowerPath.

**Dynamic LUN expansion is not supported for EFI disks in simple or sliced format and non-EFI disks greater than 1TB in simple or sliced format.(2836798)**

Dynamic LUN expansion is not supported for EFI (Extensible Firmware Interface) disks in simple or sliced format and non-EFI disks greater than 1TB in simple or sliced format. The recommended format is the Cross-platform Data Sharing (CDS) disk format.

**Workaround:**

Convert the disk format to CDS using the `vxcdsconvert` utility.

**For Solaris 11.1 or later, system hangs when both QLogic and Emulex HBAs are present and `dmp_native_support` is turned on (3138703)**

For Solaris 11.1 or later, the system may hang when both QLogic and Emulex HBAs are present, and `dmp_native_support` is turned on.

**Workaround:**

The system hang is not seen if all of the HBAs are either from Emulex or from QLogic. Do not combine both HBAs on the same system.

## For Solaris 11.1 or later, enabling DMP native support requires steps to enable booting from alternate root pools (3133514)

For Solaris 11.1 or later, if the tunable parameter `dmp_native_support` is set to `on`, using the following command causes alternate root pools on OS devices to migrate to DMP devices:

```
# zpool import -d /dev/vx/dmp
```

After the above command is run, the system cannot boot using these alternate root pools because the DMP driver is not configured for these root pools. This scenario is shown by the following output.

```
# zpool status
```

```
pool: crpool
state: ONLINE
  scan: none requested
config:
```

NAME	STATE	READ	WRITE	CKSUM
crpool	ONLINE	0	0	0
/dev/vx/dmp/disk_0s0	ONLINE	0	0	0

### Workaround:

To boot using the alternate root pools, export and re-import the root pools using the OS device.

#### To boot using the alternate root pools

##### 1 Export the root pool:

```
# zpool export crpool
```

##### 2 Display the OS path name for the device:

```
# vxdmadm getsubpaths dmpnodename=disk_0
```

```
NAME      STATE[A]  PATH-TYPE[M]  CTLR-NAME  ENCLR-TYPE  ENCLR-NAME  ATTRS
=====
c3t2d0s2  ENABLED(A)  -              c3         Disk        disk        -
```

##### 3 Re-import the root pools using the OS device.

```
# zpool import crpool -d /dev/dsk/c3t2d0s0
```

The system is now bootable using the alternate root pools.

## For Solaris 11.1 or later, uninstalling DMP or disabling DMP native support requires steps to enable booting from alternate root pools (3178642)

For Solaris 11.1 or later, after you uninstall the VxVM package or after you turn off DMP native support, you may see this issue. After reboot, the root pool containing the active boot environment is migrated to the OS device but alternate root pools continue to show DMP device. The status of the alternate root pools and their DMP devices is shown as "UNAVAIL".

```
pool: crpool
  state: UNAVAIL
status: One or more devices are unavailable in response to persistent
        errors. There are insufficient replicas for the pool to continue
        functioning.
action: Destroy and re-create the pool from a backup source. Manually
        marking the device repaired using 'zpool clear' or 'fmadm repaired'
        may allow some data to be recovered.
        Run 'zpool status -v' to see device specific details.
scan: none requested
config:
```

NAME	STATE	READ	WRITE	CKSUM
crpool	UNAVAIL	0	0	0
emc_clariion1_82s0	UNAVAIL	0	0	0

The tunable parameter `dmp_native_support` only unconfigures DMP for the single root pool containing the active boot environment. If the setup has any alternate root pools, for which DMP native support was enabled, then the alternate root pools continue to show the DMP device. If the alternate root pool is configured in the current boot environment and DMP support is removed, the DMP devices required for ZFS are not found. The DMP devices and the root pools display the state as "UNAVAIL".

### Workaround:

Even though the status of alternate root pool is "UNAVAIL", the system is bootable using the disk containing the alternate root pool. Reboot the system with the disk containing the alternate root pool. The system comes up with the root pool using the DMP device.

## For Solaris 11.1 or later, after enabling DMP native support for ZFS, only the current boot environment is bootable (3157394)

After enabling DMP native support for ZFS on Solaris 11.1 or later, only the current boot environment (BE) is bootable. Any alternate BEs in the same root pool are not bootable. This situation occurs because the DMP native support configures the ZFS root pool so that only DMP can import the root pool. If you attempt to boot the system from the alternate BE, the system panics with the following message:

```
NOTICE: zfs_parse_bootfs: error 19
Cannot mount root on rpool/193 fstype zfs

panic[cpu0]/thread=10012000: vfs_mountroot: cannot mount root

Warning - stack not written to the dumpbuf
000000001000fa00 genunix:main+17c (1, 100dc958, 12d5c00, 124702c, 0, 10828000)
%10-3: 0000000010010000 0000000000000000 00000000100dc800 0000000000000000
%14-7: 0000000010012000 0000000000000000 000000001038f7c0 000000000104c800
```

### Workaround:

To enable booting from another BE, configure the ZFS root pool so that it can be imported without DMP.

#### To configure ZFS root pool to enable booting from all the BEs

- 1 At the OBP PROM, run the following command to list all the BEs:

```
ok> boot -L
```

- 2 Use the following command to boot from the BE for which DMP native support for ZFS is enabled.

```
ok> boot -Z rpool/ROOT/BE_name
```

- 3 After booting through new BE, disable the DMP native support using the following command:

```
# vxddmpadm settune dmp_native_support=off
```

The system is now bootable from any BEs in the ZFS root pool.

## Limitation to DMP support for ZFS root in the LDOM guest (3221944)

DMP support for ZFS root is not supported in the LDOM guest. If DMP meta devices are exported to LDOM and used for root pool, then enabling the `dmp_native_support` tunable fails with the following error:

```
root@swsx39-v05#vxdmpadm settune dmp_native_support=on
VxVM vxdmpadm ERROR V-5-1-15690 Operation failed for one or more
zpool
```

```
VxVM vxdmpadm ERROR V-5-1-15686 The following zpool(s) could not
be migrated as failed to obtain root pool information -
```

```
rpool
```

Where *rpool* specifies the root pool name on the LDOM guest:

DMP supports non-root ZFS in the LDOM guest. You can use DMP devices for non-root ZFS.

## When `dmp_native_support` is set to on, commands hang for a long time on SAN failures (3084656)

When `dmp_native_support` is set to on, on SAN failures, commands that do I/O operations to the root file system or I/O to disks that contain the root pool may hang for about 1-5 minutes. The commands include commands like "zpool status", or telnet initiated to connect the system. The hang is seen because the drivers below the DMP layer take more time to report the I/O failure when some of the paths to the disk containing the root pool are disconnected. This situation should not lead to any root pool data corruption.

### Workaround:

This hang cannot be avoided but the hang time can be reduced by tuning the following parameters

### To tune the parameters

- 1 In the `/kernel/drv/fp.conf` file, set

```
fp_offline_ticker=15
```

- 2 In the `/kernel/drv/fcp.conf` file, set

```
fcp_offline_dely=10
```

- 3 Reboot the system to apply the changes.

These steps reduce the hang time to a maximum of 1 minute.

### The `vxdisk scandisks` command can take a long time to complete (2791127)

When one I/O domain is shutdown and you run the `vxdisk scandisks` command from a guest domain, the command can take more than 30 minutes to complete.

### The DMP EMC CLARiiON ASL does not recognize mirror view not ready LUNs (3272940)

On hosts that have EMC CLARiiON mirror view not ready LUNs, if you enable or disable the switch port and then issue the `vxdisk scandisks` or `vxctl enable` command, I/O error messages are written continuously in the syslog.

The dynamic multi-pathing (DMP) request for providing information to identify mirror view not ready LUNs through in-band SCSI command is pending with EMC engineering. Not ready LUNs are special kind of LUNs which reject all kinds of I/O requests.

Because DMP does not recognize not ready LUNs, Veritas Volume Manager (VxVM) tries to bring them online. As part of the online process, VxVM issues I/Os to read the disk private region. These I/Os fail and generate error messages in syslog.

Because of events that are generated as part of the online process, the `vxattachd` script triggers the `vxdisk scandisks` command again. This cycle causes continuous I/O error messages. This problem can also other commands to run slowly because the VxVM configuration daemon (`vxconfigd`) is busy servicing `vxdisk scandisks`.

**Workaround:** Stop the `vxattachd` script and:

- 1 Disable the `vxattachd` process.

For more information on how to disable `vxattachd` and what features you lose if `vxattachd` is disabled, see the `vxattachd` man page

- 2 Set the following EMC CLARiiON values:

- `recoveryoption=fixedretry`
- `retrycount=5`

Enter:

```
vxddmpadm setattr enclosure enclosure_name recoveryoption=fixedretry \
retrycount=5
```

## LUNs from any EMC CLARiiON arrays that have Not Ready state are shown in "online invalid" state by Veritas Volume Manager (VxVM) (3287940)

LUNs from any EMC CLARiiON arrays that have Not Ready state are shown in "online invalid" state by Veritas Volume Manager (VxVM). They should be shown in "error" state. The EMC CLARiiON arrays do not have a mechanism to communicate the NR (Not Ready) state of the LUNs, so VxVM cannot recognize it. However, the read operation on these LUNs fails and due to defect in disk online operation this read failure is ignored causing disk online to succeed. Thus, these LUNs are shown as "online invalid".

### Workaround:

There is no workaround.

## Changes in enclosure attributes are not persistent after an upgrade from release prior to VxVM 5.1SP1 (2082414)

The Veritas Volume Manager (VxVM) 6.1 includes several array names that differ from the array names in releases 5.1SP1 or prior. Therefore, if you upgrade to VxVM 6.1 from a release 5.1SP1 or earlier, changes in the enclosure attributes may not remain persistent. Any enclosure attribute set for these arrays may be reset to the default value after an upgrade to VxVM 6.1. Manually reconfigure the enclosure attributes to resolve the issue.

[Table 1-10](#) shows the Hitachi arrays that have new array names.

**Table 1-10** Hitachi arrays with new array names

Previous name	New name
TagmaStore-USP	Hitachi_USP
TagmaStore-NSC	Hitachi_NSC
TagmaStoreUSPV	Hitachi_USP-V

**Table 1-10** Hitachi arrays with new array names (*continued*)

Previous name	New name
TagmaStoreUSPVM	Hitachi_USP-VM
<New Addition>	Hitachi_R700
Hitachi AMS2300 Series arrays	New array names are based on the Model Number 8x. For example, AMS_100, AMS_2100, AMS_2300, AMS_2500, etc.

In addition, the Array Support Library (ASL) for the enclosures XIV and 3PAR now converts the cabinet serial number that is reported from Hex to Decimal, to correspond with the value shown on the GUI. Because the cabinet serial number has changed, any enclosure attribute set for these arrays may be reset to the default value after an upgrade to VxVM 6.1. Manually reconfigure the enclosure attributes to resolve the issue.

The cabinet serial numbers are changed for the following enclosures:

- IBM XIV Series arrays
- 3PAR arrays

### MPxIO device names shown in error state (3169587)

In this release, DMP does not support extended attributes like AVID for Solaris MPxIO devices. Up until the 5.1SP1 release, DMP used to support AVID for the MPxIO devices. When you upgrade from 5.1SP1 or prior release to 6.0 or later release, DMP assigns new names to the MPxIO devices.

The MPxIO device may go into an error state after the upgrade, if a persistent disk access record (entry in `/etc/vx/darecs`) exists with the old name, and the device was assigned a new name.

The same issue may occur if the MPxIO device name changes for another reason, such as the changed cabinet serial numbers for 3PAR or XIV devices from 6.0.

#### Workaround:

Use the following procedure to remove the persistent disk access record and resolve the issue.

**To resolve the issue with MPxIO devices in error state:**

- 1 Remove the following file:

```
# rm /etc/vx/darecs
```

- 2 Reset the vxconfigd daemon:

```
# vxconfigd -kr reset
```

**When all Primary/Optimized paths between the server and the storage array are disconnected, ASM disk group dismounts and the Oracle database may go down (3289311)**

The Oracle database shows an I/O error on the control file, but there was no I/O error seen on any DMP device. When all Primary/Optimized paths are disconnected, DMP fails over to other available paths but the failover takes time. In the meantime, the application (ASM/Oracle database) times out the I/O.

The ASM alert log file displays messages such as the following:

```
Errors in file /u01/app/oracle/diag/rdbms/orcl/orcl2/trace/orcl2_ckpt_6955.trc:
ORA-00221: error on write to control file
ORA-00206: error in writing (block 4, # blocks 1) of control file
ORA-00202: control file: '+DATA_P6/ORCL/CONTROLFILE/current.261.826783133'
ORA-15081: failed to submit an I/O operation to a disk
ORA-15081: failed to submit an I/O operation to a disk
Wed Oct 09 14:16:07 2013
WARNING: group 2 dismounted: failed to read virtual extent 0 of file 261
Wed Oct 09 14:16:07 2013
USER (ospid: 6955): terminating the instance due to error 221
Wed Oct 09 14:16:07 2013
WARNING: requested mirror side 2 of virtual extent 0 logical extent 1 offset
16384
is not allocated; I/O request failed
WARNING: requested mirror side 3 of virtual extent 0 logical extent 2 offset
16384
is not allocated; I/O request failed
```

The above issue may occur when the server is configured as follows:

DB: Oracle 12c

Volume Manager: ASM

Multipathing Solutions: DMP

OS: Solaris

Disk Array : HP EVA in ALUA mode

**Workaround:**

The following workaround can reduce the probability of this issue, and when you see this issue, you could use Oracle commands to start the database manually.

Increase the application time out and make the following changes to reduce the time taken to mark the path as offline:

- In the `/kernel/drv/fp.conf` file, add `fp_offline_ticker=15`.
- In the `/kernel/drv/fcp.conf` file, add `fcp_offline_delay=10`.

## Running the `vxdisk disk set clone=off` command on imported clone disk group luns results in a mix of clone and non-clone disks (3338075)

If you do not specify a disk group name, the `vxdisk set` operation works on the `dmname` rather than the `daname`. If a `dmname` is the same as an existing `daname`, the `vxdisk set` operation reflects on the `dm` name.

**Workaround:** Use the following command syntax to set the attributes:

```
vxdisk -g diskgroup_name set dmname clone=off
```

For example:

```
vxdisk -g dg1 set eva4k6k0_12 clone=off
```

## The administrator must explicitly enable and disable support for a clone device created from an existing root pool (3152984)

A non-rpool is a clone of the existing root pool. When native support is enabled, DMP does not touch the clone root pool because the clone may or may not have the VxVM package.

**Workaround:** To add or remove DMP support for a clone boot device, the administrator must boot through the clone and turn on/off `dmp_native_support`.

## The `VRTSvxvm` and `VRTSaslapm` packages do not have the `info.classification` attribute [3565157]

The Solaris 11 Package Manager uses the `info.classification` package attribute to display packages by category. In 6.1, the `info.classification` attribute is not defined for `VRTSvxvm` and `VRTSaslapm` for Solaris 11 platform. Consequently the

attribute does not appear in the output of the `pkg contents` command. Therefore you may not be able to search the package according to the classification.

**Workaround:** In order to search the VRTSvxvm or VRTSaslapm packages per category, you can use the `pkginfo` command instead of the `pkg` command.

## Veritas File System known issues

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

### Taking a FileSnap over NFS multiple times with the same target name can result in the 'File exists' error (2353352)

The "File exists" error occurs as a result of the caching behavior of the NFS client. Because the link operation is successful, the NFS client assumes that a file with the specified target name, such as `file2::snap:vxfs:`, was created.. As a result, the NFS client caches a file with this name.

**Workaround:** Remove the target file after a snapshot is created. This forces the NFS client to remove the name from the cache. For example:

```
# ln file1 file2::snap:vxfs:
# rm file2::snap:vxfs:
```

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

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

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

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

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

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

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

## Deduplication can fail with error 110 (2591473)

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

```

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

```

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

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

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

**Workaround:** Make more space available on the file system.

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

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

```

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

```

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

## Warning message sometimes appear in the console during system startup (2354829)

During system startup, following messages sometimes appear in system console:

```

WARNING: couldn't allocate SDT table for module vxfs
WARNING: couldn't allocate FBT table for module vxfs
Loading smf(5) service descriptions: 2/2

```

These warnings indicate that the SDT and FBT DTrace probes might not be available for the VxFS module. The VxFS module still loads and works correctly. Dtrace

SDT/FBT has limits on the size of module that it can support. Since the VxFS module exceeds the size that Dtrace can support, SDT and FBT Dtrace probes might not work for VxFS.

**Workaround:** There is no workaround for this issue.

### **In a VxFS file system that has compression enabled, the file system may get disabled due to the ENOSPC error (3301716)**

In a VxFS file system that has compression enabled, the file system may get disabled due to the ENOSPC error. This occurs because of a defect in the delayed allocation feature.

**Workaround:** Turn off the delayed allocation.

### **The file system may hang when it has compression enabled (3331276)**

In a VxFS file system that has compression enabled, a deadlock in page fault handler can lead to the file system hang.

**Workaround:**

There is no workaround for this issue.

### **The file system may hang due to file system full conditions when file level snapshots are present (2746259)**

In the presence of file level snapshots, file system full conditions may lead to the file system hang. Following a reboot, a mount may hang as well.

**Workaround:**

There is no workaround for this issue.

### **The file system may be marked for full fsck during a clone removal (2977828)**

Under low memory conditions, a clone removal may lead to file system being marked for full fsck.

**Workaround:**

A full fsck of the file system will be required to recover the file system.

## NFSv4 server panics in unlock path (3228646)

In a CFS configuration, if `fcntl(1m)` fails, some NFS specific structures (`I_pid`) are not updated correctly and may point to stale information. This causes the NFSv4 server to panic.

### Workaround:

There is no workaround for this issue.

## I/O errors on the file system may lead to data inconsistency (3331282)

If there are writable clones on the file system, I/O errors may lead to data inconsistency.

### Workaround:

Run a full `fsck` to recover the file system.

## Forcing the system to unmount during heavy I/O load may result in system panic in `vx_is_fs_disabled_impl` (3331284)

Forcing the system to unmount during heavy I/O load may result in system panic in `vx_is_fs_disabled_impl`.

### Workaround:

There is no workaround for this issue.

## When in-place and relocate compression rules are in the same policy file, file relocation is unpredictable (3278193)

You cannot have in-place compress/uncompress rules and relocate compress/uncompress rules in the same policy file. If they are in the same file, file relocation is unpredictable.

**Workaround:** Create a different policy file for each policy, and enforce the policy as per the required sequence.

## The file system deduplication operation fails with the error message "DEDUP\_ERROR Error renaming X checkpoint to Y checkpoint on filesystem Z error 16" (3348534)

The file system deduplication operation fails with the error message "DEDUP\_ERROR Error renaming X checkpoint to Y checkpoint on filesystem Z error 16", due to the failure in unmounting the checkpoint.

**Workaround:** Retry the deduplication operation to resolve the problem.

## On a system that has Solaris 11 Update 1, certain driver modules such as "fdd" may not be removed properly (3348829)

On a system that has Solaris 11 Update 1, certain driver modules such as "fdd" may not be removed properly during the uninstallation of the SF or SFCFS stack.

**Workaround:** Prior to uninstallation of the stack, this can be mitigated by following the workaround indicated below:

```
# rm /usr/kernel/drv/sparcv9/fdd
```

## Replication known issues

This section describes the replication known issues in this release of Symantec Storage Foundation.

### **vradmin syncvol command compatibility with IPv6 addresses (2075307)**

The `vradmin syncvol` command does not work with the compressed form of IPv6 addresses if the target disk group and volume names are not specified.

**Workaround:** In IPv6 environments, if you run the `vradmin syncvol` command and identify the target host using the compressed form of the IPv6 address, then you also need to specify the target disk group and volume names.

### **RVGPrimary agent operation to start replication between the original Primary and the bunker fails during failback (2036605)**

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

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

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

**Workaround:**

**To resolve this issue:**

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

**Bunker replay did not occur when the Application Service Group was configured on some of the systems in the Primary cluster, and ClusterFailoverPolicy is set to "AUTO" (2036644)**

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

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

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

**Workaround:****To resolve this issue:**

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

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

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

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

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

### Issue 1:

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

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

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

### Issue 2:

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

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

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

**Workaround:** The following workarounds resolve these issues.

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

For example:

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

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

For example:

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

## In an IPv6-only environment RVG, data volumes or SRL names cannot contain a colon (1672410, 1672417, 1825031)

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

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

## While vradmin commands are running, vradmind may temporarily lose heart beats (2071568, 2275444)

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

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

**Workaround:**

To resolve this issue:

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

```
export IPM_HEARTBEAT_TIMEOUT  
IPM_HEARTBEAT_TIMEOUT=120
```

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

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

## **vxassist relayout removes the DCM (145413)**

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

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

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

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

### **Workaround:**

To resize layered volumes that are associated to an RVG:

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

```
# vxrlink -g diskgroup status rlink
```
- 3 Stop the affected RVG. Enter the following:  

```
# vxrvg -g diskgroup stop rvg
```
- 4 Disassociate the volumes from the RVG. Enter the following:  

```
# vxvol -g diskgroup dis vol
```
- 5 Resize the volumes. In this example, the volume is increased to 10 GB. Enter the following:  

```
# vxassist -g diskgroup growto vol 10G
```
- 6 Associate the data volumes to the RVG. Enter the following:  

```
# vxvol -g diskgroup assoc rvg vol
```
- 7 Start the RVG. Enter the following:  

```
# vxrvg -g diskgroup start rvg
```
- 8 Resume or start the applications.

## Cannot relayout data volumes in an RVG from concat to striped-mirror (2129601)

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

### Workaround:

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

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

```
# vxrlink -g diskgroup status rlink
```
- 3 Stop the affected RVG. Enter the following:  

```
# vxrvg -g diskgroup stop rvg
```
- 4 Disassociate the volumes from the RVG. Enter the following:  

```
# vxvol -g diskgroup dis vol
```
- 5 Relayout the volumes to striped-mirror. Enter the following:  

```
# vxassist -g diskgroup relayout vol layout=stripe-mirror
```
- 6 Associate the data volumes to the RVG. Enter the following:  

```
# vxvol -g diskgroup assoc rvg vol
```
- 7 Start the RVG. Enter the following:  

```
# vxrvg -g diskgroup start rvg
```
- 8 Resume or start the applications.

## vradmin verifydata may report differences in a cross-endian environment (2834424)

When replicating between two nodes in a cross-platform environment, and performing an autosync or replication, the `vradmin verifydata` command may report differences. This is due to different endianness between the platforms. However, the file system on the secondary node will be consistent and up to date.

## **vradmin verifydata operation fails if the RVG contains a volume set (2808902)**

In a VVR environment, the `vradmin verifydata` command fails with the following error if the replicated volume group (RVG) contains any volume set:

Message from Primary:

```
VxVM VVR vxrsync ERROR V-5-52-2009 Could not open device
/dev/vx/dsk/vvrdg/<volname> due to: stat of raw character volume path
failed
```

## **RLINK name cannot exceed 31 characters**

The `vradmin` utility truncates the RLINK name to 31 characters, as the `vxmake` utility does not support the creation of RLINK names that are longer than 31 characters.

### **Workarounds:**

- Specify the `prlink` and `srlink` attributes using the `vradmin addsec` command, so you can choose the RLINK name in the `addsec` command line.
- If using IPv6 addresses, create host name aliases for the IPv6 addresses and specify the aliases in the `addsec` command line.

## **SRL resize followed by a CVM slave node join causes the RLINK to detach (3259732)**

In a CVR environment, performing a CVM slave node join after an SRL resize may stop replication due to a detached RLINK.

**Workaround:** There is no workaround for this issue.

## **While vradmin commands are running, vradmind may temporarily lose heartbeats (3347656)**

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

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

**Workaround:** To resolve this issue:

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

```
export IPM_HEARTBEAT_TIMEOUT
IPM_HEARTBEAT_TIMEOUT=120
```

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

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

## The `vradmin repstatus` command does not show that the SmartSync feature is running (3345984)

In a Volume Replicator (VVR) environment, after you start the initial synchronization with the `vradmin -a startrep` command with file system mounted on the primary data volumes, the `vradmin repstatus` command does not show that the SmartSync feature is running. This is an only issue with the output of the `vradmin repstatus` command.

Workaround: To confirm that SmartSync is running, enter:

```
vxrlink status rlink
```

## Write I/Os on the primary logowner may take a long time to complete (2622536)

Under a heavy I/O load, write I/Os on the Volume Replicator (VVR) primary logowner take a long time to complete.

Workaround: None

## Bunker replay does not occur with volume sets (3329970)

There are issues with bunker replication using Volume Replicator (VVR) with volume sets. Do not upgrade to Storage Foundation HA 6.1 if you have configured or plan to configure bunker replication using VVR with volume sets.

Workaround: Contact Symantec Technical Support for a patch that enables you to use this configuration.

## During moderate to heavy I/O, the vradmin verifydata command may falsely report differences in data (3270067)

While an application is online at the Volume Replicator primary site, the `vradmin verifydata` command may fail. The command output shows the differences between the source data volume and the target data volume.

Workaround: The reason for this error is that the cache object that is used for the verification might be under allocated. You might need to allocate more space for the shared cache object. For guidelines on shared cache object allocation, see the section "Creating a shared cache object" in the *Symantec Storage Foundation Administrator's Guide*.

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

The following are known issues in this release of Symantec Storage Foundation for Databases (SFDB) tools.

### SFDB commands do not work in IPV6 environment (2619958)

In IPV6 environment, SFDB commands do not work for SF. There is no workaround at this point of time.

### Attempt to use SmartTier commands fails (2332973)

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

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

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

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

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

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

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

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

- BALANCE
- CHECKPOINT
- METADATA

### Workaround

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

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

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

### Workaround

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

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

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

## Upgrading Symantec Storage Foundation for Databases (SFDB) tools from 5.0.x to 6.1 (2184482)

The `sfua_rept_migrate` command results in an error message after upgrading SFHA or SF for Oracle RAC version 5.0 to SFHA or SF for Oracle RAC 6.1.

When upgrading from SF version 5.0 to SF 6.1 the `S*vxdms3` startup script is renamed to `NO_S*vxdms3`. The `S*vxdms3` startup script is required by `sfua_rept_upgrade`. Thus when `sfua_rept_upgrade` is run, it is unable to find the `S*vxdms3` startup script and gives the error message:

```
/sbin/rc3.d/S*vxdms3 not found
SFORA sfua_rept_migrate ERROR V-81-3558 File: is missing.
SFORA sfua_rept_migrate ERROR V-81-9160 Failed to mount repository.
```

## Workaround

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

## Clone command fails if PFILE entries have their values spread across multiple lines (2844247)

If you have a parameter, such as `log_archive_dest_1`, in single line in the `init.ora` file, then `dbed_vmclonedb` works but `dbed_vmcloneb` fails if you put in multiple lines for parameter.

**Workaround:** Edit the PFILE to arrange the text so that the parameter values are on a single line. If the database uses a spfile and some parameter values are spread across multiple lines, then use the Oracle commands to edit the parameter values such as they fit in a single line.

## Workaround

There is no workaround for this issue.

## Data population fails after datafile corruption, rollback, and restore of offline checkpoint (2869259)

Sometimes when a datafile gets corrupted below its reservation size, the rollback may not pass and the file may not be rolled back correctly.

There is no workround at this point of time.

## Checkpoint clone fails if the `archive log` destination is same as the datafiles destination (2869266)

Checkpoint cloning fails if the `archive log` destination is the same as the datafiles destination. The error is similar to:

```
Use of uninitialized value $path in hash element
at /opt/VRTSdbed/lib/perl/DBED/CkptOracle.pm line 121.
Use of uninitialized value $path in concatenation (.) or string
at /opt/VRTSdbed/lib/perl/DBED/CkptOracle.pm line 124.
Use of uninitialized value $path in pattern match (m//)
at /opt/VRTSdbed/lib/perl/DBED/CkptOracle.pm line 126.
```

```
SFDB vxsfadm ERROR V-81-0564 Oracle returned error.
```

```
Reason: ORA-02236: invalid file name (DBD ERROR: error possibly near
```

```
<*> indicator at char 172 in 'CREATE CONTROLFILE REUSE SET DATABASE  
'Tclone03' RESETLOGS NOARCHIVELOG
```

**Workaround:** For the 6.1 release, create distinct archive and datafile mounts for the checkpoint service.

## FileSnap detail listing does not display the details of a particular snap (2846382)

FileSnap does not support displaying a detailed listing of a snapshot or clone. FileSnap only supports displaying a summary of all the snapshots or clones. For example, for the CLI `vxsfadm -s filesnap -a oracle --name=snap1 -o list`, a summary listing all the snapshots is displayed, instead of a detailed listing of a particular snapshot.

**Workaround:** There is no workaround for this issue.

## 'vxdbd' process is online after Flash archive installation (2869269)

After a Flash archive installation of the SF stack, the `vxdbd` process is up, even if the stack is not configured.

**Workaround:** You can ignore, or stop the `vxdbd` process using the `/opt/VRTSdbed/common/bin/vxdbdctrl stopcommand`.

## sfua\_rept\_migrate fails after phased SF Oracle RAC upgrade from 5.0MP3RP5 to 6.0.1 (2874322)

Command `sfua_rept_migrate` sometimes gives an error when upgrading to 6.0.1, and fails to unmount the repository volume. The error message is similar to:

```
# ./sfua_rept_migrate  
Mounting SFUA Sybase ASA repository.  
Unmounting SFUA Sybase ASA repository.  
UX:vxfs umount: ERROR: V-3-26388: file system /rep has been mount  
locked  
SFORA sfua_rept_migrate ERROR V-81-5550 umount /dev/vx/dsk/repdg/repvol  
failed.  
SFORA sfua_rept_migrate ERROR V-81-9162 Failed to unmount repository.
```

**Workaround:** The error does not hamper the upgrade. The repository migration works fine, but the old repository volume does not get unmounted. Unmount the mount using the manual option.

For example, use `/opt/VRTS/bin/umount -o mntunlock=VCS /rep`.

For more information, see [TECH64812](#).

## The ReverseResyncBegin (RRBegin) operation fails when performed on multiple snapshot configurations (3066532)

When you perform a Reverse Resync operation on multiple snapshot configurations, SFDB reports the following error message:

```
[oracle@db1xx64-3-vip3 ~]$ vxsfadm -a oracle -s flashsnap --name \  
man -o rrbegin  
  
SFDB vxsfadm ERROR V-81-0943 Repository already relocated to alternate  
location.
```

As per the Reverse Resync design, the first RRBegin operation relocates the SFDB repository to a backup location, and the ReverseResyncAbort and ReverseResyncCommit operations restore it to the original location. When the second RRBegin operation attempts to relocate the same repository which is already relocated, SFDB reports the error message.

**Workaround:** Make sure to perform the RRAbort or RRCommit operation using the snapshot configuration that is in the RRBegin state.

---

**Note:** You must complete Reverse Resync operations for a particular configuration before you start with another configuration.

---

## The ReverseResyncBegin (RRBegin) operation with recovery option as AUTO fails (3076583)

The RRBegin operation with the recovery option as AUTO fails when you perform the following sequence of operations:

- 1 Validate the FlashSnap setup using the validate operation.
- 2 In the database, take the tablespace offline.
- 3 Perform a snapshot operation.
- 4 Bring the tablespace online which was taken offline in 2.
- 5 Perform the Reverse Resync Begin operation.

---

**Note:** This issue is encountered only with Oracle version 10gR2.

---

**Workaround:** Perform one of the following:

- Make sure to bring the tablespace online only after performing the RRBEGIN and RRCommit operations. Otherwise, perform the Reverse Resync Begin operation while the tablespace is in the offline mode.
- To recover a database, specify the recovery option as **AUTO\_UNTIL\_SCN** in the RRBEGIN operation.

## The ReverseResyncBegin (RRBEGIN) operation fails and reports an error message due to a missing binary control file (3157314)

When the RRBEGIN operation cannot find the binary control file that is used to recover a database instance, it reports the following error message:

```
[oracle@testbox ~]$ vxsfadm -a oracle -s flashsnap -name man -o rrbegin
```

```
SFDB vxsfadm ERROR V-81-0949 Binary Control file is not available for recovery purposes
```

This issue is observed in the third-mirror break-off type (FlashSnap) snapshots that are created using the older SFDB version, which did not include the binary control file in the snapshot images.

### Workaround:

There is no workaround for this issue.

## The dbdst\_obj\_move(1M) command moves all the extents of a database table (3277003)

The `dbdst_obj_move(1M)` command moves all the extents of a database table when:

- The `dbdst_obj_move(1M)` command is run from the CFS secondary node.
- The object is an Oracle database table (-t option)
- A range of extents is specified for movement to a target tier (-s and -e options).  
The `dbdst_obj_move(1M)` command moves all extents of the specified table to a target tier when the extent size is greater than or equal to 32768. However, the expectation is to move only a specified range of extents.

**Workaround:** Run the `dbdst_obj_move(1M)` command from the CFS primary node.

Use the `fsclustadm showprimary <mountpoint>` and `fsclustadm idtoname <nodeid>` commands to determine the mode of a CFS node.

## When you attempt to move all the extents of a table, the `dbdst_obj_move(1M)` command fails with an error (3260289)

When you attempt to move all the extents of a database table, which is spread across multiple mount-points in a single operation, the `dbdst_obj_move(1M)` command fails. The following error is reported:

```
bash-2.05b$ dbdst_obj_move -S sdb -H $ORACLE_HOME -t test3 -c MEDIUM
FSPPADM err : UX:vxfs fsppadm: WARNING: V-3-26543: File handling failure
on /snap_datadb/test03.dbf with message -
SFORA dst_obj_adm ERROR V-81-6414 Internal Error at fsppadm_err
```

---

**Note:** To determine if the table is spread across multiple mount-points, run the `dbdst_obj_view(1M)` command

---

**Workaround:** In the `dbdst_obj_move(1M)` command, specify the range of extents that belong to a common mount-point. Additionally, if your table is spread across "n" mount-points, then you need to run the `dbdst_obj_move(1M)` command "n" times with a different range of extents.

## Sometimes SFDB may report the following error message: SFDB remote or privileged command error (2869262)

While using SFDB tools, if you attempt to run commands, such as `dbed_update` then you may observe the following error:

```
$ /opt/VRTSdbed/bin/dbed_update
No repository found for database faildb, creating new one.
SFDB vxsfadm ERROR V-81-0450 A remote or privileged command could not
be executed on swpa04
```

Reason: This can be caused by the host being unreachable or the `vxdbd` daemon not running on that host.

Action: Verify that the host `swpa04` is reachable. If it is, verify that the `vxdbd` daemon is running using the `/opt/VRTS/bin/vxdbdctrl` status command, and start it using the `/opt/VRTS/bin/vxdbdctrl start` command if it is not running.

**Workaround:** There is no workaround for this issue.

## The information file that is generated after a DBED data collector operation reports an error (2795490)

When the VRTSexplorer DBED scripts use the old VRTSdbms3-specific scripts that are removed from the products, the information file reports the following error:

```
/opt/VRTSdbms3/vxdbms_env.sh: cannot open [No such file or directory]
```

### Workaround:

1 Run the `cd /opt/VRTSspt/DataCollector/sort` command. If this directory does not exist, run `sh /opt/VRTSspt/DataCollector/*.sh`.

2 Run the `cd advanced/lib/VOS/v10/Collector/VxExpCollector/explorer_scripts` command.

3 In `dbed_rept_sql`, comment

```
$VXDBMS_DIR/vxdbms_env.sh
```

Or

Replace `$VXDBMS_DIR/vxdbms_env.sh` with

```
[[ -f $VXDBMS_DIR/vxdbms_env.sh ]] &&  
{  
    . $VXDBMS_DIR/vxdbms_env.sh  
}
```

## Flashsnap clone fails under some unusual archive log configuration on RAC (2846399)

In a RAC environment, when using FlashSnap, the archive log destination to snapshot must be a shared path, and must be the same across all the nodes. Additionally, all nodes must use the same archive log configuration parameter to specify the archive log destination. Configurations similar to the following are not supported:

```
tpcc1.log_archive_dest_1='location=/tpcc_arch'  
tpcc2.log_archive_dest_2='location=/tpcc_arch'  
tpcc3.log_archive_dest_3='location=/tpcc_arch'
```

Where `tpcc1`, `tpcc2`, and `tpcc3` are the names of the RAC instances and `/tpcc_arch` is the shared archive log destination.

**Workaround:** To use FlashSnap, modify the above configuration to `*.log_archive_dest_1='location=/tpcc_arch'`. For example,

```
tpcc1.log_archive_dest_1='location=/tpcc_arch'  
tpcc2.log_archive_dest_1='location=/tpcc_arch'  
tpcc3.log_archive_dest_1='location=/tpcc_arch'
```

### **Instant mode clone fails in RAC environment for all FSMs with data loading (3517782)**

When you use the instant clone mode for RAC databases, the clone operation may fail during Oracle recovery. The issue is more likely to be seen when there is load activity on some of the RAC nodes.

**Workaround:** Use either online or offline snapshot mode.

## Virtualization known issues

There are no new virtualization known issues in this release of Symantec Storage Foundation (SF).

## Software limitations

This section covers the software limitations of this release.

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

See [“Documentation”](#) on page 81.

## Veritas Volume Manager software limitations

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

### **Snapshot configuration with volumes in shared disk groups and private disk groups is not supported**

A snapshot configuration with volumes in the shared disk groups and private disk groups is not a recommended configuration. In this release, this configuration is not supported.

### **Storage reclamation does not happen on volumes with break-off snapshot (2798523)**

In this release, storage reclamation on a volume is prevented when it has a break-off type snapshot. If storage reclamation is allowed on such volumes, it can lead to the following undesired situation. Instant snapshot operations, including `vxsnap`

`refresh` and `vxsnap restore` operations, lead to full synchronization of either the snapshot or the primary volume depending on the operation.

In this release, if the volume has a snapshot, the storage reclamation is silently prevented. The physical storage is not reduced. The `reclaim` command reports that the reclamation is done on the disks but the actual storage is not reclaimed for volumes with snapshots:

```
# vxdisk -o full reclaim dg1
Reclaiming storage on:
Disk xiv0_617 : Done.
Disk xiv0_616 : Done.
Disk xiv0_618 : Done.
Disk xiv0_612 : Done.
Disk xiv0_613 : Done.
Disk xiv0_614 : Done.
Disk xiv0_615 : Done
```

As shown in the following example output, the storage is not actually reclaimed.

```
# vxdisk -o thin list
DEVICE      SIZE(MB)  PHYS_ALLOC(MB)  GROUP  TYPE
xiv0_612    19313     2101             dg1    thinrclm
xiv0_613    19313     2108             dg1    thinrclm
xiv0_614    19313     35               dg1    thinrclm
xiv0_615    19313     32               dg1    thinrclm
xiv0_616    19313     31               dg1    thinrclm
xiv0_617    19313     31               dg1    thinrclm
xiv0_618    19313     31               dg1    thinrclm
```

## SF does not support thin reclamation of space on a linked mirror volume (2729563)

The thin reclamation feature does not support thin reclamation for a linked mirror volume.

## When an I/O domain fails, the `vxdisk scandisks` or `vxctl enable` command take a long time to complete (2791127)

When an I/O domain fails, the `vxdisk scandisks` or `vxctl enable` from the logical domain (LDM) guest take a long time to complete. `vdc_ioctl`s like `DKIOCGGEO` and `DKIOCINFO` also take more time to return. These issues seem to be due to retry operations performed at the Solaris operating system layer.

Reducing the `vdc_timeout` value to lower value might help to bring down time. Dynamic multi-pathing (DMP) code is optimized to avoid making such `vdc_ioctl` calls in an LDOM guest environment as much possible. This change considerably reduces delays.

A complete resolution to this issue may require changes at the Solaris operating system level.

### **A 1 TB disk that is not labeled using operating system commands goes into an error state after the `vxconfigd` daemon is restarted**

A 1 TB disk that is not labeled using operating system commands goes into an error state after the `vxconfigd` daemon is restarted.

Currently, a solution from the vendor is not available.

## Veritas File System software limitations

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

### **Recommended limit of number of files in a directory**

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

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

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

### **Limitations with delayed allocation for extending writes feature**

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

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

- Delayed allocation is not supported for shared mounts in a cluster file system.

### **FlashBackup feature of NetBackup 7.5 (or earlier) does not support disk layout Version 8, 9, or 10**

The FlashBackup feature of NetBackup 7.5 (or earlier) does not support disk layout Version 8, 9, or 10.

### **Compressed files that are backed up using NetBackup 7.1 or prior become uncompressed when you restore the files**

The NetBackup 7.1 release and prior does not support the file compression feature. If you back up compressed files using NetBackup 7.1 or a prior release, the files become uncompressed when you restore the files.

## **Symantec Storage Foundation for Databases (SFDB) tools software limitations**

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

### **Parallel execution of `vxsfdadm` is not supported (2515442)**

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

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

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

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

## **Documentation**

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

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

<http://sort.symantec.com/documents>

## Documentation set

Each product in the Storage Foundation and High Availability Solutions product line includes release notes, an installation guide, and additional documents such as administration and agent guides. In most cases, you may also need to refer to the documentation for the product's components.

The SFHA Solutions documents describe functionality and solutions that apply across the product line. These documents are relevant whichever SFHA Solutions product you use.

---

**Note:** The GNOME PDF Viewer is unable to view Symantec documentation. You must use Adobe Acrobat to view the documentation.

---

### Symantec Storage Foundation documentation

**Table 1-11** lists the documentation for Symantec Storage Foundation.

**Table 1-11** Symantec Storage Foundation documentation

Document title	File name	Description
<i>Symantec Storage Foundation Release Notes</i>	sf_notes_61_sol.pdf	Provides release information such as system requirements, changes, fixed incidents, known issues, and limitations of the product.
<i>Symantec Storage Foundation Installation Guide</i>	sf_install_61_sol.pdf	Provides information required to install the product.
<i>Symantec Storage Foundation Administrator's Guide</i>	sf_admin_61_sol.pdf	Provides information required for administering the product.
<i>Symantec Storage Foundation: Storage and Availability Management for Oracle Databases</i>	sfhas_oracle_admin_61_unix.pdf	Provides information about the deployment and key use cases of the SFDB tools with Storage Foundation High Availability (SFHA) Solutions products in Oracle database environments. It is a supplemental guide to be used in conjunction with SFHA Solutions product guides.
<i>Veritas File System Programmer's Reference Guide</i> (This document is available online only.)	vxfs_ref_61_sol.pdf	Provides developers with the information necessary to use the application programming interfaces (APIs) to modify and tune various features and components of the Veritas File System.

## Symantec Storage Foundation and High Availability Solutions products documentation

Table 1-12 lists the documentation for Symantec Storage Foundation and High Availability Solutions products.

**Table 1-12** Symantec Storage Foundation and High Availability Solutions products documentation

Document title	File name	Description
<i>Symantec Storage Foundation and High Availability Solutions—What's new in this release</i>  (This document is available online.)	sfhas_whats_new_61_unix.pdf	Provides information about the new features and enhancements in the release.
<i>Symantec Storage Foundation and High Availability Solutions Getting Started Guide</i>	getting_started.pdf	Provides a high-level overview of installing Symantec products using the Veritas script-based installer. The guide is useful for new users and returning users that want a quick refresher.
<i>Symantec Storage Foundation and High Availability Solutions Solutions Guide</i>	sfhas_solutions_61_sol.pdf	Provides information about how SFHA Solutions product components and features can be used individually and in concert to improve performance, resilience and ease of management for storage and applications.
<i>Symantec Storage Foundation and High Availability Solutions Virtualization Guide</i>  (This document is available online.)	sfhas_virtualization_61_sol.pdf	Provides information about Symantec Storage Foundation and High Availability support for virtualization technologies. Review this entire document before you install virtualization software on systems running SFHA products.
<i>Symantec Storage Foundation and High Availability Solutions Disaster Recovery Implementation Guide</i>  (This document is available online.)	sfhas_dr_impl_61_sol.pdf	Provides information on configuring campus clusters, global clusters, and replicated data clusters (RDC) for disaster recovery failover using Storage Foundation and High Availability Solutions products.
<i>Symantec Storage Foundation and High Availability Solutions Replication Administrator's Guide</i>	sfhas_replication_admin_61_sol.pdf	Provides information on using Volume Replicator (VVR) for setting up an effective disaster recovery plan by maintaining a consistent copy of application data at one or more remote locations.

**Table 1-12** Symantec Storage Foundation and High Availability Solutions products documentation (*continued*)

Document title	File name	Description
<i>Symantec Storage Foundation and High Availability Solutions Troubleshooting Guide</i>	<code>sfhas_tshoot_61_sol.pdf</code>	Provides information on common issues that might be encountered when using Symantec Storage Foundation and High Availability Solutions and possible solutions for those issues.

Veritas Operations Manager (VOM) is a management tool that you can use to manage Symantec Storage Foundation and High Availability Solutions products. If you use VOM, refer to the VOM product documentation at:

<https://sort.symantec.com/documents>

## Manual pages

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

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

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

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

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

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

See the `man(1)` manual page.

The latest manual pages are available online in HTML format on the Symantec website at:

<https://sort.symantec.com/documents>