Veritas Storage Foundation™ for Oracle® RAC Release Notes

HP-UX

5.0.1

symantec™

Veritas Storage Foundation for Oracle RAC Release Notes

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Symantec Corporation
350 Ellis Street
Mountain View, CA 94043

http://www.symantec.com

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- Operating system

- Version and patch level
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- Problem description:
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About this release

This document includes the following topics:

About Veritas Storage Foundation for Oracle RAC

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

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

Benefits of SF Oracle RAC

SF Oracle RAC provides the following benefits:

- Support for file system-based management. SF Oracle RAC provides a generic clustered file system technology for storing and managing Oracle data files as well as other application data.

- Support for high-availability of cluster interconnects. The combination of LMX/LLT protocols and the PrivNIC/MultiPrivNIC agents provides maximum bandwidth as well as high availability of the cluster interconnects, including switch redundancy.

- Use of clustered file system for placement of Oracle Cluster Registry and voting disks. Clustered file system and volume management technologies provide robust shared block and raw interfaces for placement of Oracle Cluster Registry and voting disks. In the absence of SF Oracle RAC, separate LUNs need to be configured for OCR and voting disks.

- Support for a standardized approach toward application and database management. A single-vendor solution for the complete SF Oracle RAC software stack lets you devise a standardized approach toward application and database management. Further, administrators can apply existing expertise of Veritas technologies toward SF Oracle RAC.

- Increased availability and performance using dynamic multi-pathing (DMP). DMP provides wide storage array support for protection from failures and performance bottlenecks in the HBAs and SAN switches.

- Easy administration and monitoring of SF Oracle RAC clusters from a single web console.

- Support for many types of applications and databases.

- Improved file system access times using Oracle Disk Manager (ODM).

- Ability to configure ASM disk groups over CVM volumes to take advantage of dynamic multi-pathing (DMP).

- Enhanced scalability and availability with access to multiple Oracle RAC instances per database in a cluster.

- Support for backup and recovery solutions using volume-level and file system-level snapshot technologies. SF Oracle RAC enables full volume-level snapshots for off-host processing and file system-level snapshots for efficient backup and rollback.

- Ability to failover applications without downtime using clustered file system technology.

- Prevention of data corruption in split-brain scenarios with robust SCSI-3 Persistent Reservation (PGR) based I/O fencing.

- Support for sharing all types of files, in addition to Oracle database files, across nodes.

- Fast disaster recovery with minimal downtime and interruption to users. Users can transition from a local high availability site to a wide-area disaster recovery environment with primary and secondary sites. If a node fails, clients that are attached to the failed node can reconnect to a surviving node and resume access to the shared database. Recovery after failure in the SF Oracle RAC environment is far quicker than recovery for a failover database.

- Verification of disaster recovery configuration using fire drill technology without affecting production systems.

- Support for a wide range of hardware replication technologies as well as block-level replication using VVR.

- Support for campus clusters with the following capabilities:

  - Consistent reattach with Site Awareness

  - Site aware reads with VxVM mirroring

  - Monitoring of Oracle resources

  - Protection against split brain

- Optimized I/O performance through storage mapping technologies and tunable attributes.

About Veritas Operations Services

Veritas Operations Services (VOS) is a Web-based application that is designed specifically for Veritas Storage Foundation and High Availability products. VOS increases operational efficiency and helps improve application availability.

VOS automates and simplifies the following administrator tasks:

- Determining if systems are ready to install or upgrade Storage Foundation and High Availability products

- Gathering deployment and usage information on Storage Foundation and High Availability products

- Receiving notifications about the latest updates for:

  - Patches

  - Hardware Compatibility Lists (HCLs)

  - Array Support Libraries (ASLs)

- Array Policy Modules (APMs)

- Determining whether your Storage Foundation and High Availability product configurations conform to best practices

- Managing server and environmental configuration data from a single Web site

- Interpreting Unified Message Identifier (UMI) codes and their solutions

- Identifying and downloading patches for Storage Foundation and High Availability products

To access VOS, go to:

http://go.symantec.com/vos

About SF Oracle RAC Release Notes

This document provides important information regarding SF Oracle RAC 5.0.1 for HP-UX 11i version 3.0 Operating Environment.

Review this document before you install or upgrade SF Oracle RAC.

For the latest information on updates, patches, and software issues of this release, see the TechNote on the Symantec Enterprise Support website:

http://entsupport.symantec.com/docs/331560

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

See *Veritas Cluster Server Release Notes (5.0.1)*.

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

See *Veritas Storage Foundation Release Notes (5.0.1)*.

Changes in this release

This section describes the list of changes in SF Oracle RAC 5.0.1. For more information on the features, see *Veritas Storage Foundation for Oracle RAC Administrator's Guide*.

For the latest information on support for Oracle database versions, see the Veritas Technical Support TechNote:

http://entsupport.symantec.com/docs/280186

Support for Oracle RAC 11g Release 1

SF Oracle RAC now supports Oracle RAC 11g Release 1.

Support for MultiPrivNIC

MultiPrivNIC monitors multiple IP addresses configured over multiple private links. When a private link breaks down, it fails over the configured IP addresses on these links to another link with maximum node visibility. This ability to manage multiple links by configuring a single resource reduces the number of active agents and resources within SF Oracle RAC.

Support for hardware-based replication

SF Oracle RAC now supports hardware-based replication technologies to replicate data from a primary array to a secondary array.

Table 1-1 lists the technologies and the supporting agents.

Table 1-1   Hardware-based replication technologies

Replication technology	Supporting agents
EMC SRDF	SRDF
EMC Mirror View	MirrorView
Hitachi True Copy	HTC
IBM Metro Mirror	MetroMirror
IBM SVC	SVC CopyServices

Support for Database Dynamic Storage Tiering

SF Oracle RAC now supports configuration of Database Dynamic Storage Tiering (DST) with SF Oracle RAC for efficient and cost-effective management of data. DST enables the database administrator to manage data in a way that ensures less frequently used data is stored on slower, less expensive disks. This permits frequently accessed data to be stored on faster disks for quicker retrieval.

Support for Veritas Cluster Server Fire Drill

SF Oracle RAC now supports Veritas Cluster Server (VCS) Fire Drill that enables organizations to validate the ability of business-critical applications in resuming operations at hot standby data centers following critical outages and disasters.

Fire Drill automates creation of point-in-time snapshots and testing of the applications that use the replicated data in the event of a site-to-site application failover, often referred to as an High Availability Disaster Recovery (HA/DR) failover.

Note: All operations are managed within the VCS HA/DR framework through hardware replication technologies that use VCS agents. Replication using VVR is not supported for Fire Drill in an SF Oracle RAC environment.

The Fire Drill setup wizard allows automated configuration of a Fire Drill. The resultant Fire Drill configuration is also fully customizable. The Fire Drill wizard is invoked from the disaster recovery site using hardware replication by executing the script shipped with the hardware replication agents.

Support for secure communication in global clusters

SF Oracle RAC now provides the option of making the following communications secure in global clusters:

- Communication between wide-area connectors
- Communication between wide-area connectors and the Steward process

Support for Automated Storage Management (ASM)

ASM is a feature of Oracle that provides an integrated cluster file system and volume management capabilities for Oracle database files. ASM may be configured with Veritas Volume Manager (VxVM) or Cluster Volume Manager (CVM) to take advantage of the volume management and dynamic multi-pathing (DMP) features of SF Oracle RAC.

Support for ASM agents

Symantec provides the ASM disk group agent and the ASM instance agent for configuring Oracle ASM with Veritas Cluster Volume Manager. The ASM disk group (ASMDG) agent mounts, dismounts, and monitors the ASM disk groups required for ASM enabled databases. The ASM instance (ASMInst) agent monitors the Oracle ASM instance.

Support for campus clusters using VxVM remote mirror configuration

You can now configure VxVM disk groups for remote mirroring in a campus cluster setup.

LLT supports point-to-point unicast heartbeating mechanism

The default heartbeating mechanism in LLT is now point-to-point unicast and not broadcast heartbeating.

Obsolete in SF Oracle RAC

The VRTScsocw depot that was included in previous releases of SF Oracle RAC is now obsolete.

Deprecation of Storage Checkpoint commands

The following Storage Checkpoint commands for checking and saving the configuration of the Oracle RAC database are deprecated in this release:

■ dbed_checkconfig

■ dbed_saveconfig

Use the sfua_rept_adm command for checking and saving the configuration of the Oracle RAC database.

I/O fencing supports iSCSI devices

You can now use iSCSI devices as coordinator disks for I/O fencing. However, I/O fencing supports iSCSI devices only when you use DMP disk policy. Make sure that the /etc/vxfenmode file has the disk policy set to DMP before you use iSCSI devices as coordinator disks.

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

http://entsupport.symantec.com/docs/283161

See the *Veritas Storage Foundation for Oracle RAC Installation and Configuration Guide* for instructions to configure I/O fencing using DMP policy.

Changes to I/O fencing commands

Following are the changes to the I/O fencing commands:

■ The vxfentsthdw command now supports –d option for dmp devices.

■ The vxfenconfig -l command lists the coordinator disks that the vxfen driver uses.

Refer to the corresponding manual pages for more information on the commands.

Support to replace coordinator disks in a running cluster

You can now replace the coordinator disks in a running cluster using the vxfenswap utility.

See the *Veritas Storage Foundation for Oracle RAC Administrator's Guide* for more details.

Installation requirements

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

- Hardware requirements
- Supported software
- Supported HP-UX operating systems
- Other required HP-UX software
- Supported replication technologies for global clusters
- License requirements

Hardware requirements

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

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

Depending on the type of setup planned, make sure you meet the necessary hardware requirements.

For basic clusters   See Table 1-2 on page 15.

For campus clusters   See Table 1-3 on page 16.

Table 1-2 lists the hardware requirements for basic clusters.

Table 1-2   Hardware requirements for basic clusters

Item	Description
SF Oracle RAC systems	Two to sixteen HP-UX systems that are connected to the public network. HP-UX 11i v3 March 2009 OEUR release or later must be installed on these systems.
DVD drive	A DVD drive on one of the nodes in the cluster.
Disks	SF Oracle RAC requires that all disks support SCSI-3 Persistent Reservations (PR). **Note:** The coordinator disk does not store data, so configure the disk as the smallest possible LUN on a disk array to avoid wasting space. DMP devices are mandatory for use as coordinator disks.
Disk space	You can evaluate your systems for available disk space by running the following command: `# ./installsfrac -precheck node_name` For details on the additional space that is required for Oracle, see the Oracle documentation.
RAM	Each SF Oracle RAC system requires at least 2 GB. Symantec recommends RAM at least twice the Oracle SGA size.
Swap space	The minimum swap space requirement for Oracle RAC 10g is 4 GB. The minimum swap space requirement for Oracle RAC 11g is 8 GB. The operating system requirement for minimum swap space is two times the size of RAM. Between the minimum requirements of Oracle RAC and the operating system, make sure that you meet the minimum requirement that is higher. For example, if the operating system requirement for minimum swap space computes to 5 GB on your Oracle RAC 11g systems, make sure that you meet the minimum swap space requirement of Oracle RAC, that is 8 GB.
Network links	Two or more private links and one public link. Links must be 100BaseT or gigabit Ethernet directly linking each node to the other node to form a private network that handles direct inter-system communication. These links must be of the same type; you cannot mix 100BaseT and gigabit. Symantec recommends gigabit Ethernet using enterprise-class switches for the private links. You can also configure aggregated interfaces.

Table 1-2   Hardware requirements for basic clusters *(continued)*

Item	Description
Fibre Channel or SCSI host bus adapters	At least one built-in SCSI adapter per system to access the operating system disks. At least one additional SCSI or Fibre Channel Host Bus Adapter per system for shared data disks.

Table 1-3 lists the hardware requirements for campus clusters in addition to the basic cluster requirements.

Table 1-3   Hardware requirements for campus clusters

Item	Description
Storage	■ The storage switch (to which each host on a site connects) must have access to storage arrays at all the sites. ■ Volumes must be mirrored with storage allocated from both sites.
Network	■ Oracle requires that all nodes use the IP addresses from the same subnet. ■ Volumes must be mirrored with storage allocated from both sites. ■ Symantec recommends two Network Interface Cards (NIC) per host for LLT heartbeats. Oracle Clusterware requires one private and one virtual IP for each host. ■ DWDM links are recommended between sites for storage links. DWDM works at the physical layer and requires multiplexer and de-multiplexer devices. ■ The storage and networks must have redundant-loop access between each node and each storage array to prevent the links from becoming a single point of failure. ■ Symantec recommends a common cross-site physical infrastructure for storage and LLT private networks.
I/O fencing	I/O fencing requires placement of a third coordinator disk at a third site. The DWDM can be extended to the third site or the iSCSI LUN at the third site can be used as the third coordination point.

Supported software

Table 1-4 lists supported software versions.

Table 1-4   Supported software

Software	Version
Oracle RAC	**Note:** SF Oracle RAC supports only 64-bit Oracle. ■ Oracle RAC 10g Release 2 ■ Oracle RAC 11g Release 1
HP-UX operating system	See "Supported HP-UX operating systems" on page 17.
Other HP-UX software	See "Other required HP-UX software" on page 18.
VCS, VxVM, VxFS, VVR	Use only versions of VCS, VxVM, VxFS, and VVR provided on the software disc. Remove other versions before you install the software from the SF Oracle RAC product disc. **Warning:** SF Oracle RAC and all component software must be at the same version across all nodes in an SF Oracle RAC cluster, in this case 5.0.1. Symantec strongly recommends upgrading all SF Oracle RAC component products to the same version at the same time.

To verify the latest information on support for Oracle database versions, see the Technical Support TechNote:

http://entsupport.symantec.com/docs/280186

Supported HP-UX operating systems

SF Oracle RAC 5.0.1 can be installed on the following operating systems:

■ HP-UX 11i v3 March 2009 OEUR release or later

The following operating environments (OEs) are supported for SF Oracle RAC on HP-UX:

HPUX11i-BOE   HP-UX 11i v3 Base OE

HPUX11i-VSE-OE   HP-UX 11i v3 VirtualServer OE

HPUX11i-HA-OE   HP-UX 11i v3 High-Availability OE

HPUX11i-DC-OE   HP-UX 11i v3 DataCenter OE

Required HP-UX patches

Table 1-5 lists the required HP-UX patches.

Table 1-5   Required patches

HP-UX patch ID	Description
PHSS_36311	This patch fixes a security vulnerability in HP-UX IA-64 platforms. The Veritas Enterprise Administrator Service Core and VRTSobc33 depots require this patch on IA-64 platforms.
PHKL_40022	This patch distributes vxiod threads to processors other than the monarch CPU.

Table 1-6 lists the recommended HP-UX patches.

Table 1-6   Recommended patches

HP-UX patch ID	Patch name
PHKL_39401	This patch fixes a Virtual-Memory defect. This patch must be installed for Veritas File System (VxFS) to respond to memory pressure situations.

Warning: Install all the latest required HP-UX patches before you install SF Oracle RAC. You can use the `swlist` command to determine whether the correct update and patches are installed. The installation procedure terminates if the correct patches are not found.

HP may release patches that supersede the ones in this list. To verify that you have the latest HP-UX patches, go to the Symantec support website to view the relevant TechNote:

http://entsupport.symantec.com/docs/281875

Other required HP-UX software

If you plan to install SF Oracle RAC from an NFS mounted directory, you must install the software `ONCplus - HP-UX 11i v3 version B.11.31.07.01`. The `ONCplus B.11.31.06` software bundled with HP-UX 11i v3 March 2009 OEUR release reports issues with long path names. This causes the installation to fail as the installer can not copy files from the mounted directory to the systems on which you want to install SF Oracle RAC.

To download the software:

■ Go to http://software.hp.com.

■ Search for the software depot `ONCplus`.

■ Download ONCplus for HP-UX 11i v3 version B.11.31.07.01.

Supported replication technologies for global clusters

SF Oracle RAC supports the following hardware-based replication and software-based replication technologies for global cluster configurations:

Hardware-based replication	■ EMC SRDF ■ Hitachi TrueCopy ■ IBM Metro Mirror ■ IBM SAN Volume Controller (SVC) ■ EMC MirrorView
Software-based replication	■ Veritas Volume Replicator ■ Oracle Data Guard

License requirements

The following licenses are required for campus cluster and global cluster environments:

■ SF Oracle RAC with HA/DR

■ FlashSnap (FMR3) license

■ Site awareness license for consistent mirror reattach

No longer supported

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

SF Oracle RAC does not support the following:

■ Dissimilar version upgrades of SF Oracle RAC components
For example, if you have SF Oracle RAC 4.1 installed with Oracle RAC 9i R2, you can not upgrade VCS to version 5.0.1.

■ 32-bit Oracle architectures

■ Oracle RAC 9i, Oracle RAC 10g Release 1

■ Storage Checkpoint commands for checking and saving the configuration of the Oracle RAC database: `dbed_checkconfig, dbed_saveconfig`

■ Use of crossover cables

Oracle does not support the use of crossover cables for cluster interconnects due to the possibility of data corruption and other software limitations.

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

The use of crossover cables is discouraged for new deployments.

Fixed issues

This section describes the list of issues fixed in SF Oracle RAC.

See "Issues fixed in SF Oracle RAC 5.0.1" on page 20.

For the list of issues fixed in Veritas Cluster Server:

See *Veritas Cluster Server Release Notes (5.0.1).*

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

See *Veritas Storage Foundation Release Notes (5.0.1).*

Issues fixed in SF Oracle RAC 5.0.1

Table 1-7 lists the issues fixed in SF Oracle RAC 5.0.1.

Table 1-7   SF Oracle RAC 5.0.1 fixed issues

Incident number	Description
1826308	The cssd-monitor script is now modified to use a single ps command with -o args option to improve the performance.
1220479	The linkrac script is now modified to determine the format of the shared library that must be used with the installed version of Oracle.
1216107	The MultiPrivNIC agent is now modified to fail over the private IP address if the link on which the IP address was configured was not an LLT link.
1264337	If the Private IP address (configured in MultiPrivNIC) is found on any interface in an inactive state, SF Oracle RAC now makes it available for use on other interfaces.

Table 1-7 SF Oracle RAC 5.0.1 fixed issues *(continued)*

Incident number	Description
1382034	The MultiPrivNIC agent now fails over the IP address only if the current active link sees less peer nodes than the node that wins the race condition.
1413791	The timeout value is calculated using the variable "lbolt", which is reset after 410 days. SF Oracle RAC now uses the 64 bit variable, ticks_since_boot_whole. This variable is not reset for years as opposed to the lbolt variable.
1243481	The main.cf file is now updated to support multiple Oracle 10g database instances.
1593859	The VCSIPC implementation has now been changed to enable faster startup of Oracle RAC instances.
1636492	The cssd-monitor script is now changed to prevent the CSSD monitoring process from timing out before Oracle Clusterware starts.
857159	The gcoconfig command now assigns the correct priority number for the cluster nodes in the SystemList of the ClusterService group.

Known issues

This section lists the known issues in SF Oracle RAC 5.0.1.

For Oracle issues:

For SF Oracle RAC issues:

Oracle issues

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

Oracle VIP Configuration Assistant fails with an error message

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

```
The given interface(s), "lan0" is not public.
Public interfaces should be used to configure virtual IPs.
```

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

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

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

Oracle Cluster Verification utility displays a warning message

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

For example:

```
Utility
============================================================
OUI-25031: Some of the configuration assistants failed. It is
strongly recommended that you retry the configuration
assistants at this time. Not successfully running any "
Recommended" assistants means your system will not be correctly
configured.
1. Check the Details panel on the Configuration Assistant Screen
to see the errors resulting in the failures.
2. Fix the errors causing these failures.
3. Select the failed assistants and click the 'Retry' button
to retry them.
============================================================
```

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

Simultaneous startup and shutdown of Oracle processes

Continuous startup and shutdown of the database instances at the same time on all the nodes in an eight node SF Oracle RAC cluster can cause the cluster to hang. [856071]

Workaround: Do not startup and shutdown repeatedly at the same time on all the eight nodes in an SF Oracle RAC cluster.

Changing the Veritas agent for Oracle error handling

The Veritas agent for Oracle provides enhanced handling of Oracle errors encountered during detailed monitoring. The agent uses the reference file,

oraerror.dat, which provides a list of Oracle errors and actions to address the errors.

For a description of the actions:

See the *Veritas High Availability Agent for Oracle Installation and Configuration Guide.*

Currently, the file specifies the NOFAILOVER action for the following Oracle errors: ORA-00061, ORA-02726, ORA-6108, ORA-06114

The NOFAILOVER action means that the agent sets the state of the resource to OFFLINE and freezes the service group. If you want to change this behavior, you can stop the agent, edit oraerror.dat, and change the NOFAILOVER action to another action that is appropriate for your environment. The changes go into effect when you restart the agent.

Oracle instance may fail to start during database creation

During database creation, the Oracle instance may fail to start with the following error (logged in the alert log):

```
ORA-00603: ORACLE server session terminated by fatal error
ORA-27544: Failed to map memory region for export
ORA-27300: OS system dependent operation:socket failed with status: 11
ORA-27301: OS failure message: Resource temporarily unavailable
ORA-27302: failure occurred at: sskgxpcre1
```

[1228867]

This is a known issue in the Oracle Database 11g Release 1 (11.1.0.6). As per Oracle, this issue will be fixed in the Oracle Database 11g Release 1 (11.1.0.7).

SF Oracle RAC issues

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

Startup or shutdown failure messages reported for LLT, GAB, VXFEN, and VCSMM

If you need to reboot the system when you install SF Oracle RAC, the init scripts for LLT, GAB, VXFEN, and VCSMM report start or stop failure messages. This is because SF Oracle RAC is not yet configured and the required configuration files are not yet generated for these components. These messages may be ignored. [1666327]

VRTSgab error messages reported during upgrade from SF Oracle RAC 4.1 MP2

When you upgrade SF Oracle RAC from version 4.1 MP2 (HP-UX 11i v2) to version 5.0.1 (HP-UX 11i v3) using the Veritas installation programs, the installer reports an error message indicating failed uninstallation of GAB (Global Atomic Broadcast). The error message is logged in the installation log files and the corresponding swremove log files. [1719136]

The error message reported in the installation log file is as follows:

```
The following depots failed to uninstall on galaxy:
VRTSgab
```

The message may be ignored as the VRTSgab package for version 5.0.1 is successfully installed.

Deporting issues with shared disk groups

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

CVM disks get stuck in an error state

CVM disks might get into an error state in some scenarios. For instance, the disk might get into an error state after a reboot of the cluster nodes. It might also happen when a disk group is deported and then imported.

Workaround: Perform the following steps to bring the CVM disks online.

To bring CVM disks online

1   Run the following command on any of the cluster nodes to stop VCS.

    ```
    # /opt/VRTSvcs/bin/hastop -all
    ```

2   Run the following commands on each cluster node to clear the error state of the disks.

    ```
    # vxdisk -a online
    # vxdisk scandisks
    ```

3   Create a file that has all the VxVM disk names with the complete path. For example: /dev/rdsk/c4t1d2.

4   Check for SCSI keys on the VxVM devices.

    ```
    # vxfenadm -g all -f disk_filename
    ```

    where *disk_filename* is a file that contains all of the fully qualified path to
    each disk.

5   Register with the disks in the disk_filename.

    ```
    # vxfenadm -m -k <key> -f disk_filename
    ```

6   Remove the SCSI keys on the VxVM devices:

    ```
    # vxfenadm -p -k <key> -v victim_node_key  -f disk_filename
    ```

    where *victim_node_key* is the SCSI key listed while running the command in
    step 4.

7   Remove the key registered in step 5.

    ```
    # vxfenadm -x -k <key> -f disk_filename
    ```

8   Run the following command on each of the cluster nodes to start VCS.

    ```
    # /opt/VRTSvcs/bin/hastart
    ```

Passwordless communication required by vxfentsthdw command

The vxfentsthdw command requires passwordless communication to be set up
betweem the cluster nodes.

Stopping cluster nodes configured with I/O fencing

The I/O fencing feature protects against data corruption resulting from a failed
cluster interconnect or "split brain."

For more information, see *Veritas Cluster Server User's Guide.*

I/O fencing uses SCSI-3 Persistent Reservation keys to implement data protection.
The software places keys on I/O fencing coordinator and data disks. The
administrator must be aware of several operational changes needed when working
with clusters protected by I/O fencing. Specific shutdown procedures ensure keys
are removed from coordinator disks and data disks to prevent possible difficulties
with subsequent cluster startup. Using the reboot command rather than the
shutdown command bypasses shutdown scripts and can leave keys on the

coordinator and data disks. Depending on the order of reboot and subsequent startup events, the cluster might warn of a possible split brain condition and fail to start up.

Workaround: Use the shutdown command instead of the reboot command to perform a graceful reboot for systems.

```
# /usr/sbin/shutdown -r now
```

Stopping VCS does not unregister port f from GAB membership

In an SF Oracle RAC cluster with all the CFS resources under VCS control, when you stop VCS, all the CFS resources must go down cleanly and CFS must unregister port f from GAB membership. Oracle RAC 10g Clusterware does not clean up all its processes when it is stopped. Now, when you stop VCS, all the CFS resources go down. However, due to the left over Oracle processes, CFS does not unregister port f from GAB membership.

Workaround: Perform the following steps to bring down port f.

To bring down port f

1   Kill all the Oracle processes.

```
 # kill -9 'ps -u oracle|awk '{print $1}''
```

2   Verify that all CFS file systems are unmounted.

```
# mount | grep cluster
```

3   Unregister port f from GAB membership.

```
# fsclustadm cfsdeinit
```

Removal of SF Oracle RAC configuration files

If any of the following configuration files are present prior to running the installer utility, move or rename the files:

- /etc/llttab
- /etc/llthosts
- /etc/gabtab
- /etc/vcsmmtab
- /etc/vxfendg

■ /etc/VRTSvcs/conf/config/main.cf

DBED features are not integrated with GCO

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

Database Management System server can not be started if the base_pagesize is set to a value of 64

If you install or upgrade SF Oracle RAC to version 5.0.1 on nodes that contain IVM packages, the Database Management System (DBMS) server can not be started as the base_pagesize is set to a default value of 64.

The following error messages are printed in the swm and swagent logs:

```
Allocating a communication buffer failed

Ping server failed -- Connection error: Found server but communication erro
occurred.

ERROR:    *** Could not verify DBMS server instance. Please check error.
ERROR:    *** Return code: 1
ERROR:    *** Initialization has failed!
ERROR:    The "configure" script for "VRTSdbms3" failed (exit code "1").
          The script location was
          "/var/adm/sw/products/VRTSdbms3/pfiles/configure".
```

Workaround: Set the base_pagesize to a value lesser than 64 using kctune(1M) for the DBMS server to start successfully.

Issue with format of the last 8-bit number in PrivNIC IP addresses

The command "hares ora_priv" fails if the PrivNIC IP addresses have a a leading 0 in any of the octets that comprise the IP address, for example X.X.X.01 or X.X.0X.1. or X.0X.X.1 or 0X.X.X.1, where X is an octet of the IP address. [1164506]

When configuring private IP addresses for Oracle Clusterware, ensure that the IP addresses have a format as displayed in the following two-node example:

■ On galaxy: 192.168.12.1

■ On nebula: 192.168.12.2

Confirm the correct format by viewing the PrivNIC resource in the main.cf file.

Software limitations

The following limitations apply to this release.

Cluster File System (CFS) limitations

The following are the limitations of CFS:

- CFS supports only disk layout version 6 and 7.

- CFS does not support HSM/DMAPI.

- VxFS does not distribute its own versions of file utilities such as `cpio` or `mv`.

Volume Manager does not support RAID 5 in a cluster environment

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

Performance recommendation for space-optimized volume snapshots

For minimal performance impact, Symantec recommends that the Space Optimized Snapshots (SOS) be created only of data volumes. A mirror breakoff snapshot should be created of the Oracle log volume. The log volumes are typically small in size and do not have significant space overhead.

Oracle Disk Manager (ODM) limitation

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

Storage Checkpoint and Database FlashSnap limitation

The following are the limitations of Storage Checkpoint and Database FlashSnap:

- You cannot create a clone database using a mounted Storage Checkpoint.

- If you create an Oracle instance using the spfile option, you must run the `dbed_update` command before you can successfully perform any Storage Checkpoint or Database FlashSnap functions.

- Storage Checkpoints require file system layout version 6 or version 7. Use the vxupgrade(1M) command to check the current layout version and to change the layout version, if necessary. When upgrading a CFS file system, issue the command from the primary node. Note that after you upgrade a system to layout version 6 or version 7, the file system is no longer compatible with the older VxFS file systems.

- When cloning a database using Database FlashSnap, the Oracle database must have at least one mandatory archive destination. For more information about Oracle parameters for archiving redo logs, see your Oracle documentation.

- Only online snapshots are supported for an Oracle RAC database, when using the `dbed_vmsnap`, `dbed_vmclonedb`, and `dbed_vmchecksnap` commands.

- After running `dbed_vmsnap -o reverse_resync_commit`, your primary database is started using a pfile. If your original primary database used an spfile, you need to shut down the database and restart it using spfile. Then, run `dbed_update` to update the repository.

- The Storage Checkpoint and Database FlashSnap features of SF Oracle RAC do not support the graphical user interface of the Veritas Storage Foundation for Oracle product.

- The Database FlashSnap feature does not support RAID-5 volumes.

- SF Oracle RAC does not support the Veritas FlashSnap agent for Symmetrix (EMC TimeFinder) mapping functionality (package:`VRTSfas`).

LLT low priority heartbeat links not recommended

Symantec does not recommend using the public network as LLT low priority links for SF Oracle RAC. When all the high priority links fail, LLT uses low priority links to send data between cluster nodes. Due to high volume of data in an SF Oracle RAC environment, the public link will be flooded with SF Oracle RAC data.

Documentation errata

This section lists the known issues in SF Oracle RAC documentation.

- The HP-UX Operating Environments (OE) listed in the *Veritas Storage Foundation for Oracle RAC Installation and Configuration Guide* on page 35 are incorrect. The correct list of supported HP-UX Operating Environments is documented in the Release Notes.
  See "Supported HP-UX operating systems" on page 17.

- The following instructions described in the *Veritas Storage Foundation for Oracle RAC Installation and Configuration Guide* for mounting file systems on shared storage may fail to bring the mount points online after the system restarts.

  - Step 7 on page 199

  - Step 7 on page 201

  - Step 8 on page 207

- Step 13 on pages 293 and 294
- Step 7 on page 484

The instructions in all of the above cases must be corrected to include the option `mntlock=VCS` in the command to mount the shared file system.

For example, the following command on page 199:

```
# mount -F vxfs -o cluster /dev/vx/dsk/crsbindg/crsbinvol \
/app/crshome
```

must be corrected as follows:

```
# mount -F vxfs -o cluster, mntlock=VCS \
/dev/vx/dsk/crsbindg/crsbinvol /app/crshome
```

- The following link in the *Veritas Storage Foundation for Oracle RAC Installation and Configuration Guide* on page 306 and 314 does not resolve correctly:
  http://entsupport.symantec.com/docs/282004htm
  The link refers to the Technical Support TechNote for the latest updates or software issues on replication agents and is as follows:
  http://entsupport.symantec.com/docs/282004

Documentation

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

Table 1-8 lists the documentation for SF Oracle RAC.

Table 1-8   SF Oracle RAC documentation

Document title	File name
Veritas Storage Foundation for Oracle RAC Installation and Configuration Guide	sfrac_install.pdf
Veritas Storage Foundation for Oracle RAC Administrator's Guide	sfrac_admin.pdf
Veritas Storage Foundation for Oracle RAC Release Notes	sfrac_notes.pdf

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

Table 1-9 Veritas Cluster Server documentation

Document title	File name
Veritas Cluster Server Installation Guide	vcs_install.pdf
Veritas Cluster Server Release Notes	vcs_notes.pdf
Veritas Cluster Server User's Guide	vcs_users.pdf
Veritas Cluster Server Bundled Agents Reference Guide	vcs_bundled_agents.pdf
Veritas Cluster Server Agent Developer's Guide	vcs_agent_dev.pdf
Veritas Cluster Server Enterprise Agent for Oracle Installation and Configuration Guide	vcs_oracle_install.pdf

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

Table 1-10 Veritas Storage Foundation documentation

Document title	File name
Veritas Storage Foundation Release Notes	sf_notes.pdf
Veritas Storage Foundation Installation Guide	sf_install.pdf
Veritas Storage Foundation Cluster File System Release Notes	sf_notes.pdf
Veritas Storage Foundation Cluster File System Administrator's Guide	sfcfs_admin.pdf
Veritas Storage Foundation Intelligent Storage Provisioning Solutions Guide	sf_isp_solutions.pdf
Veritas FlashSnap Point-in-Time Copy Solutions Administrator's Guide	flashsnap_admin.pdf

Table 1-11 lists the documentation for Veritas Volume Manager and Veritas File System.

Table 1-11 Veritas Volume Manager and Veritas File System documentation

Document title	File name
Veritas Volume Manager Administrator's Guide	vxvm_admin.pdf
Veritas Volume Manager Cross-platform Data Sharing Administrator's Guide	sf_cds_admin.pdf

Table 1-11   Veritas Volume Manager and Veritas File System documentation
(continued)

Document title	File name
Veritas Volume Manager Troubleshooting Guide	vxvm_tshoot.pdf
Veritas File System Administrator's Guide	vxfs_admin.pdf

Table 1-12 lists the documentation for Symantec Product Authentication Service.

Table 1-12   Symantec Product Authentication Service documentation

Document title	File name
Symantec Product Authentication Service Installation Guide	vxat_install.pdf
Symantec Product Authentication Service Administrator's Guide	vxat_admin.pdf
Symantec Product Authentication Service Release Notes	vxat_notes.pdf