

# Veritas Storage Foundation<sup>™</sup> for Oracle RAC Release Notes

Solaris x64 Platform Edition

5.0



# Veritas Storage Foundation for Oracle RAC Release Notes

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## Storage Foundation for Oracle RAC

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Veritas Storage Foundation for Oracle RAC is a licensed product. See the *Veritas Storage Foundation for Oracle RAC Installation and Configuration Guide* for license installation instructions.

## Technical support

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# Veritas Storage Foundation for Oracle RAC Release Notes

This document provides important information regarding Veritas™ Storage Foundation for Oracle RAC (SF Oracle RAC) for Solaris. Review this entire document before installing this product.

See the following Technical Support TechNote for the latest information on updates, patches, and software issues regarding this release:

<http://entsupport.symantec.com/docs/286955>

Veritas Storage Foundation for Oracle RAC is an integrated set of software products. It enables administrators of Oracle Real Application Clusters (RAC) to operate a database in an environment of cluster systems running Veritas Cluster Server (VCS) and the cluster features of Veritas Volume Manager and Veritas File System, also known as CVM and CFS, respectively.

Acronyms used for Storage Foundation for Oracle RAC components include the following:

<b>CVM</b>	Veritas Volume Manager cluster functionality
<b>CFS</b>	Veritas File System cluster functionality
<b>VCS</b>	Veritas Cluster Server
<b>VEA</b>	Veritas Enterprise Administrator graphical user interface
<b>VxFS</b>	Veritas File System
<b>VxVM</b>	Veritas Volume Manager

SF Oracle RAC components are described in the *Veritas Storage Foundation for Oracle RAC Installation and Configuration Guide*. Refer to component-product documentation and release notes for additional information to assist you during installation and configuration of SF Oracle RAC.

## New Features

We offer the following new features in SF 5.0 for Oracle RAC (Solaris x64 Platform Edition). See the *Installation and Configuration Guide* for details.

- Fencing with DMP disks
- Compliance with Solaris JumpStart technology
- Support for Oracle 10g Release 2
- Change in behavior: VCS FEN error messages are now VXFEN error messages

## System requirements

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

**Table 1-1** System Requirements

Item	Description
SF Oracle RAC systems	Two to eight systems with two or more CPUs at 2GHz or higher.
RAM	Each SF Oracle RAC system requires 2 GB or more of physical memory. Refer to your Oracle documentation for additional requirements.
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.  Symantec recommends switches for the private network links. These links must be of the same type; you cannot mix 100BaseT and Gigabit.
DVD drive	One drive that is accessible to all nodes in the cluster.
Fibre channel or SCSI host bus adapters	SF Oracle RAC requires at least one built-in SCSI adapter per system to access the operating system disks, and at least one additional SCSI or Fibre Channel Host Bus Adapter per system for shared data disks.
Disks	Typical SF Oracle RAC configurations require that shared disks support applications that migrate between systems in the cluster.  The SF Oracle RAC I/O fencing feature requires that all disks used as data disks or as coordinator disks must support SCSI-3 Persistent Reservations (PR).

Item	Description
Disk space	SF Oracle RAC space requirement: <ul style="list-style-type: none"><li>■ total: 2.6 G</li><li>■ /opt: 1.4 G</li><li>■ /usr: 200 KB</li><li>■ /tmp: 512 MB</li><li>■ /var: 32 MB</li><li>■ /var/tmp: 700 MB</li></ul>
Swap space	Typically, two times the main memory.

## Supported hardware

Review the current compatibility list to confirm compatibility of your hardware:  
<http://entsupport.symantec.com/docs/287089>

## Supported software

Supported software includes:

- Operating system and patches
- Veritas software
- Oracle software

### Operating system and patches

Within a cluster, all nodes must use the same operating system version and patch level. Run SF Oracle RAC on the following operating system at the required patch levels.

- Solaris 10

### Solaris Patch requirements

The Sun patch number in the following table is only required for a SF Oracle RAC installation performed from the Symantec DVD.

**Table 1-2** Solaris patch requirements

Operating system	Sun patch number or package name	Notes
Solaris 10	119043-02	This patch is only required for a SF Oracle RAC installation performed from the Symantec DVD.

Some required system patches may already be present in your operating system. You should check to see if your operating system already contains any required patches. Use the command `showrev -p` to display the patches included in your system. For example, to check for patch 119043-02, enter the following command:

```
#showrev -p|grep 119043
```

If the patches shown in the required list are not already installed, then go to the SunSolve website to download them. You need to install the appropriate patches and then reboot.

**DISCLAIMER:** Patch version and information is determined at the time of product release. For the most current patch version and information, please contact your vendor.

## Veritas software

Only versions of VCS, VxVM, and VxFS provided on the software disc are supported. Remove other versions before you install the software from the Veritas Storage Foundation for Oracle RAC software disc.

## Oracle software

SF Oracle RAC supports the following Oracle software:

- Oracle 10g Release 1
- Oracle 10g Release 2

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

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

# Software limitations

The following limitations apply to this release.



## Non-global zones

Storage Foundation for Oracle RAC is not supported on non-global zones.

## Cluster File System (CFS)

The following are limitations of Cluster File System:

- CFS supports only disk layout version 6 and 7.
- No support for HSM/DMAPI.
- VxFS does not distribute its own versions of file utilities such as `cpio` or `mv`.

## Volume Manager in a shared disk environment (CVM)

Volume Manager cluster functionality does not support software RAID 5.

## Space-optimized volume snapshots

For minimal performance impact Symantec recommends that the Space Optimized Snapshots (SOS) be created only of the Data Volumes. A mirror break of snapshot should be created of the Oracle Log volume. Creating a mirror breakoff snapshot of the Oracle Log volume does not have much space overhead since the log volumes are typically small in size.

## Volume location for ocrvol and votevol

The Oracle RAC wizard does not support the following condition:

- For Oracle 10g, the ocrvol volume and votevol volume cannot exist in the same shared disk group as that of Oracle datafiles.

However, you can allow for this condition when you manually configure Oracle service groups.

## Oracle Disk Manager (ODM)

Oracle Disk Manager 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 Checkpoints and Database FlashSnap

The following are limitations of Storage Checkpoints and Database FlashSnap:

- You cannot create a clone database using a mounted Storage Checkpoint. [32726]

- If you create an Oracle instance using the `sfile` 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 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:** After you upgrade a system to layout version 6 or 7, the file system is no longer compatible with 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. [270905]
- For an Oracle RAC database, when using the `dbed_vmsnap`, `dbed_vmclonedb`, and `dbed_vmchecksnap` commands, only online snapshots are supported. [605330]
- After running `dbed_vmsnap -o reverse_resync_commit`, your primary database is started using a `pfile`. If your original primary database used an `sfile`, you need to shut down the database and restart it using the `sfile`. Then, run `dbed_update` to update the repository.
- The Storage Checkpoint and Database FlashSnap features of SF Oracle RAC do not support the GUI of the Veritas Storage Foundation for Oracle product.
- The Database FlashSnap feature does not support RAID-5 volumes. [34570]

## LLT low priority heartbeat links not recommended

Symantec does not recommend using the public network as LLT low priority links for SF Oracle RAC. Low priority links reduce network overhead by reducing the frequency of heartbeats, but they are not suited for the typical volume of SF Oracle RAC data.

## Installation notes

The following information includes guidelines, tips, and other considerations for installing the product.

### Storage Foundation for Oracle RAC packages

Storage Foundation for Oracle RAC is a licensed product. The *Veritas Storage Foundation for Oracle RAC Installation and Configuration Guide* describes how

to obtain a license that applies for Veritas Storage Foundation for Oracle RAC, Veritas Volume Manager, Veritas File System, and Veritas Cluster Server.

## Software installed for Storage Foundation for Oracle RAC

The software components installed by the Veritas Storage Foundation 5.0 for Oracle RAC installation utility, `installsfprac`, include:

- Veritas Storage Foundation for Oracle RAC
- Veritas Cluster Server (VCS)
- Veritas Volume Manager (VxVM)
- Veritas Group Lock Manager
- Veritas File System (VxFS)
- Veritas extension for Oracle Disk Manager (ODM)
- Veritas Cluster Server agent for Oracle

## Upgrading the SFDB repository

After you have completed the SF Oracle RAC upgrade, if you plan to use the commands for Checkpoints, FlashSnap, or Storage Mapping, you must:

- Change permissions
- Upgrade the repository

---

**Note:** Do not recursively change permissions, groups, or owners.

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### To change permissions

- 1 Change permissions for the following directory:

For Veritas Storage Foundation for Oracle:

```
# chmod 750 /opt/VRTSdbed
```

- 2 Reset owner and group settings to the appropriate owner and group for the database administrators on your system.

For example, to change owner to the user `oracle` and the group `dba`, run the following command:

```
# chown oracle:dba /opt/VRTSdbed
```

### To upgrade the repository in a cluster environment

- 1 Unconfigure the SFUA repository from the VCS configuration:

```
# /opt/VRTSdbcom/bin/sfua_db_config -o unconfig_cluster
```

- 2 Mount the repository file system manually.

- 3 Run the repository upgrade command again with no options:

```
# /opt/VRTSdbcom/bin/sfua_db_config
```

## Operation notes

The following information includes guidelines, tips, and other considerations for operating the product. See the *Storage Foundation for Oracle RAC Installation and Configuration Guide* for complete procedures.

### Enabling fencing

When the product installer completes installation of SF Oracle RAC, I/O fencing is disabled on all cluster nodes. Symantec does not support using SF Oracle RAC with I/O fencing disabled. See the *Veritas Storage Foundation for Oracle RAC Installation and Configuration Guide* for details on configuring I/O fencing in a cluster environment.

## Open issues

The following issues were reported for this release:

### Issues affecting Oracle 10g Release 2

#### Oracle Database Configuration Assistant

The Database Configuration Assistant utility displays the error, “SGA size cannot be greater than maximum shared memory segment size (0).”

**Workaround:** Ignore this message and manually configure the database memory parameters for Oracle. In the **Memory** tab of the Oracle Database Creation Assistant (DBCA), select a **Custom** and **Manual** shared memory management configuration and enter the appropriate values.

### GAB and LLT kernel modules are still loaded after uninstalling

After a successful removal of SF Oracle RAC, the GAB and LLT kernel modules may still be loaded. [605017]

**Workaround:** Unload gab and llt modules on all nodes:

```
modunload -i <gms_module_id>  
modunload -i <gab_module_id>  
modunload -i <llt_module_id>
```

To find the module ID, use `modinfo`. For example, for gms:

```
# modinfo | grep gms
```

## Deporting and importing of shared disk groups

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

## Handling of RAW files with ODM enabled for Oracle 10g

Oracle can use RAW files for data files, control files and redo logs. Previously, the SQL REUSE clause was ignored if the associated file was a RAW file. From Oracle 10g onwards, the REUSE clause of SQL is mandatory when Oracle Disk Manager (ODM) is enabled. [540429]

There are two workarounds for this issue.

**First Workaround:** To create database files on raw volumes, you must set the REUSE option in the SQL commands. For examples of error messages and SQL workarounds, see the following Technical Support TechNote:

<http://entsupport.symantec.com/docs/283362>

**Second Workaround:** Perform the following steps:

- 1 Disable ODM

```
$ cd $ORACLE_HOME/lib
$ ln -s libodm10.so libodm10.so
```

- 2 Use DBCA and create database.
- 3 Shutdown database. Make sure all instances of RAC are down.

If Database instance is under VCS control

```
# /opt/VRTSvcs/bin/hares -offline <oracle_resource> -sys galaxy
# /opt/VRTSvcs/bin/hares -offline <oracle_resource> -sys nebula
```

If Oracle database instance is not under VCS control, use native Oracle commands.

- 4 Enable ODM

```
$ cd $ORACLE_HOME/lib
```

For 64 bit Oracle

```
$ ln -s /usr/lib/amd64/libodm.so libodm10.so
```

For 32 bit Oracle

```
$ ln -s /usr/lib/libodm.so libodm10.so
```

- 5 Bring up each instance of RAC.

If Database instance is under VCS control

```
# /opt/VRTSvcs/bin/hares -online <oracle_resource> -sys galaxy
# /opt/VRTSvcs/bin/hares -online <oracle_resource> -sys nebula
```

If Oracle database instance is not under VCS control, use native Oracle commands.

## Stopping CRS before stopping VCS in Oracle 10g clusters

In SF Oracle RAC clusters with Oracle 10g, if CRS is not under VCS control, stop the CRS daemons before using `hastop -all` command to stop VCS.

To enable VCS to control CRS daemons, refer to the information on configuring VCS service groups for Oracle 10g in the *Veritas Storage Foundation for Oracle RAC Installation and Configuration Guide*.

## Avoid using `lltconfig -u` in an Oracle 10g RAC environment

Using `lltconfig -u` in an Oracle 10g RAC environment to unconfigure a link with Oracle's private IP address plumbed on it prevents the `PrivNIC` agent from failing over this IP address. This usage may result in a machine reboot by the Oracle CRS.

## 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.

Refer to the *Veritas High Availability Agent for Oracle Installation and Configuration Guide* for a description of the actions.

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.

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.

## 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.” See “VCS Communications, Membership,

and I/O Fencing” in the *VCS User’s Guide* for details on the problems a failed interconnect can create and the protection I/O fencing provides.

I/O fencing uses SCSI-3 Persistent Reserve 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 -g0 -y -i6
```

## 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 10g Cluster Ready Services (CRS) 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.

- 1 Kill all the Oracle processes.
 

```
# kill -9 `ps -u oracle|awk '{print $1}'`
```
- 2 Verify that all CFS files systems are unmounted.
 

```
# mount | grep cluster
```
- 3 Unregister port f from GAB membership.
 

```
# fsclustadm cfsdeinit
```

## Setting the discovery mode to host visible devices for Symmetrix arrays

You can set the discovery mode to host visible devices only for symmetrix arrays to avoid excessive IO throughput for large configurations.

### To set the discovery mode to host visible devices for Symmetrix arrays

- 1 Determine the agent name under which symmetrix provider is configured:  
`# /opt/VRTSvail/bin/vail_symm_discovery_conf.sh -l`
- 2 Set the discovery mode to discover host visible devices only:  
`# /opt/VRTSvail/bin/vail_symm_discovery_conf.sh -a agent_name -s`  
The *agent\_name* is the output from the -l option:
  - "VAILAgent" for Storage Foundation, Storage Foundation for Oracle, or Storage Foundation for Oracle RAC
  - "StorageAgent" if VxFAS is configured

## Clonedb instance encounters an ORA-600 error during startup when ODM is enabled

During Storage Foundation for Oracle RAC startup and when ODM is enabled, the `dbed_clonedb` CLI will complete successfully, but the clonedb instance alert log may display an ORA-600 error.

**Workaround:** Restart the clone database using the `umount` and `restartdb` options of the `dbed_clonedb` CLI. For example:

```
dbed_clonedb -S clone_PROD -o umount
dbed_clonedb -S clone_PROD -o restartdb
```



# 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 1-3** Storage Foundation for Oracle RAC Documentation Set

Document Title	File Name
<b>Veritas Storage Foundation for Oracle RAC</b>	
<i>Veritas Storage Foundation for Oracle RAC Installation and Configuration Guide</i>	sfrac_install.pdf
<i>Veritas Storage Foundation for Oracle RAC Release Notes</i>	sfrac_notes.pdf
<b>Veritas Cluster Server</b>	
<i>Veritas Cluster Server Installation Guide</i>	vcs_install.pdf
<i>Veritas Cluster Server Release Notes</i>	vcs_notes.pdf
<i>Veritas Cluster Server User's Guide</i>	vcs_users.pdf
<i>Veritas Cluster Server Bundled Agents Reference Guide</i>	vcs_bundled_agents.pdf
<i>Veritas Cluster Server Agent Developer's Guide</i>	vcs_agent_dev.pdf
<i>Veritas Cluster Server Enterprise Agent for Oracle Installation and Configuration Guide</i>	vcs_oracle_install.pdf
<b>Veritas Storage Foundation</b>	
<i>Veritas Storage Foundation Release Notes</i>	sf_notes.pdf
<i>Veritas Storage Foundation Installation Guide</i>	sf_install.pdf
<i>Veritas Storage Foundation Intelligent Storage Provisioning Solutions Guide</i>	sf_isp_solutions.pdf
<i>Veritas Volume Manager Cross-platform Data Sharing Administrator's Guide</i>	sf_cds_admin.pdf
<i>Veritas FlashSnap Point-in-Time Copy Solutions Administrator's Guide</i>	flashsnap_admin.pdf
<b>Veritas Volume Manager</b>	
<i>Veritas Volume Manager Administrator's Guide</i>	vxvm_admin.pdf
<i>Veritas Volume Manager Troubleshooting Guide</i>	vxvm_tshoot.pdf
<b>Veritas File System</b>	
<i>Veritas File System Administrator's Guide</i>	vxfs_admin.pdf

