

Veritas Storage Foundation[™] for Oracle RAC Release Notes

Solaris

5.0

Maintenance Pack 1



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 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://support.veritas.com/docs/281987>

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:

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

Changes in this release

The 5.0 Maintenance Pack 1 for SF Oracle RAC introduces the following changes:

- VCS FEN error messages are now VXFEN error messages
- For the latest information on support for Oracle database versions, see the Veritas Technical Support TechNote:
<http://support.veritas.com/docs/280186>

Features introduced in SF 5.0 for Oracle RAC

We offer the following new features in SF 5.0 for Oracle RAC. See the *Installation and Configuration Guide* for details.

- Fencing with DMP disks
- Compliance with Solaris JumpStart technology
- Support for Oracle 10g Release 2

No longer supported

Support is no longer provided for the following:

- Oracle 9i Release 1

System requirements

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

Item	Description
SF Oracle RAC systems	Two to eight systems with two or more CPUs at 1GHz or higher.
RAM	Each SF Oracle RAC system requires 2 GB or more of physical memory.
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.

Item	Description
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	<p>Typical SF Oracle RAC configurations require that shared disks support applications that migrate between systems in the cluster.</p> <p>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).</p>
Disk space	<p>SF Oracle RAC space requirement:</p> <ul style="list-style-type: none"> ■ total: 2.6 G ■ /opt: 1.4 G ■ /usr: 200 KB ■ /tmp: 512 MB ■ /var: 32 MB ■ /var/tmp: 700 MB
Swap space	<p>Minimum: 4GB of swap space</p> <p>Recommended: two times the main memory</p>

Supported hardware

Review the current compatibility list to confirm compatibility of your hardware:

<http://support.veritas.com/docs/283161>

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 systems at the required patch levels.

- Solaris 10
- Solaris 9

- Solaris 8

Some required operating system patches may already be present on your system. Use the `showrev -p` command to display the patches on your system. If the Solaris patches in the following list are not already installed on your system, install the patches before installing SF Oracle RAC:

- Solaris 10: 119254-06
- Solaris 9: 116670-04, 112964-07
- Solaris 8: 111413-06, 108993-18, 108528-18, 112438-03

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:

- Oracle9i Release 2
- 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://support.veritas.com/docs/280186>

Oracle software patches

- Oracle 10g Release 2, Patchset 1: requires Oracle Patch 4637591
- Oracle 10g Release 2: requires Oracle Patches 4435949, 4637591, 5082958

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 SRVM, ocrvol, and votevol

The Oracle RAC wizard does not support the following condition:

- For Oracle9i, the SRVM volume cannot exist in the same shared disk group as that of Oracle datafiles.
- 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. [See Etrack Incident 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. [See Etrack Incident 270905]
- For an Oracle RAC database, when using the `dbed_vmsnap`, `dbed_vmclonedb`, and `dbed_vmchecksnap` commands, only online snapshots are supported. [See Etrack Incident 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. [See Etrack Incident 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, `installsfrac`, 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

Installing SF Oracle RAC version 5.0 MP1 for the first time

If you are installing Storage Foundation 5.0 MP1 for Oracle RAC software for the first time and not upgrading an existing system, for pre-installation instructions:

See the *Veritas Storage Foundation 5.0 for Oracle RAC Installation and Configuration Guide*, “Preparing to install SF Oracle RAC” on page 45.

To use Solaris JumpStart:

See [“Using Solaris JumpStart to install SF Oracle RAC”](#) on page 13.

To use an alternate root:

See [“Installing SF Oracle RAC on an alternate root”](#) on page 15.

Installing SF 5.0 MP1 for Oracle RAC involves the following tasks:

- Installing SF Oracle RAC version 5.0 using `installsfrac` script
Note that to upgrade to version 5.0 MP1, you must have SF Oracle RAC version 5.0 installed.
- Installing SF 5.0 MP1 using `installmp` script
- Configuring SF Oracle RAC using `installsfrac` script

To install the SF 5.0 for Oracle RAC software

- 1 Log in as superuser on one of the systems for installation.

- 2 Install the Veritas Storage Foundation 5.0 for Oracle RAC GA software from the release CD. Run the product installation script instead of the generic installer script.
See the *Storage Foundation for Oracle RAC Installation and Configuration Guide*.
Enter the following command from the top-level directory of the mounted CD:

```
# ./installsfrac [-rsh] -installonly galaxy nebula
```

The `-rsh` option is required if you are using the remote shell (RSH) rather than the secure shell (SSH) to install the software simultaneously on several systems.
- 3 Insert the disc containing the SF 5.0 MP1 for Oracle RAC software into the disc drive, and mount the disc on a suitable mount point.
- 4 To install SF 5.0 MP1 for Oracle RAC, you must invoke the `installmp` script from one of your cluster nodes using the option that corresponds to your configuration.
For example:
 - To install on the local system only:

```
# ./installmp
```
 - To install on more than one system using secure shell (SSH) utilities:

```
# ./installmp galaxy nebula ...
```
 - To install on more than one system using remote shell (RSH) utilities:

```
# ./installmp -rsh galaxy nebula
```
 - A restart of the system will be required after the patches are installed. If CRS is not configured under VCS control, log in as superuser on *galaxy* and *nebula* in the cluster and enter:

```
# /etc/init.d/init.crs start
```
 - If CRS is configured under VCS control, log in as superuser and enter the following command for each system in the cluster:

```
# /opt/VRTSvcs/bin/hares -online cssd_resource -sys galaxy  
# /opt/VRTSvcs/bin/hares -online cssd_resource -sys nebula
```
- 5 After the initial system checks and the requirement checks are complete, press Return to start upgrading the packages.
- 6 When installation is complete, note the locations of the summary, log, and response files indicated by the installer.
- 7 Restart all systems in the cluster.

```
# /usr/sbin/shutdown -g0 -y -i6
```
- 8 Change to `/opt/VRTS/install` directory.
- 9 Run the `installsfrac` script, this time specifying the `-configure` option to configure the software, for example:

```
# ./installsfrac [-rsh] -configure galaxy nebula
```

See the *Veritas Storage Foundation 5.0 for Oracle RAC Installation and Configuration Guide*, “Installing and Configuring SF Oracle RAC Software” on page 87.

- 10 Install and configure the correct version of Oracle.
See Chapter 5, “Preparing to install Oracle9i RAC” in the *Veritas Storage Foundation 5.0 for Oracle RAC Installation and Configuration Guide*.
See Chapter 10, “Preparing to install Oracle 10g RAC” in the *Veritas Storage Foundation 5.0 for Oracle RAC Installation and Configuration Guide*.
- 11 If you want to use Checkpoints, FlashSnap, or Storage Mapping, configure the repository database.
See Chapter 18, “Configuring the repository database for Oracle” in the *Veritas Storage Foundation 5.0 for Oracle RAC Installation and Configuration Guide*.

Using Solaris JumpStart to install SF Oracle RAC

For Solaris JumpStart, use the procedures below to install SF Oracle RAC 5.0 and 5.0 MP1.

For JumpStart instructions:

See the documentation that came with your Solaris operating system software.

To install SF Oracle RAC 5.0 using Solaris JumpStart

- 1 List the SF Oracle RAC packages and their installation order.

```
# cd /cdrom/dvd1/storage_foundation_for_oracle_rac
# ./installsfrac -installpkgs
```

On the SF Oracle RAC DVD-ROM these packages are in the tar gzip format.

- 2 Copy these files on to the jumpstart server and expand them.
- 3 Create an admin_file on your JumpStart server with the following contents:

```
mail=
instance=overwrite
partial=nocheck
runlevel=quit
idepend=quit
rdepend=nocheck
space=quit
setuid=nocheck
conflict=nocheck
action=nocheck
basedir=default
```

- 4 Add a command to your JumpStart script for each of the SF Oracle RAC package using one of the following:

- If there is no response file:


```
# pkgadd -R /pathname -a admin_file -d pkg_dir package
```
- If there is a response file:


```
# pkgadd -n -R /pathname -a admin_file -d pkg_dir \
-r package.response_file package
```

- 5 The following packages need empty response files:

```
VRTSdcli
VRTSjre
VRTSvsvc
VRTSvxvm
VRTSweb
```

To create an empty response file:

```
# touch package.response_file
```

- 6 The following packages need the following values in the corresponding response files:

```
VRTSobc33
    VXPALSECURITY=n
    VXPALLOCALHOSTNAME=
    VXPALDOMAINCONTROLLER=
    VXPALAUTHENTICATIONBROKER=
VRTSob
    SECURITYADMINPASSWORD=
    ROOTAGENTPASSWORD=
    CONFIGURESECURITY=n
VRTSvdid
    OPT=/opt
VRTScssim
    PKGDIR=VRTScssim
    BASEDIR=/opt
```

To configure SFRAC

- 1 Add the SF Oracle RAC license.


```
# cd /cdrom/dvd1/storage_foundation_for_oracle_rac
# ./installsfrac [-rsh] -license
```
- 2 Invoke the installsfrac script to configure SF Oracle RAC.


```
# ./installsfrac [-rsh] -configure
```

To use JumpStart to install SF Oracle RAC 5.0 MP1 patches

Add these 5.0 MP1 patches to the JumpStart server.

For Solaris 8:

```
124004-02 123996-06 123678-04 122632-02 122631-02 122633-02 123076-02
123079-02 123075-02 123995-05 123744-03 123742-02 123207-01 123984-01
```

```
123983-01 121714-01 123200-02 122058-08 123821-02 123818-01 123740-02
124002-02 123823-01 123743-02 123216-02 121711-01 123085-02 123670-01
123214-01 123673-01 121708-03
```

For Solaris 9:

```
124004-02 123996-06 123678-04 122632-02 122631-02 122633-02 123076-02
123079-02 123075-02 123995-05 123744-03 123742-02 123208-01 123984-01
123983-01 121714-01 123201-02 122058-08 123821-02 123818-01 123740-02
124002-02 123823-01 123743-02 123216-02 121711-01 123086-02 123670-01
123214-01 123674-01 121709-03
```

For Solaris 10:

```
124004-02 123996-06 123678-04 122632-02 122631-02 122633-02 123076-02
123079-02 123075-02 123995-05 123744-03 123742-02 123209-01 123210-01
123211-01 123984-01 123983-01 121714-01 123202-02 122058-08 123821-02
123818-01 123740-02 124002-02 123823-01 123743-02 123216-02 121711-01
123087-02 123670-01 123214-01 123675-01 121710-03
```

Installing SF Oracle RAC on an alternate root

To install SF Oracle RAC on an alternate root using the installer, use the following procedure.

To install the packages on alternate root

- 1 Verify that the Solaris OS is installed on the alternate root.
For example: `/dev/dsk/c0t8d0s0`.
- 2 Mount your alternate root disk to a mount point (on all nodes).

```
# mkdir /disk1
# mount /dev/dsk/c0t8d0s0 /disk1
```

The mount point must be by the same name on all systems.

- 3 Start the installer with the `-rootpath` option.

```
# cd /cdrom/dvd1/storage_foundation_for_oracle_rac
# ./installsfrac [-rsh] -rootpath /disk1
```

To configure SFRAC

- 1 Restart the systems with the new root (disk1).
- 2 Add the SF Oracle RAC license.

```
# cd /cdrom/dvd1/storage_foundation_for_oracle_rac
# ./installsfrac [-rsh] -license
```
- 3 Invoke the `installsfrac` script to configure SF Oracle RAC.

```
# ./installsfrac [-rsh] -configure
```

Upgrading from SF Oracle RAC 5.0 to 5.0 MP1

You can upgrade to 5.0 MP1 only if SF Oracle RAC 5.0 is installed and configured. For complete procedures:

See the *Storage Foundation for Oracle RAC Installation and Configuration Guide*.

Overview of upgrade tasks

You must perform the following tasks:

- [Stopping Oracle and the cluster resources](#)
- [Upgrading to SF Oracle RAC 5.0 MP1 using the installmp installer](#)
- [Performing post-upgrade tasks for SF Oracle RAC 5.0 MP1](#)

Note: When invoking the installer, use the `-rsh` option if you have not configured SSH communications between systems. SSH is the default.

Stopping Oracle and the cluster resources

Before you install Maintenance Pack 1 using the `installmp` script, you must stop Oracle and the cluster resources.

To stop Oracle and the cluster resources[

- 1 Log in as superuser to one of the nodes, galaxy for example, in the cluster.
- 2 Create a backup of the existing cluster configuration. Back up the `main.cf` and `types.cf` on all cluster nodes:


```
# cp /etc/VRTSvcs/conf/config/main.cf \
/etc/VRTSvcs/conf/config/main.cf.save
# cp /etc/VRTSvcs/conf/config/types.cf \
/etc/VRTSvcs/conf/config/types.cf.save
```
- 3 Make a backup of `vcsmm.conf`.


```
# cp /kernel/drv/vcsmm.conf /kernel/drv/vcsmm.conf.save
```
- 4 For Oracle9i, stop all Oracle resources including the database on all nodes.
 - Stop `gsd`. On each node, log in as oracle user and enter:


```
$ $ORACLE_HOME/bin/gsdctl stop
```
 - Offline all VCS service groups that contain resources for managing Oracle listener process or the database instances. As root user, enter:


```
# hagr -offline group_name -any
```
- 5 For Oracle 10g, stop all resources.
 - If the database instances are under VCS control, take the corresponding VCS service groups offline. As superuser, enter:

```
# hagrps -offline group_name -any
```

- If the database instances are under CRS control, then run the following on one node:

```
$ srvctl stop database -d database_name
```

- If the resources are under CRS control, stop all resources configured under CRS control. As oracle user, enter:

```
$ srvctl stop nodeapps -n sys
```

Repeat the above command for each node in the cluster. Note that if the Oracle listener or database instances are managed by CRS, they are taken offline by the “srvctl” command shown above.

- 6 For Oracle 10g, stop CRS on each node in the cluster. Symantec highly recommends putting CRS under VCS control.
 - If CRS is controlled by VCS, log in as superuser on any system in the cluster and enter:


```
# hares -offline cssd-resource -sys galaxy
```

```
# hares -offline cssd-resource -sys nebula
```
 - If CRS is not controlled by VCS, log in as superuser on each system in the cluster and enter:


```
# /etc/init.d/init.crs stop
```
- 7 Take offline all other VCS groups that depend on VxFS file systems or VxVM disk groups, whether local or CFS.
- 8 Stop all applications that use VxFS or VxVM but that are not under VCS control.
- 9 Make sure that no processes are running which make use of mounted shared file system or shared volumes.


```
# fuser -c /mount_point
```

```
# umount /mount_point
```
- 10 Deport any CVM disk groups that are not under VCS control.
- 11 Set the VCS resource attribute, AutoStart, to 0 for all VCS resources that manage the Oracle 10g CRS or Oracle database instances. From any system in the cluster, enter:


```
# haconf -makerw
```

```
# hares -modify oracle_res AutoStart 0
```

```
# haconf -dump -makero
```

For Oracle 10g:

```
# haconf -makerw
```

```
# hares -modify cssd_resource AutoStart 0
```

```
# haconf -dump -makero
```
- 12 With Storage Foundation for Oracle RAC 5.0 installed and configured, run the following command on all nodes in the SF Oracle RAC cluster:


```
# hastop -all
```

- 13 For Oracle 10g, comment out the CRS-specific lines in the `/etc/inittab` file to prevent the system from starting the CRS daemons during system startup. On each system, prefix the CRS lines with a colon (":") to comment them out. For example:

```
:h1:2:respawn:/etc/init.evmd run >/dev/null 2>&1 </dev/null
:h2:2:respawn:/etc/init.cssd fatal >/dev/null 2>&1 </dev/null
:h3:2:respawn:/etc/init.crsd run >/dev/null 2>&1 </dev/null
```

Upgrading to SF Oracle RAC 5.0 MP1 using the installmp installer

Start the installer and add the patches using the following procedure.

To upgrade to SF Oracle RAC 5.0 MP1

- 1 Insert the disc containing the Veritas SF Oracle RAC 5.0 MP1 software in a disc drive connected to one of the nodes for installation.
- 2 Log in as superuser on one of the systems for installation.
- 3 Mount the software (5.0 MP1) disc.

```
# mkdir /cdrom
# mount -F hsfs -o ro /dev/dsk/c0t6d0s2 /cdrom
```

- 4 Browse to the directory containing installer program.

```
# cd /cdrom
```

- 5 Start the SF Oracle RAC installer utility.

Invoke `installmp` from one of your cluster nodes using the option that corresponds to your configuration:

- To install using `ssh` (default):


```
# ./installmp galaxy nebula
```
- To install using `rsh`:


```
# ./installmp -rsh galaxy nebula
```

- 6 Review the output as the installer checks that the systems are ready for installation. At the conclusion of these initial checks, and before installing any software, the installer does the following:

- Creates a log file (`installmp-xxxxxx`) on each system in the directory `/var/tmp`.
- Specifies the utilities it uses to communicate with the remote systems; typically this is `ssh -x` and `scp`.
- Lists the patches that it will install on each system

Storage Foundation Cluster File System and Veritas Enterprise

Administrator processes must be stopped before adding patches. When you are prompted:

```
installmp is now ready to install MP1.
```

Required 5.0 processes that are currently running will be stopped.

Are you sure you want to install MP1? [y,n,q] (y)

Press **Enter** to continue.

- 7 Note the location of the summary and log files for future reference.
- 8 On all nodes, restore the configuration files from the backups created in an earlier procedure.
See [“To stop Oracle and the cluster resources\[”](#) on page 16.
 - Restore the original main.cf file:


```
# cp /etc/VRTSvcs/conf/config/main.cf.save \
/etc/VRTSvcs/conf/config/main.cf
```
 - Merge any changes you made to the original types.cf file and backed up in a previous procedure at:


```
/etc/VRTSvcs/conf/config/types.cf.save
```

 with the new types.cf file at:


```
/etc/VRTSvcs/conf/types.cf
```
 - Restore the original vcsmm.conf file:


```
# cp /kernel/drv/vcsmm.conf.save /kernel/drv/vcsmm.conf
```
- 9 Restart each system in the cluster when prompted.


```
# /usr/sbin/shutdown -g0 -y -i6
```
- 10 Make sure that all eight GAB ports are up after the restart.
- 11 Make sure that all the resources configured under VCS except the CSSD and Oracle resource come online.
- 12 Make sure CRS is offline before relinking.

Performing post-upgrade tasks for SF Oracle RAC 5.0 MP1

To relink the Oracle 10g libraries manually

See the *Veritas Storage Foundation for Oracle RAC 5.0 Installation and Configuration Guide*, page 222.

To relink Oracle 10g R1 or R2 using the installer

- 1 Invoke installsfrac.


```
# cd /opt/VRTS/install
# ./installsfrac -configure
```
- 2 Enter the system names when prompted:


```
Enter the system names separated by spaces on which to configure
SFRAC: galaxy nebula
```
- 3 Navigate to the “Install or Relink Oracle” menu.

- Select the appropriate Oracle 10g version:
 - 1) Oracle 9iR2
 - 2) Oracle 10gR1
 - 3) Oracle 10gR2
 - Select “Relink Oracle” from the menu:
 - 1) Install Oracle Clusterware (CRS)
 - 2) Install Oracle RDBMS server
 - 3) Relink Oracle
 - b) [Go to previous menu]
- 4 In the “Install or Relink Oracle” menu, enter the required information. For example:
- ```
Enter Oracle UNIX user name: [b] (oracle) oracle
Enter Oracle UNIX group name: [b] (oinstall) oinstall
Enter Oracle base directory: [b] /app/oracle
Enter absolute path of CRS home directory: [b] /app/crshome
Enter absolute path of Database Home directory: [b] /app/oracle/orahome
Enter Oracle Bits (64/32) [b] (64) 64
```
- 5 Confirm your responses in the verification screen. The installer copies the SF 5.0 Oracle RAC libraries to \$ORACLE\_HOME/lib.
- ```
Oracle environment information verification

Oracle Unix User: oracle
Oracle Unix Group: oinstall
Oracle Clusterware (CRS) Home: /app/crshome
Oracle Release: 10.2
Oracle Bits: 64
Oracle Base: /app/oracle
Oracle Home: /app/oracle/orahome

Is this information correct? [y,n,q] (y)
```
- 6 As root user, remove the prefix “:” to uncomment the CRS-specific lines in the /etc/inittab file.
- 7 Start CRS on each node in the cluster.
- If CRS is not controlled by VCS, log in as superuser on each system in the cluster and enter:


```
# /etc/init.d/init.crs start
```
 - If CRS is controlled by VCS, log in as superuser on any system in the cluster and enter:


```
# hares -online cssd-resource -sys galaxy
# hares -online cssd-resource -sys nebula
```
- 8 Start all resources.
- If the Oracle database instances are under VCS control, bring the corresponding VCS service groups online. As superuser, enter:

```
# hagrpl -online oracle_group -sys galaxy
# hagrpl -online oracle_group -sys nebula
```

- If the database instances are under CRS control, then run the following on one node:

```
$ srvctl start database -d database_name
```

- If the resources are under CRS control, start all resources configured under CRS control. As oracle user, enter:

```
$ srvctl start nodeapps -n sys
```

Repeat the above command for each node in the cluster. Note that if the Oracle listener or database instances are managed by CRS, they are taken offline by the “srvctl” command shown above.

- 9 Verify that the Oracle instances are up and running.
- 10 Reset the VCS resource attribute AutoStart to 1 for all resources that manage Oracle CRS and database instances. As root user on any system in the cluster, enter:

```
# haconf -makerw
# hares -modify cssd_res AutoStart 1
# hares -modify oracle_res AutoStart 1
# haconf -dump -makero
```

To relink the Oracle9i libraries manually

See the *Veritas Storage Foundation for Oracle RAC 5.0 Installation and Configuration Guide*, page 148.

To relink Oracle9i

- 1 Invoke installsfrac.

```
# cd /opt/VRTS/install
# ./installsfrac -configure
```

- 2 Enter the system names when prompted:

```
Enter the system names separated by spaces on which to configure
SFRAC: galaxy nebula
```

- 3 Navigate to the “Install or Relink Oracle” menu.

- Select the Oracle 9i version:

```
1) Oracle 9iR2
2) Oracle 10gR1
3) Oracle 10gR2
```

- Select “Relink Oracle” from the menu:

```
1) Install Oracle RDBMS server
2) Relink Oracle
b) [Go to previous menu]
```

- 4 In the “Install or Relink Oracle” menu, enter the required information. For example:

```

Enter Oracle UNIX user name: [b] (oracle) oracle
Enter Oracle UNIX group name: [b] (oinstall) oinstall
Enter Oracle base directory: [b] /app/oracle
Enter absolute path of Database Home directory: [b] /app/oracle/orahome
Enter Oracle Bits (64/32) [b] (64) 64

```

- 5 Confirm your responses in the verification screen. The installer copies the SF 5.0 Oracle RAC libraries to /opt/ORCLcluster, where it expects libsgxn.

```

Oracle environment information verification
Oracle Unix User: oracle
Oracle Unix Group: oinstall
Oracle Release: 9.2
Oracle Bits: 64
Oracle Base: /app/oracle
Oracle Home: /app/oracle/orahome
Is this information correct? [y,n,q] (y)

```

- 6 As Oracle user, enter the command:

```
$ $ORACLE_HOME/bin/gsdctl start
```

- 7 Bring online the Oracle resources configured under VCS.

```

# hares -online listener_res -sys galaxy
# hares -online listener_res -sys nebula
# hagrp -online group_name -sys galaxy
# hagrp -online group_name -sys nebula

```

- 8 Verify that the Oracle instances are up and running.

- 9 Reset the VCS resource attribute AutoStart to 1 for all resources that manage Oracle and database instances. As root user on any system in the cluster, enter:

```

# haconf -makerw
# hares -modify oracle_res AutoStart 1
# haconf -dump -makero

```

Upgrading the repository database

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 database

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

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 Save the repository disk group name, mount point, and other attributes.

- 2 Unconfigure the SFUA repository from the VCS configuration:

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

This command:

- removes the repository information from the VCS configuration
- unmounts the repository
- deports the disk group
- takes the volumes offline

- 3 Reconfigure the repository:

```
# vxdg import sfua_rep
```

```
# vxvol -g dbed_rep startall
```

- 4 Mount the repository file system manually.

```
# mount -F vxfs /dev/vx/dsk/sfua_rep/dbed_rep /sfua_rep
```

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

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

The following is required to configure the repository for SF Oracle RAC:

- A mount point of already mounted Veritas Volume on a shared storage, with Veritas File system
- A public NIC used by each system in the cluster
- A Virtual IP address and netmask

Minimum downtime upgrade from SF Oracle RAC 5.0 to 5.0MP1

This procedure is valid only for upgrading SF Oracle RAC 5.0 to 5.0 MP1. For upgrades from previous versions of SF Oracle RAC:

See the *Veritas Storage Foundation 5.0 for Oracle RAC Installation and Configuration Guide*.

Upgrading clusters with Oracle 10g

Note: There will be some downtime involved. Review the entire procedure and carefully plan your downtime before proceeding with any steps.

Assumptions:

- SF Oracle RAC 5.0 is installed
- Oracle 10g is installed
- Oracle binaries are installed on separate nodes for each node in the cluster

The example for this procedure assumes a four-node SF Oracle RAC 5.0 cluster with nodes *galaxy*, *nebula*, *jupiter* and *mercury*.

Upgrade the half of the nodes in the cluster at a time. The example nodes are *galaxy* and *nebula*.

To prepare the first half of the Oracle 10g cluster for minimum downtime upgrade

On the first half of the cluster nodes, back up the configuration files:

```
# cp /etc/VRTSvcs/conf/config/main.cf \
/etc/VRTSvcs/conf/config/main.cf.save
# cp /etc/VRTSvcs/conf/config/types.cf \
/etc/VRTSvcs/conf/config/types.cf.save
# cp /kernel/drv/vcsmm.conf /kernel/drv/vcsmm.conf.save
```

To upgrade the first half of the Oracle 10g cluster

- 1 Login to *galaxy* as root user, set Oracle group and cssd resource AutoStart 0.

```
# /opt/VRTSvcs/bin/haconf -makerw
# /opt/VRTSvcs/bin/hagrp -modify oracle_resource AutoStart 0
# /opt/VRTSvcs/bin/hares -modify cssd_resource AutoStart 0
# /opt/VRTSvcs/bin/haconf -dump -makero
```

- 2 Offline Oracle and all parallel groups on *galaxy* and *nebula* except CVM.

- If the Oracle instance is under VCS control:


```
# /opt/VRTSvcs/bin/hagrp -offline oracle_group -sys galaxy
# /opt/VRTSvcs/bin/hagrp -offline oracle_group -sys nebula
```

- If the Oracle instance is not under VCS control, log in as Oracle user and shutdown all the instances on *galaxy* and *nebula*.

For example:

```
$ srvctl stop instance -d database_name -I instance_name -n
galaxy
$ srvctl stop instance -d database_name -I instance_name -n
nebula
$ srvctl stop nodeapps -n galaxy
$ srvctl stop nodeapps -n nebula
```

- 3 Stop CRS daemon on node *galaxy* and *nebula*. If the CRS daemon is under VCS control, offline it.

```
# /opt/VRTSvcs/bin/hares -offline cssd_resource -sys galaxy
# /opt/VRTSvcs/bin/hares -offline cssd_resource -sys nebula
```

- 4 Switch Failover groups from *galaxy* to *jupiter* and *mercury*.

```
# /opt/VRTSvcs/bin/hagrp -switch failover_group -to jupiter/mercury
```

- 5 Unmount all the VxFS file system which is not under VCS control.

```
# mount |grep vxfs
# fuser -c /mount_point
# umount /mount_point
```

- 6 Offline CVM group:

```
# /opt/VRTSvcs/bin/hagrp -offline cvm-group -sys galaxy
# /opt/VRTSvcs/bin/hagrp -offline cvm-group -sys nebula
```

- 7 Log in to *galaxy* and *nebula* as root user and stop VCS.

```
# hastop -local
```

- 8 Comment out CRS-specific lines in */etc/inittab* file to prevent the system from starting the CRS daemons during system startup. On each system, prefix the CRS lines with a colon (":") to comment them out.

For example:

```
:h1:2:respawn:/etc/init/evmd run >/dev/null 2>&1 </dev/null
:h2:2:respawn:/etc/init/cssd fatal >/dev/null 2>&1 </dev/null
:h3:2:respawn:/etc/init.crsd run >/dev/null 2>&1 </dev/null
```

- 9 Log in to *galaxy* and *nebula*, stop VEA if it is running.

```
# /opt/VRTSob/bin/vxsvcctl stop
```

- 10 Change to CD-ROM directory.

```
# cd /cdrom
```

- 11 Start the installer.

```
# ./installmp [-rsh] galaxy nebula
```

- 12 Install the language patches (optional) if you would like to run SFRAC 5.0MP1 in language other than English.

- 13 Restart each system in the cluster when prompted.

```
# /usr/sbin/shutdown -g0 -y -i6
```

- 14 When *galaxy* and *nebula* come up, make sure *galaxy* and *nebula* join *jupiter* and *mercury* at GAB/LLT/VXFEN level, however CVM/CFS/HAD will not come up due to mismatch versions. Verify the ports a, b, d, o all have 0123 membership.

For example, enter on node *galaxy*:

```
# /sbin/gabconfig -a
GAB Port Memberships
```

```
=====
```

```
Port a gen 5c3d0b membership 0123
Port b gen 5c3d10 membership 0123
Port d gen 5c3d0c membership 0123
Port o gen 5c3d0f membership 0123
```

Enter on *jupiter*:

```
# /sbin/gabconfig -a
GAB Port Memberships
=====
Port a gen 5c3d0b membership 0123
Port b gen 5c3d10 membership 0123
Port d gen 5c3d0c membership 0123
Port f gen 5c3d15 membership ; 23
Port f gen 5c3d15 visible 01
Port h gen 5c3d2a membership ; 23
Port h gen 5c3d2a visible 01
Port o gen 5c3d0f membership 0123
Port v gen 5c3d12 membership ; 23
Port v gen 5c3d12 visible 01
Port w gen 5c3d13 membership ; 23
Port w gen 5c3d13 visible 01
```

15 Verify CRS is offline before relinking.

To relink Oracle libraries on the first half of the Oracle 10g cluster

1 Invoke installsfrac:

```
# cd /opt/VRTS/install
# ./installsfrac [-rsh] -configure galaxy nebula
```

2 Navigate to the "Install or Relink Oracle" menu.

■ Select the appropriate Oracle 10g version:

- 1) Oracle 9iR2
- 2) Oracle 10gR1
- 3) Oracle 10gR2

■ Select "Relink Oracle" from the menu.

- 1) Install Oracle Clusterware (CRS)
- 2) Install Oracle RDBMS server
- 3) Relink Oracle
- b) [Go to previous menu]

3 In the "Install or Relink Oracle" menu, enter the required information. For example:

```
Enter Oracle UNIX user name: [b] (oracle) oracle
Enter Oracle UNIX group name: [b] (oinstall) oinstall
Enter Oracle base directory: [b] /app/oracle
Enter absolute path of Database Home directory: [b] /app/oracle/
orahome
Enter Oracle Bits (64/32) [b] (64) 64
```

4 Confirm your responses in the verification screen. The installer copies the SF 5.0 Oracle RAC libraries to /opt/ORCLcluster, where it expects libskgxn.

```

Oracle environment information verification
Oracle Unix User: oracle
Oracle Unix Group: oinstall
Oracle Clusterware (CRS) Home: /app/crshome
Oracle Release: 10.2
Oracle Bits: 64
Oracle Base: /app/oracle
Switch Applications to 5.0MP1 cluster

```

After relinking the Oracle libraries for the first half of your cluster, you can begin to upgrade the second half of your cluster.

To switch applications to the upgraded Oracle 10g cluster nodes

Note: Your downtime starts now.

- 1 On the second half of the cluster nodes, back up the configuration files:


```

# cp /etc/VRTSvcs/conf/config/main.cf \
/etc/VRTSvcs/conf/config/main.cf.save
# cp /kernel/drv/vcssmm.conf /kernel/drv/vcssmm.conf.save

```
- 2 Offline Oracle and all parallel groups on *jupiter* and *mercury* except CVM.
 - If the Oracle instance is under VCS control:


```

# /opt/VRTSvcs/bin/hagrp -offline oracle_group -sys jupiter
# /opt/VRTSvcs/bin/hagrp -offline oracle_group -sys mercury

```
 - If the Oracle instance is not under VCS control, log in as Oracle user and shutdown all the instances on *jupiter* and *mercury*.
For example:


```

$ srvctl stop instance -d database_name -I instance_name \
-n jupiter
$ srvctl stop instance -d database_name -I instance_name \
-n mercury
$ srvctl stop nodeapps -n jupiter
$ srvctl stop nodeapps -n mercury

```
- 3 Stop CRS daemon on *jupiter* and *mercury*. If the CRS daemon is under VCS control, offline it.


```

# /opt/VRTSvcs/bin/hares -offline cssd-resource -sys jupiter
# /opt/VRTSvcs/bin/hares -offline cssd-resource -sys mercury

```
- 4 Offline Failover groups on *jupiter* and *mercury*.


```

# /opt/VRTSvcs/bin/hagrp -offline failover_group -sys jupiter
# /opt/VRTSvcs/bin/hagrp -offline failover_group -sys mercury

```
- 5 Unmount all the VxFS file system which is not under VCS control.


```

# mount |grep vxfs
# fuser -c /mount_point
# umount /mount_point

```
- 6 Offline CVM group:

```
# /opt/VRTSvcs/bin/hagrp -offline cvm-group -sys galaxy
# /opt/VRTSvcs/bin/hagrp -offline cvm-group -sys nebula
```

- 7 Log in *galaxy* as root user, stop VCS

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

- 8 On *galaxy* and *nebula*, as root user, removing the prefix ":" to uncomment the CRS-specific lines in the `/etc/inittab` file.

```
h1:2:respawn:/etc/init/evmd run >/dev/null 2>&1 </dev/null
h2:2:respawn:/etc/init/cssd fatal >/dev/null 2>&1 </dev/null
h3:2:respawn:/etc/init.crsd run >/dev/null 2>&1 </dev/null
```

- 9 On all nodes, restore the configuration files from the backups created in an earlier procedure.

See [“To prepare the first half of the Oracle 10g cluster for minimum downtime upgrade”](#) on page 24.

- Restore the original `main.cf` file:

```
# cp /etc/VRTSvcs/conf/config/main.cf.save \
/etc/VRTSvcs/conf/config/main.cf
```

- Merge any changes you made to the original `types.cf` file and backed up in a previous procedure at:

```
/etc/VRTSvcs/conf/config/types.cf.save
```

with the new `types.cf` file at:

```
/etc/VRTSvcs/conf/types.cf
```

- Restore the original `vcsmm.conf` file:

```
# cp /kernel/drv/vcsmm.conf.save /kernel/drv/vcsmm.conf
```

- 10 Start VCS on *galaxy* and *nebula*.

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

- 11 Start CRS daemon on node *galaxy* and *nebula*:

- If CRS is not configured under VCS control, log in as superuser on *galaxy* and *nebula* in the cluster and enter:

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

- If CRS is configured under VCS control, log in as superuser and enter the following command for each system in the cluster:

```
# /opt/VRTSvcs/bin/hares -online cssd_resource -sys galaxy
# /opt/VRTSvcs/bin/hares -online cssd_resource -sys nebula
```

- 12 Bring Oracle online on *galaxy* and *nebula*.

- If oracle instance is under VCS control:

```
# /opt/VRTSvcs/bin/hagrp -online oracle_group -sys galaxy
# /opt/VRTSvcs/bin/hagrp -online oracle_group -sys nebula
```

- If Oracle instance is not under VCS control, log in as Oracle user and start all the instances on *galaxy* and *nebula*. For example:

```
$ srvctl start instance -d database_name -I instance_name \
-n galaxy
```

```
$ srvctl start instance -d database_name -I instance_name \
-n nebula
```

- 13 Bring online all the applications on *galaxy* and *nebula* which were offline before upgrade.

Note: Your downtime ends now. You have one Oracle instance running on *galaxy* and one instance running on node *nebula*.

To upgrade the second half of the Oracle 10g cluster

- 1 Log into node *jupiter* and *mercury*.
- 2 Comment out CRS-specific lines in `/etc/inittab` file to prevent the system from starting the CRS daemons during system startup. On each system, prefix the CRS lines with a colon (":") to comment them out. For example:


```
:h1:2:respawn:/etc/init/evmd run >/dev/null 2>&1 </dev/null
:h2:2:respawn:/etc/init/cssd fatal >/dev/null 2>&1 </dev/null
:h3:2:respawn:/etc/init.crsd run >/dev/null 2>&1 </dev/null
```

- 3 Log in to *jupiter* and *mercury*.

- 4 Stop VEA if it is running:

```
# /opt/VRTSob/bin/vxsvctrl stop
```

- 5 Upgrade SFRAC on *jupiter* and *mercury*.

```
# cd /cdrom
```

```
For ssh
```

```
# ./installmp jupiter mercury
```

```
For rsh
```

```
# ./installmp -rsh jupiter mercury
```

- 6 Install the language patches (optional) if you would like to run SFRAC 5.0MP1 in language other than English.

- 7 Restart each system in the cluster when prompted.

```
# /usr/sbin/shutdown -g0 -y -i6
```

- 8 When *jupiter* and *mercury* come back online, they will join *galaxy* and *nebula* to form a four-node SFRAC 5.0 MP1 cluster.

```
# /sbin/gabconfig -a
```

```
GAB Port Memberships
```

```
=====
Port a gen 5c3d0d membership 0123
Port b gen 5c3d13 membership 0123
Port d gen 5c3d0e membership 0123
Port f gen 5c3d33 membership 0123
Port h gen 5c3d2d membership 0123
Port o gen 5c3d12 membership 0123
Port v gen 5c3d2f membership 0123
Port w gen 5c3d31 membership 0123
```

- 9 Verify CRS is offline before relinking.
- 10 Relink the Oracle libraries on the second half of the Oracle 10g cluster:
See [“To relink Oracle libraries on the first half of the Oracle 10g cluster”](#) on page 26.

To bring up applications on the second half of the Oracle 10g cluster

- 1 On *jupiter* and *mercury*, as root user, removing the prefix ":" to uncomment the CRS-specific lines in the `/etc/inittab` file.

```
h1:2:respawn:/etc/init/evmd run >/dev/null 2>&1 </dev/null
h2:2:respawn:/etc/init/cssd fatal >/dev/null 2>&1 </dev/null
h3:2:respawn:/etc/init.crsd run >/dev/null 2>&1 </dev/null
```

- 2 Start the CRS daemon on *jupiter* and *mercury*:
 - If CRS is not configured under VCS control, log in as superuser on *jupiter* and *mercury* in the cluster and enter:


```
# /etc/init.d/init.crs start
# /etc/init.crs start
```
 - If CRS is configured under VCS control, log in as superuser and enter the following command for each system in the cluster:


```
# /opt/VRTSvcs/bin/hares -online cssd_resource -sys jupiter
# /opt/VRTSvcs/bin/hares -online cssd_resource -sys mercury
```
- 3 Bring Oracle online on *jupiter* and *mercury*.
 - If oracle instance is under VCS control


```
# /opt/VRTSvcs/bin/hagrp -online oracle_resource \
  -sys jupiter
# /opt/VRTSvcs/bin/hagrp -online oracle_resource \
  -sys mercury
```
 - If Oracle instance is not under VCS control, Login as Oracle user and start all the instances on *jupiter* and *mercury*. For example:


```
$ srvctl start instance -d database_name -I instance_name \
  -n jupiter
$ srvctl start instance -d database_name -I instance_name \
  -n mercury
```
- 4 Bring up all the applications which were offline before upgrade on *jupiter* and *mercury*.
- 5 Change oracle group and cssd AutoStart attribute to 1


```
# /opt/VRTSvcs/bin/haconf -makerw
# /opt/VRTSvcs/bin/hares -modify oracle_resource AutoStart 1
# /opt/VRTSvcs/bin/hares -modify cssd_resource AutoStart 1
# /opt/VRTSvcs/bin/haconf -dump -makero
```

Upgrading clusters with Oracle9i

Note: There will be some downtime involved. Review the entire procedure and carefully plan your downtime before proceeding with any steps.

Assumptions:

- SF Oracle RAC 5.0 is installed
- Oracle9i R2 is installed
- Oracle binaries are installed on separate nodes for each node in the cluster

The example for this procedure assumes a four-node SF Oracle RAC 5.0 cluster with nodes *galaxy*, *nebula*, *jupiter* and *mercury*.

Upgrade the half of the nodes in the cluster at a time. The example nodes are *galaxy* and *nebula*.

To prepare the first half of the Oracle9i cluster for minimum downtime upgrade

On the first half of the cluster nodes, back up the configuration files:

```
# cp /etc/VRTSvcs/conf/config/main.cf \
/etc/VRTSvcs/conf/config/main.cf.save
# cp /etc/VRTSvcs/conf/config/types.cf \
/etc/VRTSvcs/conf/config/types.cf.save
# cp /kernel/drv/vcsmm.conf /kernel/drv/vcsmm.conf.save
```

To upgrade the first half of the Oracle9i cluster

- 1 Set Oracle group AutoStart 0.


```
# haconf -makerw
# /opt/VRTSvcs/bin/hares -modify oracle_resource AutoStart 0
# haconf -dump -makero
```
- 2 Offline all Parallel groups on *galaxy* and *nebula* except CVM. If Oracle instance is under VCS control, offline it.


```
# /opt/VRTSvcs/bin/hagrp -offline group_name -sys galaxy
# /opt/VRTSvcs/bin/hagrp -offline group_name -sys nebula
```
- 3 Stop the GSD daemon


```
$ gsdctl stop
```
- 4 Switch Failover groups from *galaxy* to any other node *jupiter* and *mercury*.


```
# /opt/VRTSvcs/bin/hagrp -switch failover_group -to jupiter/mercury
```
- 5 Unmount all the vxfs file system which is not under VCS control.


```
# mount | grep vxfs
# fuser -c /mount_point
# umount /mount_point
```

- 6 Offline CVM group


```
# /opt/VRTSvcs/bin/hagrp -offline cvm_group -sys galaxy
# /opt/VRTSvcs/bin/hagrp -offline cvm_group -sys nebula
```
- 7 Stop VCS on node galaxy and nebula


```
# hastop -local
```
- 8 Stop VEA if it is running


```
# /opt/VRTSob/bin/vxsvcctrl status
# /opt/VRTSob/bin/vxsvcctrl stop
```
- 9 Change to CD-ROM directory, start the installer


```
# cd /cdrom
# ./installmp [-rsh] galaxy nebula
```
- 10 Install the language patches (optional) if you would like to run SFRAC 5.0MP1 in language other than English.
- 11 Restart each system in the cluster when prompted.


```
# /usr/sbin/shutdown -g0 -y -i6
```
- 12 Make sure *galaxy* and *nebula* join *jupiter* and *mercury* at GAB/LLT/VXFEN level, however CVM/CFS/HAD will not come up due to mismatch versions. Verify the ports a, b, d, o all have 0123 membership. For example:
Enter on node *galaxy*,


```
# /sbin/gabconfig -a
GAB Port Memberships
=====
Port a gen 5c3d0b membership 0123
Port b gen 5c3d10 membership 0123
Port d gen 5c3d0c membership 0123
Port o gen 5c3d0f membership 0123
Enter on node jupiter,
# /sbin/gabconfig -a
GAB Port Memberships
=====
Port a gen 5c3d0b membership 0123
Port b gen 5c3d10 membership 0123
Port d gen 5c3d0c membership 0123
Port f gen 5c3d15 membership ; 23
Port f gen 5c3d15 visible 01
Port h gen 5c3d2a membership ; 23
Port h gen 5c3d2a visible 01
Port o gen 5c3d0f membership 0123
Port v gen 5c3d12 membership ; 23
Port v gen 5c3d12 visible 01
Port w gen 5c3d13 membership ; 23
Port w gen 5c3d13 visible 01
```

To relink Oracle 9iR2 library

- 1 Invoke installsfrac:

- ```
cd /opt/VRTS/install
./installsfrac [-rsh] -configure galaxy nebula
```
- 2 Navigate to the “Install or Relink Oracle” menu.
    - Select the Oracle 9i version:
      - 1) Oracle 9iR2
      - 2) Oracle 10gR1
      - 3) Oracle 10gR2
    - Select “Relink Oracle” from the menu:
      - 1) Install Oracle RDBMS server
      - 2) Relink Oracle
      - b) [Go to previous menu]
  - 3 In the “Install or Relink Oracle” menu, enter the required information. For example:
 

```
Enter Oracle UNIX user name: [b] (oracle) oracle
Enter Oracle UNIX group name: [b] (oinstall) oinstall
Enter Oracle base directory: [b] /app/oracle
Enter absolute path of Database Home directory: [b] /app/oracle/orahome
Enter Oracle Bits (64/32) [b] (64) 64
```
  - 4 Confirm your responses in the verification screen. The installer copies the SF 5.0 Oracle RAC libraries to /opt/ORCLcluster, where it expects libskgxn.
 

```
Oracle environment information verification
Oracle Unix User: oracle
Oracle Unix Group: oinstall
Oracle Release: 9.2
Oracle Bits: 64
Oracle Base: /app/oracle
Oracle Home: /app/oracle/orahome
Is this information correct? [y,n,q] (y)
```

---

**Note:** Your downtime starts now.

---

### To switch applications to the SF Oracle RAC 5.0 MP1 cluster

- 1 Offline all Parallel groups on *jupiter* and *mercury* except CVM. If Oracle instance is under VCS control, offline it.
 

```
/opt/VRTSvcs/bin/hagrp -offline group_name -sys jupiter
/opt/VRTSvcs/bin/hagrp -offline group_name -sys mercury
```
- 2 Stop the GSD daemon.
 

```
$ gsdctl stop
```
- 3 Offline Failover groups *jupiter* and *mercury*.
 

```
/opt/VRTSvcs/bin/hagrp -offline failover_group -sys jupiter
/opt/VRTSvcs/bin/hagrp -offline failover_group -sys mercury
```
- 4 Unmount all the vxfs file system which is not under VCS control.

```
mount | grep vxfs
fuser -c /mount_point
umount /mount_point
```

- 5 Offline the CVM group.

```
/opt/VRTSvcs/bin/hagrp -offline cvm_group -sys galaxy
/opt/VRTSvcs/bin/hagrp -offline cvm_group -sys nebula
```

- 6 Stop VCS on node *jupiter* and *mercury*.

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

- 7 On all nodes, restore the configuration files from the backups created in an earlier procedure.

See [“To prepare the first half of the Oracle 10g cluster for minimum downtime upgrade”](#) on page 24.

- Restore the original main.cf file:

```
cp /etc/VRTSvcs/conf/config/main.cf.save \
/etc/VRTSvcs/conf/config/main.cf
```

- Merge any changes you made to the original types.cf file and backed up in a previous procedure at:

```
/etc/VRTSvcs/conf/config/types.cf.save
```

with the new types.cf file at:

```
/etc/VRTSvcs/conf/types.cf
```

- Restore the original vcsmm.conf file:

```
cp /kernel/drv/vcsmm.conf.save /kernel/drv/vcsmm.conf
```

- 8 Start VCS on *galaxy* and *nebula*.

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

- 9 Start gsd. Bring Oracle online on *galaxy* and *nebula*.

```
$ gsdctl start
```

```
/opt/VRTSvcs/bin/hagrp -online oracle group -sys galaxy/nebula
```

---

**Note:** Your downtime ends now. You have one oracle instance running on node *galaxy* and one instance running on node *nebula*.

---

### To upgrade the second half of the Oracle9i cluster

- 1 Stop VEA if it's running

```
/opt/VRTSob/bin/vxsvcctl status
/opt/VRTSob/bin/vxsvcctl stop
```

- 2 Change to CD-ROM directory, start the installer

```
cd /cdrom
```

```
./installmp [-rsh] jupiter mercury
```

- 3 Install the language patches (optional) if you would like to run SFRAC 5.0MP1 in language other than English.

- 4 Restart each system in the cluster when prompted.  

```
/usr/sbin/shutdown -g0 -y -i6
```
- 5 When *jupiter* and *mercury* come back online, they will join *galaxy* and *nebula* to form a four-node SFRAC 5.OMP1 cluster.
- 6 Relink the Oracle libraries on the second half of the Oracle 10g cluster:  
See [“To relink Oracle 9iR2 library”](#) on page 32.
- 7 Bring online the Oracle resources configured under VCS.  

```
hares -online listener_res -sys galaxy
hares -online listener_res -sys nebula
hagrps -online group_name -sys galaxy
hagrps -online group_name -sys nebula
```
- 8 Verify that the Oracle instances are up and running.
- 9 Reset the VCS resource attribute AutoStart to 1 for all resources that manage Oracle and database instances. As root user on any system in the cluster, enter:  

```
haconf -makerw
hares -modify oracle_res AutoStart 1
haconf -dump -makero
```

## 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.

---

### 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
```

Removing SF Oracle RAC 5.0 MP1

To remove the patch set

- 1 As root user, take the Oracle service group offline on each node:


```
# hagrps -offline oracle_group -sys -system_name
```
- 2 For Oracle9i, stop the gsd processes. As oracle user, determine if gsd processes are running:


```
$ $ORACLE_HOME/bin/psdctl stat
```

 If gsd processes are running, enter:


```
$ $ORACLE_HOME/bin/psdctl stop
```
- 3 For Oracle 10g, stop the CRS daemons on each node:


```
# /etc/init.d/init.crs stop
```
- 4 As root user, remove the VRTSdbac patch on each node.
 For Solaris 8, type:


```
# patchrm 123673-01
```

 For Solaris 9, type:


```
# patchrm 123674-01
```

 For Solaris 10, type:


```
# patchrm 123675-01
```
- 5 Verify a patch is removed. For example, type this command for patch 123675-01:


```
# showrev -p | grep 120150-01
```
- 6 Verify the file system containing Oracle binaries is mounted:


```
# mount
```
- 7 Relink the IPC and VCSMM libraries.
 - For Oracle 10g:

See [“To relink Oracle 10g R1 or R2 using the installer”](#) on page 19.
 - For Oracle9i:

See [“To relink Oracle9i”](#) on page 21.
- 8 Stop VCS on all nodes. From any node, enter:


```
# hastop -all
```
- 9 On each node, stop the VEA server process:


```
# /etc/init.d/isisd stop
```

- 10 Before removing the patches, type this command to ensure proper removal of patch 117080-XX (“XX” corresponds to the patch ID for this Volume Manager patch):

```
# vxddctl stop
```

- 11 On each node, remove the remaining patches. For example:

On Solaris 8:

```
# patchrm 121708-03 123214-01 123670-01 123085-02 121711-01
123216-02 123743-02 123823-01 124002-02 123740-02 123818-01
123821-02 122058-08 123200-02 121714-01 123983-01 123984-01
123207-01 123742-02 123744-03 123995-05 123075-02 123079-02
123076-02 122633-02 122631-02 122632-02 123678-04 123996-06
124004-02
```

On Solaris 9:

```
# patchrm 121709-03 123214-01 123670-01 123086-02 121711-01
123216-02 123743-02 123823-01 124002-02 123740-02 123818-01
123821-02 122058-08 123201-02 121714-01 123983-01 123984-01
123208-01 123742-02 123744-03 123995-05 123075-02 123079-02
123076-02 122633-02 122631-02 122632-02 123678-04 123996-06
124004-02
```

Solaris 10:

```
# patchrm 121710-03 123214-01 123670-01 123087-02 121711-01
123216-02 123743-02 123823-01 124002-02 123740-02 123818-01
123821-02 122058-08 123202-02 121714-01 123983-01 123984-01
123211-01 123210-01 123209-01 123742-02 123744-03 123995-05
123075-02 123079-02 123076-02 122633-02 122631-02 122632-02
123678-04 123996-06 124004-02
```

Some of the patches are different if you installed optional packages.

- 12 Verify the removal of a patch. For example:
- ```
showrev -p | 121710-03
```
- 13 Restore the VCS `types.cf` configuration files from the location where you saved them, or manually edit the `/etc/VRTSvcs/conf/config/types.cf` to remove the new attributes for the DiskGroup, IP, IPMultiNIC, and IPMultiNICB bundled agents.
- 14 Shut down and restart each node.

- Execute the `shutdown` command on each node:

```
/usr/sbin/shutdown -y -i6 -g0
```

- After each node reboots, run the `gabconfig -a` command to check membership on each of GAB ports:

```
/sbin/gabconfig -a
```

The output for a two-node cluster (nodes 0 and 1) resembles:

```
GAB Port Memberships
=====
Port a gen 421fe202 membership 01
Port b gen 32223a02 membership 01
```

```
Port d gen dd61d602 membership 01
Port f gen 76317602 membership 01
Port h gen 5242e902 membership 01
Port o gen fab08701 membership 01
Port q gen 544c5402 membership 01
Port v gen cdc6c602 membership 01
```

- Verify the CVM group is online:
 

```
hagr -state cvm
```

 Verify the output shows CVM is online on each node.
- Check whether the VEA Service is running:
 

```
/etc/init.d/isisd status
```

 Current state of server : NOT RUNNING
- If the VEA Service is not running, restart it:
 

```
/etc/init.d/isisd start
```

## 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.

### Preventing automatic database startup for Oracle 10g R2

CRS and Oracle agent might attempt to start the instance at the same time if the database mount is available. To prevent automatic database starting, you must change the Management policy for the database (automatic, manual) to MANUAL using SRVCTL command. The command will change AUTO\_START attribute of CRS database and instance resources. [See Etrack Incident 838841]

#### To prevent automatic database starting

- ◆ Depending on the status of the database:
  - If the database is already registered and running:
 

To change it to manual execute the following commands as Oracle user:

```
$ srvctl stop database -d db-name
$ srvctl modify database -d db-name -y manual
```

- If the database is not registered, use the following command to register database:

```
$ srvctl add database -d db-name -p \
location-of-parameter-file -y manual
```

## Open issues

The following issues were reported for this release:

### Issues affecting Oracle 10g Release 2

#### Oracle VIP Configuration Assistant

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

"The given interface(s), "hme0" is not public. Public interfaces should be used to configure virtual IPs."

**Workaround:** Invoke the vipca utility manually.

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

#### Oracle Cluster Verification Utility Warning message

During the final stage of Oracle 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 re commended that you retry the configuration
assistants at this time. Not successf ully running any
"Recommended" assistants means your system will not be correctl
y configured.
1. Check the Details panel on the Configuration Assistant Screen
to see the erro rs 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 can safely ignore this message.

#### 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 are still loaded. [See Etrack Incident 605017]

**Workaround:** Modunload gab and llt 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.

## Oracle 10.1.0.3 databases created by DBCA may fail on reboot

When a cluster runs an Oracle 10g (10.1.0.3) database created by the Oracle Database Creation Assistant (DBCA), shutting down or rebooting one node may kill the database instances on other nodes. This problem occurs when CRS control of the database is disabled. The 10.1.0.4 release addresses this issue.

**Workaround:** Refer to the following TechNote on the Technical Support website for the latest information on this problem:

<http://support.veritas.com/docs/275388>.

## 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. [See Etrack Incident 540429]

**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://support.veritas.com/docs/283362>

## 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 `hasstop -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.

**Work round:** Use the `shutdown` command instead of the `reboot` command to perform a graceful reboot for systems.

```
/usr/sbin/shutdown -g0 -y -i6
```

## Number of links required for the PrivNIC agent

Interfaces specified in the PrivNIC configuration should be exactly the same in name and total number as those which have been used for LLT configuration. [See Etrack Incident 587136]

The attribute table on page 457 of the Storage Foundation for Oracle RAC Installation and Configuration Guide should be replaced with the following attribute definition table.

**Table 1-1** Required attributes for PrivNIC agent

| Attribute | Dimension            | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-----------|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Device    | string - association | Specifies the network interface device as shown by the “ifconfig” command and the “network-id” associated with the interface. Network-ids of the interfaces connected to the same physical network must match. The interface with the lower network-id has the higher preference for failover. Interfaces specified in the PrivNIC configuration should be exactly the same in name and total number as those which have been used for LLT configuration.<br><br>Example:<br><pre>Device@galaxy = {qfe0=0, qfe1=1, qfe2=2} Device@nebula = {qfe0=0, qfe1=1, qfe2=2}</pre> |
| Address   | string-scalar        | The numerical private IP address. For example:<br><pre>Address = "192.168.12.1"</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| NetMask   | string - association | The numerical netmask for the private IP address. For example:<br><pre>Address = "255.255.255.0"</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

## 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
```

## The gcoconfig command assigns priority 0 to all nodes

If you configure GCO using the `/opt/VRTSvcs/bin/gcoconfig` command, the gcoconfig utility assigns the same priority '0' to all the nodes that are in the SystemList of the ClusterService group. [See Etrack Incident 857159]

**Workaround:** Edit main.cf and give the proper priority number for the cluster nodes in the SystemList of the ClusterService group.

Use one of the following approaches to edit the main.cf file:

- Veritas Cluster Server GUI
- VCS commands
- Stop VCS and manually edit the main.cf file  
Note that this approach has HA downtime.

## 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

## Fixed issues

The following issues were corrected for this release. Fixed issues and software enhancement requests are referenced by incident number.

**Table 1-2** Fixed issues in SF Oracle RAC version 5.0 MP1

| Incident number | Description                                                                            |
|-----------------|----------------------------------------------------------------------------------------|
| 820286          | LMX helper thread disabled by default.                                                 |
| 808472          | cssd-monitor script doesn't show correct online/offline info for CRS daemons on 10gR1. |
| 798949          | installsfrac <hostname> -configure fails under certain conditions.                     |
| 798397          | installsfrac -configure (relink oracle libraries) should check status of cluster       |
| 793518          | installer: oracle relink option copy gxn lib with incorrect name for 9i.               |
| 768962          | VCSMM processes should NOT die unless corresponding data structures are cleaned-up.    |
| 640451          | sqlplus session hangs during OCE test case runs.                                       |
| 644286          | IPC errors while running OCE 10gr2.                                                    |
| 640452          | OCE test case hang with our IPC library on 10.1.0.5.                                   |
| 626451          | installsfrac does not bring up GCO configuration.                                      |

**Table 1-3** Fixed issues in SF Oracle RAC version 5.0

| Incident number | Description                                                                            |
|-----------------|----------------------------------------------------------------------------------------|
| 640452          | Resolves problem that caused Oracle to hang with SF Oracle RAC IPC library on 10.1.0.5 |
| 626451          | The installer sometimes does not display the global clustering configuration option.   |

**Table 1-3** Fixed issues in SF Oracle RAC version 5.0

| Incident number | Description                                                                                                                                                                                                                                                                                                                      |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 569071          | Increase the <code>lmx_max_buffer</code> default value from 500 to 1000.                                                                                                                                                                                                                                                         |
| 544172          | Utility to get the Oracle IPC version number at the time of configuration.                                                                                                                                                                                                                                                       |
| 542004          | IPC library for Oracle 10gR2 gives ORA-27504: IPC error creating OSD context.                                                                                                                                                                                                                                                    |
| 520193          | Change of naming, build scheme for IPC libraries for Oracle.                                                                                                                                                                                                                                                                     |
| 512383          | Changes to IPC for Oracle 10gR2 and oracle 9.2.0.7.                                                                                                                                                                                                                                                                              |
| 511554          | Enhancements to the SF Oracle RAC installer                                                                                                                                                                                                                                                                                      |
| 492961          | Changes to IPC for 10gR2.                                                                                                                                                                                                                                                                                                        |
| 425505          | LMX: Adding support of protocol versioning in LMX header.                                                                                                                                                                                                                                                                        |
| 319114          | Previously, CRS sometimes did not work on a Japanese OS. This issue has been fixed. In the <i>VERITAS Storage Foundation for Oracle RAC 5.0 Release Notes</i> , a known issue is included that states that CRS may not work on a Japanese OS. This statement is incorrect. CRS works on a Japanese OS in 5.0 and later releases. |

## 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 1-4** 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> | <code>sfrac_install.pdf</code> |
| <i>Veritas Storage Foundation for Oracle RAC Release Notes</i>                        | <code>sfrac_notes.pdf</code>   |
| <b>Veritas Cluster Server</b>                                                         |                                |
| <i>Veritas Cluster Server Installation Guide</i>                                      | <code>vcs_install.pdf</code>   |
| <i>Veritas Cluster Server Release Notes</i>                                           | <code>vcs_notes.pdf</code>     |

**Table 1-4** Storage Foundation for Oracle RAC Documentation Set

| Document Title                                                                                 | File Name              |
|------------------------------------------------------------------------------------------------|------------------------|
| <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         |

## Documentation errata

Updates and corrections are required for the following topics in the *Storage Foundation for Oracle RAC 5.0 Installation and Configuration Guide*:

### Creating the coordinator disk group

The *Storage Foundation for Oracle RAC 5.0 Installation and Configuration Guide* contains text that is incorrect. [See Etrack Incident 794321]

On page 114, replace:

#### To create the coordinator disk group

- 1 On one node, create the disk group by specifying the device name of one of the disks; the option `coordinator=on` sets the coordinator attribute:

```
vxpdg -o coordinator=on init vxfencoorddg c1t1d0
```

- 2 Add the other two disks to the disk group:

```
vxldg -g vxfencoorddg adddisk c2t1d0
vxldg -g vxfencoorddg adddisk c3t1d0
```

Refer to the Veritas Volume Manager documentation for details on creating disk groups.

with:

#### To create the coordinator disk group

- 1 On one node, create the disk group by specifying the device name of one of the disks:

```
vxldg init vxfencoorddg c1t1d0
```

- 2 Add the other two disks to the disk group:

```
vxldg -g vxfencoorddg adddisk c2t1d0
vxldg -g vxfencoorddg adddisk c3t1d0
```

Refer to the Veritas Volume Manager documentation for details on creating disk groups.

- 3 Set the option coordinator=on to set the coordinator attribute:

```
vxldg -g vxfencoorddg set coordinator=on
```

## Setting permissions for database administration

The *Storage Foundation for Oracle RAC 5.0 Installation and Configuration Guide* contains text that is misleading in “Setting permissions for database administration,” on page 103. [See Etrack Incident 896414]

Replace:

After SF Oracle RAC is installed, the default settings allow only the superuser to access the /opt/VRTSdbed folder. If you want database administrators (DBAs) to access SF Oracle RAC components, you must set the required permissions. You can skip setting the database administration permission and advance to configuring the cluster volume manager.

With:

After SF Oracle RAC is installed, the default settings allow only the superuser to access the /opt/VRTSdbed folder.

- If you already have an Oracle user and group, and you want database administrators (DBAs) to access SF Oracle RAC components, you must set the required permissions.
- If you do not have an Oracle user and group, defer setting the database administration permission and advance to configuring the cluster volume manager. You can configure the database permissions when setting up the database repository.

## Stopping the CRS daemon

The *Storage Foundation for Oracle RAC 5.0 Installation and Configuration Guide* contains text on page 460 that is not completely accurate.

Replace:

---

**Note:** VCS will not actually stop the CRS daemon. Instead, it will report an error message to the VCS engine log file if an offline is issued. Refer to the Oracle documentation to understand how to safely stop the CRS daemon. VCS will not start the CRS daemon. It will wait for the daemon to start automatically upon system boot up. If CRS daemon is stopped, refer to the Oracle documentation to understand how to safely restart the daemon.

---

with:

---

**Note:** If you are using Oracle 10.1.0.3 and 10.1.0.2, VCS will not actually stop the CRS daemon. Instead, it will report an error message to the VCS engine log file if an offline is issued. Refer to the Oracle documentation to understand how to safely stop the CRS daemon. VCS will not start the CRS daemon. It will wait for the daemon to start automatically upon system boot up. If CRS daemon is stopped, refer to the Oracle documentation to understand how to safely restart the daemon. This behavior does not apply for Oracle 10.1.0.4 and above.

---

## Relinking Oracle 10g after upgrading SF Oracle RAC

The “Upgrading SF Oracle RAC” chapter relinking procedure for Oracle 10g is incorrect. Replace “Relinking Oracle 10g R1 or R2” on pages 125-127 with the following procedures.

### Relinking Oracle10g (Installer)

- 1 Invoke installsfrac once again:

```
cd /opt/VRTS/install
./installsfrac -configure
```
- 2 Enter the system names when prompted:  
Enter the system names separated by spaces on which to configure  
SFRAC: galaxy nebula
- 3 Navigate to the “Install and Relink Oracle” menu.
  - a Select the appropriate Oracle 10g version (3):
    - 1) Oracle 10gR1
    - 2) Oracle 10gR2

**b** Select “Relink Oracle” (3) from the menu:

- 1) Install Oracle Clusterware (CRS)
- 2) Install Oracle RDBMS server
- 3) Relink Oracle
- b) [Go to previous menu]

**c** From the menu displayed, enter the required information. For example:

```
Enter Oracle UNIX user name: [b] (oracle) oracle
Enter Oracle UNIX group name: [b] (oinstall) oinstall
Enter Oracle base directory: [b] /app/oracle
Enter absolute path of CRS Home directory: [b]
/app/crshome
Enter absolute path of Database Home directory: [b]
/app/oracle/orahome
Enter Oracle Bits (64/32) [b] (64) 64
```

**d** Confirm your responses in the verification screen. The installer copies the SF 5.0 Oracle RAC libraries to /opt/ORCLcluster, where it expects libskgxn.

Oracle environment information verification

```
Oracle Unix User: oracle
Oracle Unix Group: oinstall
Oracle Clusterware (CRS) Home:
 /app/crshome
Oracle Release: 10.2
Oracle Bits: 64
Oracle Base: /app/oracle
Oracle Home: /app/oracle/orahome
```

Is this information correct? [y,n,q] (y)

galaxy

```
Copying /opt/VRTSvcs/rac/lib/libskgxn2_64.so
/opt/ORCLcluster/lib/libskgxn2.so success
```

nebula

```
Copying /opt/VRTSvcs/rac/lib/libskgxn2_64.so
/opt/ORCLcluster/lib/libskgxn2.so success
```

galaxy

```
Copying /opt/VRTSvcs/rac/lib/libskgxp10_ver25_64.so to
/app/oracle/orahome/lib/libskgxp10.so success
Removing /oracle/10g/lib/libodm10.so success
Linking /opt/VRTSodm/lib/amd64/libodm.so /app/oracle/orahome/
lib/libodm10.so ... success
Setting permissions oracle:oinstall /app/oracle/orahome/lib/
libskgxp10.so ... success
```

nebula

```
Copying /opt/VRTSvcs/rac/lib/libskgxp10_ver25_64.so to
```

```

/app/oracle/orahome/lib/libskgxp10.so success
Removing /oracle/10g/lib/libodm10.so success
Linking /opt/VRTSodm/lib/amd64/libodm.so /app/oracle/orahome/
lib/libodm10.so ... success
Setting permissions oracle:oinstall /app/oracle/orahome/lib/
libskgxp10.so ... success

```

- e Enter “q” at the next prompt to leave the installer now that CRS setup tasks are complete.
- 4 Bring the CSSD resource online. Enter:
 

```
hares -online cssd -sys galaxy
hares -online cssd -sys nebula
```
- 5 Confirm that CRS is online. Enter:
 

```
$_CRS_HOME/bin/crs_stat -t
```
- 6 Bring online the oracle resources configured under VCS. If they’re directly controlled by CRS, you may run the CRS commands to start the instance.

## Relinking Oracle 10g (Using the command line)

- 1 For 10gR1, enter one set of the following commands:
  - For 32bit oracle:
 

```
cp /opt/VRTSvcs/rac/lib/libskgxn2_32.so \
/opt/ORCLcluster/rac/lib/libskgxn2.so
$ cp /opt/VRTSvcs/rac/lib/libskgxp10_ver23_32.so \
$_ORACLE_HOME/lib32/libskgxp.so
$ ln -s /usr/lib/libodm.so libodm10.so
```
  - For 64bit oracle:
 

```
cp /opt/VRTSvcs/rac/lib/libskgxn2_64.so \
/opt/ORCLcluster/rac/lib/libskgxn2.so
$ cp /opt/VRTSvcs/rac/lib/libskgxp10_ver23_64.so \
$_ORACLE_HOME/lib32/libskgxp.so
$ ln -s /usr/lib/amd64/libodm.so libodm10.so
```
- 2 For 10gR2, enter one set of the following commands:
  - For 32bit oracle:
 

```
cp /opt/VRTSvcs/rac/lib/libskgxn2_32.so \
/opt/ORCLcluster/rac/lib/libskgxn2.so
$ cp /opt/VRTSvcs/rac/lib/libskgxp10_ver25_32.so \
$_ORACLE_HOME/lib32/libskgxp.so
```
  - For 64bit oracle:
 

```
cp /opt/VRTSvcs/rac/lib/libskgxn2_64.so \
/opt/ORCLcluster/rac/lib/libskgxn2.so
$ cp /opt/VRTSvcs/rac/lib/libskgxp10_ver25_64.so \
$_ORACLE_HOME/lib32/libskgxp.so
```

- 3 Bring the CSSD resource online. Enter:  

```
hares -online cssd -sys galaxy
hares -online cssd -sys nebula
```
- 4 Confirm that CRS is online. Enter:  

```
$(CRS_HOME)/bin/crs_stat -t
```
- 5 Bring online the oracle resources configured under VCS. If they're directly controlled by CRS, you may run the CRS commands to start the instance.

## Adding and removing SF Oracle RAC on systems with Oracle 10g

The “Adding and removing SF Oracle RAC on systems with Oracle 10g” chapter is missing a step from following procedure[803809].

Add the following at the beginning of “To run the uninstall utility” on page 256.

- 1 Offline all Oracle parallel groups  

```
hagrps -offline oracle_group -sys nebula
```
- 2 Offline CRS  

```
hares -offline cssd_resource -sys nebula
```

If CRS is not under VCS control

```
/etc/init.d/init.crs stop
```

## Preparing for global clustering

The *Storage Foundation for Oracle RAC 5.0 Installation and Configuration Guide* contains text in the “Preparing for global clustering” chapter that is not completely accurate. [See Etrack incident 609566]

On page 274, under Installing SF Oracle RAC on the secondary site, add a bullet:

- Make sure you use the same oracle group and user IDs for both primary and secondary clusters.

## Setting permissions for the repository database

The *Storage Foundation for Oracle RAC 5.0 Installation and Configuration Guide* contains incorrect permissions in multiple locations.

In “Upgrading to SF Oracle RAC from Storage Foundation Cluster File System” on page 130:

Replace Step 3:

Configure SF Oracle.

```
chmod 705 /opt/VRTSdbed
chown oracle:dba /opt/VRTSdbed
```

With:

Configure SF Oracle.

```
chmod 750 /opt/VRTSdbed
chown oracle:dba /opt/VRTSdbed
```

In “Setting administrative permissions” on page 315-316:

Replace:

#### To enable access for users other than root

- 1 To enable the user “oracle” access to the /opt/VRTSdbed directory, use the `chown` and `chmod` commands, as follows:

```
chown -R oracle /opt/VRTSdbed
chmod -R 500 /opt/VRTSdbed
```

- 2 To allow users in the group “dba” access to the /opt/VRTSdbed directory, use the `chgrp` and `chmod` commands, as follows:

```
chgrp -R dba /opt/VRTSdbed
chmod -R 550 /opt/VRTSdbed
```

With:

#### To enable access for users other than root

Use the `chown` and `chmod` commands:

```
chmod 750 /opt/VRTSdbed
chown oracle:dba /opt/VRTSdbed
```

## Setting up the repository database for Oracle

The following information is missing from the chapter “Configuring the repository database for Oracle.” It should be inserted at the end of the chapter. This information is required only for Oracle 9i, since Oracle 10g is configured during installation. [See Etrack Incident 565419]

### Setting up Oracle 9i RAC objects with `srvctl`

When configured within an Oracle RAC environment, you must set up the Oracle `srvctl` service and register the name of the RAC database with `srvctl`, so that Veritas Storage Foundation for Oracle can learn the status of remote database instances. Otherwise, commands such as `dbed_ckptcreate -o offline` may fail.

#### To set up Oracle 9i RAC objects

- 1 Look in `/var/opt/oracle/srvConfig.loc` to learn the pathname to the SRVM configuration file as defined by the variable `srvconfig_loc`. For example:

```
srvconfig_loc=/orasrvm/srvm.ora
```

- 2 List the details of the SRVM configuration file with `ls -l`:

- ```
# ls -l /orasrvm/srvm.ora
```
- 3 If the configuration file does not exist, create and initialize the file:
- ```
touch /orasrvm/srvm.ora
srvconfig -init
```
- 4 If the configuration file exists, note the size of the file shown by the output of `ls -l`.
- ```
-rw-r--r-- 1 oracle dba 10569216 Jan 20 14:29 /orasrvm/srvm.ora
```
- 5 If the configuration file size is greater than zero (as shown in the example above), the file is initialized. If the file size is zero, initialize it:
- ```
srvconfig -init
```
- 6 Start the Oracle RAC Manageability daemon on each system:
- ```
$ gsdctl start
```
- 7 Confirm the GSD daemon status:
- ```
$ gsdctl stat
GSD is running on the local node
```
- 8 Add the database to the `srvctl` configuration:
- ```
$ srvctl add database -d vrts -o /app/oracle/orahome
$ srvctl config database
vrts
```
- 9 Add each instance to the configuration. For example, in a two-instance configuration, add the first instance:
- ```
$ srvctl add instance -d vrts -i vrts1 -n galaxy
$ srvctl config database -d vrts
galaxy vrts /app/oracle/orahome
```
- Then add the second instance:
- ```
$ srvctl add instance -d vrts -i vrts2 -n nebula
$ srvctl config database -d vrts
galaxy vrts1 /app/oracle/orahome
nebula vrts2 /app/oracle/orahome
```
- 10 Check the status of the instances to confirm they are running:
- ```
$ srvctl status database -d vrts
Instance vrts1 is running on node galaxy
Instance vrts2 is running on node nebula
```

## Using single-host and two-host terminology

References to “single-host” and “two-host” configurations in the `dbed_vmclonedb` sections are not correct in an SF Oracle RAC configuration. These terms were borrowed from the Storage Foundation for Oracle Database environment, but “single-host” is not valid for SF Oracle RAC, and “two-host” is not correct for three or more node SF Oracle RAC configurations. [See Etrack Incident 840198]

For SF Oracle RAC configurations, change these references:

- From “single-host” to “same-node”
- From “two-host” to “node in the cluster”

## Using Checkpoint commands

The following instances of `dbed` commands in the “Using Checkpoints and Storage Rollback with Storage Foundation for Oracle RAC” chapter of the *SF Oracle RAC Installation and Configuration Guide* are incorrect and must be changed. [See Etrack Incident 819369]

- Add extra space between “`dbed_ckptcreate`” and “`-S PROD.`”

On page 323, Step 1, Replace:

```
$ /opt/VRTS/bin/dbed_ckptcreate-S PROD -H \
/oracle/product -o online
Creating online Storage Checkpoint of database PROD.
Storage Checkpoint Checkpoint_903937870 created.
```

```
$ mkdir /tmp/ckpt_ro
$ /opt/VRTS/bin/dbed_ckptmount-S PROD \
-c Checkpoint_903937870 -m /tmp/ckpt_ro
with:
```

```
$ /opt/VRTS/bin/dbed_ckptcreate -S PROD -H \
/oracle/product -o online
Creating online Storage Checkpoint of database PROD.
Storage Checkpoint Checkpoint_903937870 created.
```

```
$ mkdir /tmp/ckpt_ro
$ /opt/VRTS/bin/dbed_ckptmount -S PROD \
-c Checkpoint_903937870 -m /tmp/ckpt_ro
```

## Using the `dbed_vmchecksnap` example -t PROD

Corrections are needed to the “Using database FlashSnap for backup and off-host processing” chapter for an invalid `dbed_vmchecksnap` example: `-t PROD`; it should be: `-t host2`[839056]

On page 361, replace:

```
dbed_vmchecksnap -S $ORACLE_SID -H $ORACLE_HOME -O setdefaults \
-p my_tag -f snap1 -t PROD
Snapplan snap1 for PROD
=====
SNAPSHOT_VERSION=5.0
PRIMARY_HOST=host1
SECONDARY_HOST=host2
```

with:

```
dbed_vmchecksnap -S PROD -H $ORACLE_HOME -O setdefaults \
-p my_tag -f snap1 -t host2
^^^ NOTE: -S PROD and -t host2
```

```
Snapplan snap1 for PROD
=====
SNAPSHOT_VERSION=5.0
PRIMARY_HOST=host1
SECONDARY_HOST=host2
```

## Finding FlashSnap status information

For Database FlashSnap status information, see *Veritas Storage Foundation for Oracle Administrator's Guide*. [See Etrack Incident 855452]

The 5.0 documentation disc contains the sf\_ora\_admin.pdf.

