

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

Linux

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

## Technical support

For technical assistance, visit <http://support.veritas.com> and select phone or email support. Use the Knowledge Base search feature to access resources such as TechNotes, product alerts, software downloads, hardware compatibility lists, and our customer email notification service.



# Veritas Storage Foundation for Oracle RAC Release Notes

This document provides important information regarding Veritas™ Storage Foundation for Oracle RAC (SF Oracle RAC) for Linux. 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/281993>

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

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

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

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

## Changes in this release

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

- Support for Red Hat Enterprise Linux 4 Update 4
- Support for Oracle 9.2.0.8 patchset for 9iR2
- VCS FEN error messages are now VXFEN error messages

## 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
- Support for Oracle 10g Release 2

## No longer supported

Support is no longer provided for the following:

- x86 (32-bit) architecture
- IA 64 architecture

## 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 2GHz 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	Typical SF Oracle RAC configurations require that shared disks support applications that migrate between systems in the cluster.  The SF Oracle RAC I/O fencing feature requires that all disks used as data disks or as coordinator disks must support SCSI-3 Persistent Reservations (PR).
Disk space	SF Oracle RAC space requirement: <ul style="list-style-type: none"><li>■ total: 2.6 G</li><li>■ /opt: 1.4 G</li><li>■ /usr: 200 KB</li><li>■ /tmp: 512 MB</li><li>■ /var: 32 MB</li><li>■ /var/tmp: 700 MB</li></ul>
Swap space	Two times the main memory.

## 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. Software support for this release includes the following Linux operating systems and kernel binaries distributed by Red Hat and SUSE:

**Table 1-1** Linux operating systems supported

Operating System	Architecture	Kernel
Red Hat Enterprise Linux 4 Update 4	x86_64 Intel Xeon, AMD, Opteron	2.6.9-42.EL 2.6.9-42.ELsmp 2.6.9-42.ELlargesmp
Red Hat Enterprise Linux 4 Update 3	x86_64 Intel Xeon, AMD, Opteron	2.6.9-34.EL 2.6.9-34.ELsmp 2.6.9-34.ELlargesmp
SUSE Linux Enterprise Server 9 Service Pack 3	x86_64 Intel Xeon, AMD, Opteron	2.6.5-7.244-smp 2.6.5-7.244-default

If your system is running an older version of Red Hat Enterprise Linux or SUSE Linux Enterprise Server, you must upgrade Linux before installing the SF Oracle RAC software. Consult your Linux documentation for information on upgrading your system.

For RHEL4, disable SELinux (Security Enhanced Linux) and Firewall during OS installation.

For SLES9, do not use the auditing subsystem. ODM is not compatible with the auditing subsystem on SLES 9.

## 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 Oracle software in the following combinations:

Base Oracle version	Latest supported Oracle version	RHEL 4.0 Update 3 or Update 4 x86_64	SLES9 SP3 x86_64
Oracle 9i Release 2 9.2.0.4	9.2.0.8	Yes	No
Oracle 10g Release 1 10.1.0.3	10.1.0.5	No	Yes
Oracle 10g Release 2 10.2.0.1	10.2.0.2	Yes	Yes

The “Latest supported Oracle version” is always supported. For a fresh installation, you must upgrade the Oracle binaries to the “Latest supported Oracle version” before performing the database creation operation. This prevents potential problems due to an older Oracle version being incorrectly linked with the IPC library requirement for the newer version.

### Oracle software patches

Oracle9i Release 2 (9.2.0.7) on Red Hat Enterprise Linux 4.0 requires a number of patches. These patches, and other manual steps that need to be executed before installing Oracle, are available at the Oracle metalink site.

## Software limitations

The following limitations apply to this release.

### 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 spfile option, you must run the `dbed_update` command before you can successfully perform any Storage Checkpoint or Database FlashSnap functions.
- Storage Checkpoints require file system layout version 6 or 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 spfile, you need to shut down the database and restart it using the spfile. 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]

# Installation notes

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

## Setting the environment variable LD\_ASSUME\_KERNEL

Setting the environment variable LD\_ASSUME\_KERNEL=2.4.19 may be required for some Oracle tasks. Set the variable manually. Do not set this variable in the profile of root user. Doing so may result in SF Oracle RAC processes terminating abnormally. [See Etrack Incident 529325]

## 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 39.

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.

```
# /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.
- 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 83.
- 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*.

## 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*.

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**Warning:** You cannot roll back the 5.0 Maintenance Pack 1 product to the previously installed release.

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If you want to go back to SF Oracle RAC 5.0 after upgrading to 5.0 MP1, you will need to back up your configuration files before running the uninstall script, reinstall SF Oracle RAC 5.0, and reapply your configuration files.

See “[Removing SF Oracle RAC 5.0 MP1](#)”

### Overview of upgrade tasks

You must perform the following tasks:

- [Upgrading your operating system](#)
- [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](#)

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

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## Upgrading your operating system

If you want to upgrade the OS to RHEL 4 Update 4, upgrade the OS now on all cluster nodes.

### To upgrade the OS to RHEL 4 Update 4

- 1 Upgrade the OS to RHEL 4 Update 4 on all nodes.  
Do not choose "reinstall" while upgrading as it will wipe out previous SFRAC installation.
- 2 Reboot the nodes after the OS installation is complete.  
On reboot all the modules will load and Oracle resources will come up.

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

```
# hagr -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.

- 5 For Oracle 10g, stop CRS on each node in the cluster.

```
# hares -offline cssd_resource -sys galaxy
```

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

- 6 Make sure that no processes are running which make use of mounted shared file system or shared volumes.

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

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

- 8 Deport any CVM disk groups that are not under VCS control.

- 9 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
```

- 10 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
```

## Upgrading to SF Oracle RAC 5.0 MP1 using the installmp installer

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

If you upgraded the OS to RHEL4 Update 4, manually upgrade VRTSperl rpm. Note that during the OS upgrade, the VRTSperl rpm is removed.

### To manually upgrade the VRTSperl rpm

- 1 Change to the directory /storage\_foundation\_for\_oracle\_rac/rpms.

2 Copy the VRTSperl rpm on all cluster nodes in /tmp including the current node if it is part of the cluster.

3 Upgrade VRTSperl rpm with following command:

```
# rpm -Uvh /tmp/<VRTSperl rpm>
```

#### 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 -p /media/cdrom
# mount /dev/cdrom /media/cdrom
```

4 Browse to the directory containing installer program.

For example: installmp.

For RHEL4, use the following command:

```
# cd /media/cdrom/rhel_x86_64
```

For SLES9, use the following command:

```
# cd /media/cdrom/sles9_x86_64
```

Where /media/cdrom is the software disc mount point.

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 rpms that it will replace on each system

After the installer has all the configuration information, it can replace the rpms on the cluster systems.

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.

All the Storage Foundation for Oracle RAC processes are stopped before removing the packages. This includes VCS, VM, FS and VEA and includes the processes: vcsmm, gab, and llt.

- 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 14.
  - Restore the original main.cf file:
 

```
# cp /etc/VRTSvcs/conf/config/main.cf.save \
/etc/VRTSvcs/conf/config/main.cf
# cd /etc/VVRTSvcs/conf/config
# cp /etc/main.cf.50 /etc/VRTS/conf/config
```
  - 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
- 9 Restart each system in the cluster when prompted.
- 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.

## Performing post-upgrade tasks for SF Oracle RAC 5.0 MP1

If you wish to perform product configuration, product installation scripts from /opt/VRTS/install/ can be run with the -configure option.

If you are upgrading Oracle:

- Verify you have shutdown Oracle resources.  
See [“Stopping Oracle and the cluster resources”](#) on page 14.
- Install and configure the correct version of Oracle before relinking.  
Refer to the *Veritas Storage Foundation for Oracle RAC Installation and Configuration Guide* for release 5.0.
- To upgrade to Oracle9i Release 2 (9.2.0.8) for RHEL4 x86 or x86\_64
  - Apply the patchset.
  - Migrate the database.

## 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
```
- 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 Base: /app/oracle
Oracle Home: /app/oracle/orahome

Is this information correct? [y,n,q] (y)
```
- 6 Start CRS on each node in the cluster.
  - 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
```
- 7 Start all resources.

- If the Oracle database instances are under VCS control, bring the corresponding VCS service groups online. As superuser, enter:
 

```
# hagrps -online oracle_group -sys galaxy
# hagrps -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.

### 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
```

- 5 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 Base: /app/oracle
Oracle Home: /app/oracle/orahome
Is this information correct? [y,n,q] (y)
```

## 6 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
```

## 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.

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### To change permissions

- 1 Change permissions for the following directory:  
For Veritas Storage Foundation for Oracle:  
# `chmod 550 /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:  
# `vxvg import sfua_rep`  
# `vxvol -g dbed_rep startall`

#### 4 Mount the repository file system manually.

```
# mount -t 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
```

## 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 -m /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/vxsvctrl stop`
- 10 Change to CD-ROM directory.  
# `cd /cdrom`
- 11 Start the installer.  
# `./installmp [-rsh] galaxy nebula`
- 12 Restart each system in the cluster when prompted.
- 13 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
```

### 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
```
- 4 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 Clusterware (CRS) Home: /app/crshome
Oracle Release: 10.2
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
```
- 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 -m /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 21.

- 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
```

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

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

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

```
# /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/vxsvcctrl stop

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

```

# cd /cdrom
For ssh
# ./installmp jupiter mercury
For rsh
# ./installmp -rsh jupiter mercury

```
- 6 Restart each system in the cluster when prompted.
- 7 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
```

- 8 Verify CRS is offline before relinking.
- 9 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 23.

### 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.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
```

### 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 -m /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
 

```
# hstop -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 Restart each system in the cluster when prompted.
  - 11 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
```
  - 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 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 -m /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 21.
  - 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
```
- 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/hagrps -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/vxsvctrl status
# /opt/VRTSob/bin/vxsvctrl stop
```
- 2 Change to CD-ROM directory, start the installer  

```
# cd /cdrom
# ./installmp [-rsh] jupiter mercury
```
- 3 Restart each system in the cluster when prompted.
- 4 When *jupiter* and *mercury* come back online, they will join *galaxy* and *nebula* to form a four-node SFRAC 5.OMP1 cluster.
- 5 Relink the Oracle libraries on the second half of the Oracle 10g cluster:  
 See [“To relink Oracle 9iR2 library”](#) on page 29.
- 6 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
```

## 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 550 /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 SF Oracle RAC 5.0 MP1, you must remove all SF Oracle RAC software packages. You cannot roll back the Maintenance Pack to the previously installed release.

### Removing SF Oracle RAC 5.0 MP1 without saving your configuration

See “Uninstalling SF Oracle RAC on Oracle 10g Systems” on page 251 of the *Symantec Storage Foundation for Oracle RAC 5.0 Installation and Configuration Guide*.

## Rolling back SF Oracle RAC from 5.0 MP1 to 5.0

Rolling back the SF Oracle RAC 5.0 MP1 patch installation is a manual process which involves removing SF Oracle RAC completely and reinstalling the previous version of SF Oracle RAC. You must:

- Save your configuration files
- Completely remove SF Oracle RAC 5.0 MP1
- Reinstall the previous version of SF Oracle RAC
- Restore your saved configuration files

### To save SF Oracle RAC configuration files

Back up current configuration files on each cluster node. Note that some of the files may not exist.

```
mkdir -p /var/sfrac50-config-save/etc/vx/vras
mkdir -p /var/sfrac50-config-save/etc/VRTSvcs/conf/config

cp -p /etc/llttab /etc/llthosts /etc/gabtab /etc/vxfendg /etc/
vxfenmode
/var/sfrac50-config-save/etc/
cp -p /etc/VRTSvcs/conf/config/main.cf
/var/sfrac50-config-save/etc/VRTSvcs/conf/config/

cp -p /etc/vx/vxddl.exclude /etc/vx/darecs
/etc/vx/disk.info /etc/vx/jbod.info /etc/vx/.aascsi3 /etc/vx/
.apscsi3 /etc/vx/volboot
/etc/vx/array.info /etc/vx/ddl.support /etc/vx/disks.exclude /
etc/vx/cntrls.exclude
/etc/vx/enclr.exclude /etc/vx/.newnames /etc/vx/guid.state /etc/
vx/vxvm_tunables
/etc/vx/vxdmp_tunables /etc/vx/vvrports /var/sfrac50-config-
save/etc/vx

cp -p /etc/vx/vras/.rdg /etc/vx/vras/vras_env /var/sfrac50-
config-save/etc/vx/vras/
```

### To remove Storage Foundation for Oracle RAC 5.0 MP1

- 1 Stop Oracle and CRS on each cluster node.
 

```
# /etc/init.d/init.crs stop
```
- 2 Unencapsulate root disk if necessary.
 

```
# df /
```

The root disk is under VxVM control if `/dev/vx/dsk/rootvol` is listed as being mounted as the root (`/`) file system.

```
# vxplex -o rm dis mirrootvol-01 mirswapvol-01
# /etc/vx/bin/vxunroot
```
- 3 Unmount all vxfs mounts and all file systems on VxVM volumes.

- 4 Stop all volumes for each disk group.  
# `vxvol -g diskgroup stopall`
- 5 Stop VCS along with all the resources. Then stop remaining resources manually.  
# `hastop -all`
- 6 Remove SFRAC.  
# `cd /opt/VRTS/install`  
# `./uninstallsfrac galaxy nebula`
- 7 Remove all the remaining VRTS rpms manually on each cluster node.  
# `rpm -qa | grep VRTS`  
# `rpm -e <remaining VRTS RPMs>`  
For example:  
# `rpm -e VRTSob VRTSvlic VRTSobgui VRTSperl VRTSgab VRTScpi`

#### To reinstall Storage Foundation for Oracle RAC

Install Storage Foundation for Oracle RAC using the `-installonly` option.

```
# cd <5.0 install location>/rhel4_i686/
storage_foundation_for_oracle_rac
# ./installsfrac -installonly galaxy nebula
```

#### To restore your configuration

- 1 Restore VCS and VxVM configuration on each cluster node.  

```
cd /var/sfrac50-config-save/etc/vx
cp disk.info jbod.info .aascsi3 .apscsi3 volboot
array.info ddl.support disks.exclude cntrls.exclude
enclr.exclude newnames guid.state vxvm_tunables
vxgmp_tunables /etc/vvrports /etc/vx/
cp vras/.rdg vras/vras_env /etc/vx/vras/
cd /var/sfrac50-config-save/etc
cp llttab llthosts gabtab vxfenmode /etc
cd /var/sfrac50-config-save/etc/VRTSvcs/conf/config
cp main.cf /etc/VRTSvcs/conf/config
```

If vxfen was originally configured in enabled mode:

```
rm /etc/vxfenmode ... on all nodes
cd /var/sfrac50-config-save/etc
cp vxfendg /etc
cp vxfenmode /etc
```
- 2 Install VxVM on each cluster node. Run `vxinstall` on all nodes.
- 3 If necessary, re-encapsulate the root disk.
- 4 Restart all nodes.

## 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), "eth0" is not public. Public interfaces should be used to configure virtual IPs."

This message appears only when the VIP is not from regular public IP range (200. etc).

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

**Workaround:** You can safely ignore this message.

## Kernel warning messages when Veritas modules load

For SLES9 SP3, a warning message resembling the following may be displayed in the console or the system log when Veritas modules are loaded into the kernel.

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

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

## 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.

## Network interfaces change their names after restart

On SUSE systems, network interfaces change their names after restarting even with `HOTPLUG_PCI_QUEUE_NIC_EVENTS=yes` and `MANDATORY_DEVICES="..."` set.

**Workaround:** Use `PERSISTENT_NAME= ethX` where X is the interface number for all interfaces. For more details see the *Storage Foundation for Oracle RAC Installation and Configuration Guide*.

## Wizard does not detect preconfigured PrivNIC resources

The VCS Oracle 10g RAC wizard does not properly detect PrivNIC resources if they are already set up. If PrivNIC is already configured, you must remove the `ora_priv` resource from `main.cf`.

## CRS resources go into UNKNOWN state after reboot

After reboot, CRS resources (`gsd`, `ons`, instances, listeners) may display UNKNOWN state [See Etrack Incident 499688].

To resolve this issue, do one of the following:

- Stop and start CRS with: `/etc/init.d/init.crs`
- stop the UNKNOWN resources one by one and start them with: `$CRS_HOME/bin/crs_start`

This problem is identified as bug in Oracle. For further information on this bug, contact Oracle support.

## 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>

## 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.

## Netdump - Network console and crash dump facility

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

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

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

For information on `netdump` installations for SUSE systems, see:

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

## SCSI reservation errors during bootup

If you reboot a node of an SF Oracle RAC cluster, SCSI reservation errors may be observed during bootup. [See Etrack Incident Linux:255515]

For example:

```
Nov 23 13:18:28 galaxy kernel: scsi3 (0,0,6) : RESERVATION CONFLICT
```

This message is printed for each disk that is a member of any shared disk group which is protected by SCSI-3 I/O fencing. The message may be safely ignored.

## I/O fencing module may not be able to write the reservation keys

If are using Oracle 10g R2, and you exit the product installer without stopping all the SF Oracle RAC components, you may encounter problems with the I/O fencing module, `vxfen`. [See Etrack Incident 495518]

**Workaround:** If `vxfen` has problems coming up after the reboot, SCSI-3 PR registration keys should be fixed using `vxfcntlclearpre` command. See the *Storage Foundation for Oracle RAC Installation and Configuration Guide*.

## 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.

## 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 441 of the Storage Foundation for Oracle RAC Installation and Configuration Guide should be replaced with the following attribute definition table.

**Table 1-2** 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><br>Device@galaxy = {eth0=0, eth1=1, eth2=2}<br>Device@nebula = {eth0=0, eth1=1, eth2=2} |
| Address   | string-scalar        | The numerical private IP address. For example:<br><br>Address = "192.168.12.1"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| NetMask   | string - association | The numerical netmask for the private IP address. For example:<br><br>Address = "255.255.255.0"                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

## Fixed issues

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

**Table 1-3** Fixed issues in SF Oracle RAC version 5.0 MP1

| Incident number | Description                                                                                                                                                          |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 768962          | VCSMM driver should clean-up data structures for stale processes                                                                                                     |
| 640452          | Resolves problem that caused Oracle to hang with SF Oracle RAC IPC library on 10.1.0.5                                                                               |
| 632036          | VxFEN does not panic the node even after split-brain on SLES9                                                                                                        |
| 626451          | The installer sometimes does not display the global clustering configuration option.                                                                                 |
| 620793          | Database recovery may fail with <code>dbed_vmclonedb -o recoverdb</code>                                                                                             |
| 620413          | Error message on Red Hat for <code>dbed_vmchecksnap</code> and <code>dbed_vmsnap</code>                                                                              |
| 595651          | The <code>vcsmmdebug</code> command with <code>-s</code> option gives segmentation fault.                                                                            |
| 596047          | The <code>vcsmmconfig -c</code> command hangs if <code>mm_slave_max</code> parameter value on the newly joining node does not match with that of the existing nodes. |
| 538897          | Panic in VCSMM driver when processing second deregistration request for the same process.                                                                            |
| 534950          | Fencing shuts down the larger cluster after a split brain.                                                                                                           |
| 346204          | Error messages in uninstaller log.                                                                                                                                   |

**Table 1-4** Fixed issues in SF Oracle RAC version 5.0

| Incident number | Description                                                                     |
|-----------------|---------------------------------------------------------------------------------|
| 542851          | Command <code>vcsmm unconfigure</code> fails due to leftover Oracle processes.  |
| 515274          | Installer unable to back up Oracle membership and IPC libraries.                |
| 516131          | Database startup may fail.                                                      |
| 496151          | Infinite start check loop in <code>init.cssd</code> .                           |
| 303864          | Wizards do not start if the <code>/etc/hosts</code> file contains ipv6 entries. |

# 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 1-5** Storage Foundation for Oracle RAC Documentation Set

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

## Documentation errata

Updates and corrections to 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 108, 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:

```
# vxrdg -o coordinator=on init vxfencoorddg c1t1d0
```

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

```
# vxrdg -g vxfencoorddg adddisk c2t1d0
```

```
# vxrdg -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:

```
# vxrdg init vxfencoorddg sdx
```

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

```
# vxrdg -g vxfencoorddg adddisk sdy
```

```
# vxrdg -g vxfencoorddg adddisk sdz
```

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

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

```
# vxrdg -g vxfencoorddg set coordinator=on
```

### Corrections to 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/bin/init.crs stop
```

## Corrections to Preparing for global clustering chapter

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.

On page 297, 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.

## Corrections to 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 Oracle9i, 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 /orasrvn/srvn.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
```

## 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”

## Corrections to 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 311, 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
```

## 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_oracle_admin.pdf`.

