

Veritas Storage Foundation™ for Oracle RAC Release Notes

AIX 6.1

5.0 Maintenance Pack 1 Update 1



Veritas Storage Foundation for Oracle RAC Release Notes

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Documentation version

PN:

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About this release

This chapter includes the following topics:

- [About this product](#)
- [Changes in this release](#)
- [Features introduced in SF Oracle RAC 5.0](#)
- [No longer supported](#)
- [Installation requirements](#)
- [Software limitations](#)

About this product

This document provides important information regarding Veritas Storage Foundation for Oracle RAC™ (SF Oracle RAC) version 5.0 Maintenance Pack 1 Update 1 for AIX 6.1. Review this entire document before installing this product. See the following Technical Support TechNote for the latest information on updates, patches, and software issues regarding this release:

<http://entsupport.symantec.com/docs/282024>

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.

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 Administrator's Guide*. For additional information to assist you during installation and configuration of SF Oracle RAC:

See the component-product documentation and release notes.

Changes in this release

Veritas Storage Foundation for Oracle RAC 5.0 Maintenance Pack 1 (MP1) Update 1 for AIX 6.1 includes the following changes since version 5.0:

- AIX 6.1 support
- VCS FEN error messages are now VXFEN error messages
- For the latest information on support for Oracle database versions, see the following TechNote:
<http://entsupport.symantec.com/docs/280186.htm>

Features introduced in SF Oracle RAC 5.0

The following new features in Storage Foundation 5.0 for Oracle RAC are covered in the *Veritas Storage Foundation for Oracle RAC Installation and Configuration Guide*:

- Fencing with DMP disks
- Support for Oracle 10g Release 2
- Support for up to 8 nodes. A typographical error in the 5.0 Release Notes indicated 9 nodes.

No longer supported

Support is no longer provided for the following:

- Use of crossover cables is not supported by Oracle

Installation requirements

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

- [Hardware requirements](#)
- [Supported software](#)
- [Supported operating systems](#)

Before you install SF Oracle RAC, you must read the Late Breaking News TechNote: <http://entsupport.symantec.com/docs/282024>

Hardware requirements

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

- Review the current compatibility list to confirm compatibility of your hardware: <http://entsupport.symantec.com/docs/283161>
- Review recommendations in Oracle's documentation for your version of Oracle.
- Review the hardware requirements for an SF Oracle RAC installation using SCSI-3 disks.
 See the table below.

Table 1-1 Hardware requirements

Item	Description
SF Oracle RAC systems	Two to eight systems with two or more CPUs at 2GHz or higher.
DVD drive	One drive that is accessible to all nodes in the cluster.
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> <p>Note: The coordinator disk does not store data, so configure the disk as the smallest possible LUN on a disk array to avoid wasting space.</p>
Disk space	See "Disk space (local)" on page 12.

Table 1-1 Hardware requirements (*continued*)

Item	Description
RAM	Each SF Oracle RAC system requires at least 2 GB Symantec recommends additional amount of at least twice the Oracle SGA size.
Swap space	The minimum requirements is 4GB of swap space. Symantec recommends two times the main memory for swap space.
Network links	Two or more private links and one public link. Links must be 100BaseT or Gigabit Ethernet directly linking each node to the other node to form a private network that handles direct inter-system communication. These links must be of the same type; you cannot mix 100BaseT and Gigabit. Symantec recommends Gigabit Ethernet using enterprise-class switches for the private links.
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.

Disk space (local)

Confirm that your system has enough free disk space to install SF Oracle RAC. Each node in the cluster must have the following minimum local disk space to install the SF Oracle RAC filesets:

/opt	1.9 G
/usr	420 MB
/tmp	512 MB
/var	581 MB
/var/tmp	700 MB
/	120 MB
total	3 G

To check for current RAM, swap space, and /tmp

- 1 To check the current RAM installed on a system, enter the following command:

```
# /usr/sbin/lsattr -E -l sys0 -a realmem
```

If the current RAM is insufficient, you must install more memory before proceeding with the installation.

- 2 To check the amount of swap space configured for a system, enter:

```
# /usr/sbin/lsps -a
```

Oracle recommends 1 GB of swap space.

Refer to the operating system documentation for information about configuring swap space.

See the *Oracle Database Administrator's Reference for UNIX* for more information.

- 3 To check for the current space available in the /tmp directory, enter:

```
# df -k /tmp
```

If the space remaining in /tmp is insufficient, complete one of the following operations:

- Delete unnecessary files in /tmp, and recheck the available space.
- Extend the file system that contains the /tmp directory.
- Set the TEMP and TMPDIR environment variables when setting the Oracle user's environment.

Supported software

Software versions that SF 5.0 for Oracle RAC supports include:

Oracle RAC	Oracle 10g Release 2 Oracle9i Release 2
AIX operating system	See "Supported operating systems" on page 14.
VCS, VxVM, VxFs, VVR	Use only versions of VCS, VxVM, VxFs, and VVR provided on the software disc. Remove other versions before you install the software from the SF Oracle RAC product disc.

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

<http://entsupport.symantec.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

Supported operating systems

Before installing SF Oracle RAC, you must read the following TechNote for information on required iFixes and perform the instructions.

<http://support.symantec.com/docs/300577>

Run SF Oracle RAC on the following operating systems at the required patch levels:

- AIX 6.1 with SP3 and the required iFix
- AIX 5.3 TL7 with SP2 and the required iFix

At the time this Release Note is published, AIX 6.1 supports only Oracle 10g R2.

APAR and fileset information

You will need the following AIX filesets for Oracle installation:

- bos.adt.libm
- perfagent.tools
- bos.perf
- Java14
- rsct.core
- rsct.compat.basic
- rsct.compat.clients
- rsct.basic
- rsct.clients

The Veritas High Availability Agent for Oracle on AIX requires the following runtime fileset level for the xLC.rte and xLC.aix50.rte filesets:

xLC.rte	7.0.0.1	COMMITTED	C Set	++	Runtime
xLC.aix50.rte	7.0.0.4	COMMITTED	C Set	++	Runtime for AIX 5.0

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.

For details on asynchronous I/O issues with AIX 6.1:

See [“Asynchronous I/O message”](#) on page 42.

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

RDAC driver and FASTT array for coordinator disks

For multipathing connected storage when using the AIX RDAC driver for FASTT arrays, the following points must be considered:

- Since it is an active/passive array, only the current active path is exposed to clients.
- The I/O fencing driver, `vxfen`, can use only a single active path and has no fore-knowledge of the passive paths to the coordinator disks on an array.

Therefore, if the single active path fails, all nodes in the cluster lose access to the coordinator disks. The loss of the path to the coordinator disks can potentially go unnoticed until a reboot, split brain, or any other reason that leads to a cluster

membership change occurs. In any of these conditions, the cluster cannot form, and all nodes panic to prevent data corruption. No data loss occurs.

This limitation does not apply if DMP is used for fencing co-ordinator disks. However, if the `scsi3_disk_policy` is set to "raw," which is the default setting, this limitation still applies.

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

This chapter includes the following topics:

- [About installing SFRAC](#)
- [Installing SF Oracle RAC 5.0 MP1 Update1 for AIX 6.1](#)
- [Upgrading to SF Oracle RAC 5.0 MP1 Update 1 for AIX 6.1](#)

About installing SFRAC

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

Veritas Storage Foundation for Oracle RAC packages

Veritas 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 Veritas Storage Foundation for Oracle RAC

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

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

- Veritas Cluster Server agent for Oracle

Installing SF Oracle RAC 5.0 MP1 Update1 for AIX 6.1

If you are installing SF Oracle RAC 5.0 MP1 Update1 software as a first time installation and not upgrading an existing system, for pre-installation instructions:

See the *Veritas Storage Foundation for Oracle RAC 5.0 Installation and Configuration Guide*, “Preparing to install SF Oracle RAC” on page 41.

Installing SF Oracle RAC 5.0 MP1 Update1 for AIX 6.1 involves the following tasks:

- Installing SF Oracle RAC version 5.0 MP1 Update1 for AIX 6.1 using the `installsfrac -installonly` option
- Restarting your systems
- Configuring SF Oracle RAC using the `installsfrac -configure` option

Note: The procedures below apply when adding a node to an existing cluster.

To install the SF Oracle RAC 5.0 MP1 Update1 for AIX 6.1 software

- 1 If you have not already done so, read the following TechNote and perform the instructions to upgrade your operating system to AIX 6.1 SP3.
<http://entsupport.symantec.com/docs/300577>
- 2 Log in as root on one of the systems for installation.
- 3 Install the Veritas Storage Foundation for Oracle RAC 5.0 MP1 Update1 for AIX 6.1 software from the release DVD. Run the product installation script instead of the generic installer script.

See the *Veritas Storage Foundation for Oracle RAC 5.0 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.

- 4 Follow the installation instructions in the *Veritas Storage Foundation for Oracle RAC 5.0 Installation and Configuration Guide*.
- 5 When installation is complete, restart all systems in the cluster.

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

Error messages may occur such as the following:

```
# GAB WARNING V-15-1-20115 Port d registration failed, GAB not
configured
VRTS:GMS: vxgms: GAB_API_REGISTER error=161

VRTS:ODM: ODM WARNING V-41-6-5 odm_gms_api_start_msgs fails
Preserving 4745 bytes of symbol table [/etc/pw-syscall.64bit_kernel]
0513-059 The ctrmc Subsystem has been started. Subsystem PID is 483564.
GAB ERROR V-15-1-20109 Port h registration failed, GAB not configured
GAB ERROR V-15-1-20109 Port h registration failed, GAB not configured
GAB ERROR V-15-1-20109 Port h registration failed, GAB not configured
GAB ERROR V-15-1-20109 Port h registration failed, GAB not configured
GAB ERROR V-15-1-20109 Port h registration failed, GAB not configured
GAB ERROR V-15-1-20109 Port h registration failed, GAB not configured
```

You may safely ignore these messages. They will not occur after SF Oracle RAC is configured.

To configure SF Oracle RAC 5.0 MP1 Update1 for AIX 6.1

- 1 Log in and change to the /opt/VRTS/install directory.
- 2 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 for Oracle RAC5.0 Installation and Configuration Guide*, “Installing and Configuring SF Oracle RAC Software” on page 83.

- 3 Install and configure Oracle:
See Chapter 10, “Preparing to install Oracle 10g RAC” in the *Veritas Storage Foundation for Oracle RAC 5.0 Installation and Configuration Guide*.
- 4 To use Checkpoints, FlashSnap, or Storage Mapping, you must configure the repository database.
See Chapter 18, “Configuring the repository database for Oracle” in the *Veritas Storage Foundation for Oracle RAC 5.0 Installation and Configuration Guide*.

Upgrading to SF Oracle RAC 5.0 MP1 Update 1 for AIX 6.1

Upgrading from SF Oracle RAC 5.0 to 5.0 MP1 Update 1 for AIX 6.1 is supported if you are currently running:

- AIX 5.3 TL7 SP2 and the required iFix
See <http://entsupport.symantec.com/docs/300577>
- SF Oracle RAC 5.0 or 5.0 MP1
- Oracle 10g R2 or Oracle9i R2

If you are using an older version of AIX, SF Oracle RAC you will need to upgrade to the supported configuration listed above before upgrading to SF Oracle RAC 5.0 MP1 Update 1 for AIX 6.1.

For SF Oracle RAC upgrade procedures:

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

Warning: After running the `installmp` script, the filesets are in a committed state. You cannot roll back the 5.0 MP1 Update 1 for AIX 6.1 product to the previously installed release.

Overview of upgrade tasks

To upgrade to SF Oracle RAC 5.0 MP1 Update 1 for AIX 6.1, perform the following tasks:

- Upgrading your configuration if it does not meet the minimum support requirements
- Backing up your cluster configuration if you require a method for rolling back to your previous configuration after installing SF Oracle RAC 5.0 MP1 Update 1 for AIX 6.1 (optional)

- Stopping Oracle and the cluster resources
- Upgrading to SF Oracle RAC 5.0 MP1 Update 1 for AIX 6.1 using the `installmp` installer
- Upgrading your operating system to AIX 6.1 (optional)
- Performing post-upgrade tasks for SF Oracle RAC 5.0 MP1 Update 1 for AIX 6.1

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

Note: The upgrade procedure necessitates a restart after installing the SF 5.0 Oracle RAC filesets.

Backing up your configuration

If you require a method for rolling back from SF Oracle RAC 5.0 MP1 Update 1 for AIX 6.1 to your previous configuration, perform a backup of your operating system, SF Oracle RAC, and Oracle configuration.

To roll back from SF Oracle RAC MP1 Update 1 for AIX 6.1, you will need to uninstall and reinstall the following:

- Oracle
- SF Oracle RAC
- Operating system
- Saved configuration files (when reinstalling)

Stopping Oracle and the cluster resources

Before you install SF Oracle RAC MP1 Update 1 for AIX 6.1 using the `installmp` script, you must stop Oracle and the cluster resources.

To stop Oracle and the cluster resources

- 1 Log in as root 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 Oracle 10g, stop all resources.
 - If the database instances are under VCS control, take the corresponding VCS service groups offline. As root, 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.

- 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 CRS on each node in the cluster.

Symantec highly recommends putting CRS under VCS control.

- If CRS is controlled by VCS, log in as root 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 root on each system in the cluster and enter:

```
# /etc/init.crs stop
```

This may take a minute or two, because the CRS process takes some time to stop in the background after the command is given.

- 6 For extra protection, Symantec recommends backing up the following before taking VCS offline or unmounting your file system:

- CRS
- Oracle configuration files
- Oracle database files

For details:

See Oracle documentation.

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

```
# mount |grep vxfs

# fuser -c /mount_point

# umount /mount_point
```

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

- 12** 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
```

- 13** With SF Oracle RAC 5.0 installed and configured, run the following command on all nodes in the SF Oracle RAC cluster:

```
# hastop -all
```

- 14** 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 /null
:h2:2:respawn:/etc/init.cssd fatal >/dev/null 2>&1 /null
:h3:2:respawn:/etc/init.crsd run >/dev/null 2>&1 /null
```

- 15** On each system, invoke “`slibclean`” to unload all unused modules:

```
# /usr/sbin/slibclean
```

- 16** For an optional port verification step, make sure only ports a, b, d, and o are open:

```
# gabconfig -a
GAB Port Memberships
=====
Port a gen 6b5901 membership 01
Port b gen 6b5904 membership 01
Port d gen 6b5907 membership 01
Port o gen 6b5905 membership 01
```

- 17** For an optional disk group verification step, make sure no disk groups are imported:

```
# vxdg list
NAME          STATE          ID
#
^^^ NOTE: no diskgroups imported
```

Upgrading to SF Oracle RAC 5.0 MP1 Update 1 for AIX 6.1 using the installmp installer

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

To upgrade to SF Oracle RAC 5.0 MP1 Update 1 for AIX 6.1

- 1** Insert the disc containing the Veritas SF Oracle RAC 5.0 MP1 Update 1 for AIX 6.1 software in a disc drive connected to one of the nodes for installation.
- 2** Log in as root on one of the systems for installation.
- 3** Mount the software (5.0 MP1 Update 1 for AIX 6.1) disc.

```
# mkdir /cdrom
# mount -V cdrfs -o ro /dev/cd0 /cdrom
```

- 4** Browse to the directory containing installer program.

```
# cd /cdrom
```

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 filesets 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 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
```

- 9 Restart each system in the cluster when prompted.

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

- 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 that all the resources configured under VCS come online.

Upgrading your operating system to AIX 6.1 SP3

After completing the SF Oracle RAC to 5.0 MP1 Update 1 for AIX 6.1, you may upgrade to AIX 6.1 SP3 if you are using Oracle 10g R2. You can skip this procedure if you are not upgrading to AIX 6.1.

To upgrade your operating system

- 1 Stop Oracle and the cluster resources.
See “[To stop Oracle and the cluster resources](#)” on page 24.
- 2 Upgrade your operating system to AIX 6.1 SP1 using the migration method.
See the appropriate AIX documentation.
- 3 If you have not already done so, read the following TechNote and perform the instructions to upgrade your operating system to AIX 6.1 SP3.
<http://entsupport.symantec.com/docs/300577>
- 4 Restart each system in the cluster when finished.

```
# /usr/sbin/shutdown -r
```
- 5 Make sure that all eight GAB ports are up after the restart.
- 6 Make sure that all the resources configured under VCS except the CSSD and Oracle resource come online.
- 7 Make sure that all the resources configured under VCS come online.

Performing post-upgrade tasks for SF Oracle RAC 5.0 MP1 Update 1 for AIX 6.1

After completing the upgrade to SF Oracle RAC 5.0 MP1 Update 1 for AIX 6.1 and the upgrade to AIX 6.1:

- For Oracle 10g R2: you must create the new skgxn archive library and relink Oracle 10g
- For Oracle9i: you must relink the Oracle9i libraries.

To create the new skgxn archive library before relinking Oracle 10g

- 1 If you are running Oracle 10g, perform the following setup steps on each system in the cluster before bringing up CRS:

- Unload any unused modules:

```
# /usr/sbin/slibclean
```

- Create the 32-bit SKGXM archive library under /opt/VRTSvcs/rac/lib:

```
# cd /opt/VRTSvcs/rac/lib
# rm libskgxn2.a # cp libvcsmm.so shr_skgxn2.o
# ar -X32 -qv libskgxn2.a shr_skgxn2.o
# rm shr_skgxn2.o
```

- Create the 64-bit SKGXM archive library under /opt/VRTSvcs/rac/lib64

```
# cd /opt/VRTSvcs/rac/lib64
# rm libskgxn2.a
# cp libvcsmm.so shr_skgxn2.o
# ar -X64 -qv libskgxn2.a shr_skgxn2.o
# rm shr_skgxn2.o
```

- 2 For Oracle 10g R2, perform the following commands on each system in the cluster.

- Remove the following files from under /opt/ORCLcluster:

```
# rm /opt/ORCLcluster/lib/libskgxn2.a
# rm /opt/ORCLcluster/lib/libskgxn2.so
# rm /opt/ORCLcluster/lib32/libskgxn2.a
# rm /opt/ORCLcluster/lib32/libskgxn2.so
```

- Copy these SF Oracle RAC SKGXM libraries to /opt/ORCLcluster:

```
# cp /opt/VRTSvcs/rac/lib/libskgxn2.a \
/opt/ORCLcluster/lib32/libskgxn2.a
# cp /opt/VRTSvcs/rac/lib/libvcsmm.so \
/opt/ORCLcluster/lib32/libskgxn2.so
# cp /opt/VRTSvcs/rac/lib64/libskgxn2.a \
/opt/ORCLcluster/lib/libskgxn2.a
```

```
# cp /opt/VRTSvcs/rac/lib64/libvcsmm.so \
/opt/ORCLcluster/lib/libskgxn2.so
```

Run the commands on each system in the cluster.

- Copy the SF Oracle RAC SKGXP library to /opt/ORCLcluster:

```
# cd /opt/ORCLcluster/lib32
# cp /opt/VRTSvcs/rac/lib/libskgxp10_ver25_32.so .
# cp /opt/VRTSvcs/rac/lib/libskgxp10_ver25_32.a .
# cd /opt/ORCLcluster/lib
# cp /opt/VRTSvcs/rac/lib/libskgxp10_ver25_64.so .
# cp /opt/VRTSvcs/rac/lib/libskgxp10_ver25_64.a .
```

- Copy the `clsinfo` script to /opt/ORCLcluster:

```
# cd /opt/ORCLcluster/bin
# cp /opt/VRTSvcs/rac/bin/scripts/clsinfo .
```

To relink Oracle 10g 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 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 Patch Level: [b] (0.1) 0.1
```

- 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 Patch Level: 0.1
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 root on each system in the cluster and enter:

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

- If CRS is controlled by VCS, log in as root 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 root, 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.

- 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 Oracle9i R2 libraries after upgrading to Storage Foundation for Oracle RAC 5.0 MP1 Update 1 for AIX 6.1

- 1 Make sure no Oracle instances are running on the system.
- 2 Stop GSD.
- 3 Login as root user and perform `/usr/sbin/slibclean`.
- 4 Replace the VRTS skgxn library in ORACLE_HOME:

For 64-bit:

```
$ cp /opt/VRTSvcs/rac/lib64/libvcsmm.so $ORACLE_HOME/lib/libskgxn9.a
$ cp /opt/VRTSvcs/rac/lib64/libvcsmm.so $ORACLE_HOME/lib/libskgxn9.a
```

32-bit:

```
$ cp /opt/VRTSvcs/rac/lib/libvcsmm.so $ORACLE_HOME/lib32/libskgxn9.a
```

- 5 Copy the skgxp library to ORACLE_HOME/lib:

If the Oracle version is 9.2.0.7 or 9.2.0.8:

```
$ cp /opt/VRTSvcs/rac/lib/libskgxp9_ver24_64.a $ORACLE_HOME/lib/libskgxp9.a
```

If the Oracle version is 9.2.0.6 or lower:

```
$ cp /opt/VRTSvcs/rac/lib/libskgxp9_ver22_64.a $ORACLE_HOME/lib/libskgxp9.a
```

- 6 Copy the ODM library to ORACLE_HOME/lib:

```
$ cp /opt/VRTSodm/lib/libodm64.so $ORACLE_HOME/lib/libodm9.so
```

- 7 Relink the Oracle library:

```
$ cd $ORACLE_HOME/rdbms/lib $make -f ins_rdbms.mk ioracle
```

- 8 Repeat the previous steps on every node if Oracle Home is in a local filesystem.
- 9 Bring up GSD.
- 10 Bring up the SOracle instances.

Upgrading the repository database

After you have completed the SF Oracle RAC upgrade, if you plan to use the commands for Checkpoints, FlashSnap, Database Dynamic Storage Tiering , 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:

```
# 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:

```
# vxvg import sfua_rep
# vxvol -g dbed_rep startall
```

- 4 Mount the repository file system manually.

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

- 5 Run the repository upgrade command again without any 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

Operation notes

This chapter includes the following topics:

- [About operation notes](#)
- [Enabling fencing](#)
- [Setting LIBPATH in the EnvFile attribute of Veritas agent for Oracle](#)
- [Determining if disk arrays have array support library \(ASL\)](#)
- [Preventing automatic database startup for Oracle 10g R2](#)

About operation notes

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

See the *Veritas 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. For details on configuring I/O fencing in a cluster environment:

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

Setting LIBPATH in the EnvFile attribute of Veritas agent for Oracle

If you do not specify the use of the `EnvFile` attribute in the Oracle resource definition in the `main.cf` file, Oracle starts with the root user's LIBPATH. This setting may not be appropriate for Oracle. Edit the file (or files for multiple instances) that correspond to the `EnvFile` attribute as specified in the Oracle resource definition.

For example, to set the variable, edit:

```
LIBPATH=$ORACLE_HOME/lib:${LIB_PATH} export LIB_PATH
```

Set `$ORACLE_HOME` to the home directory of Oracle in your environment.

Determining if disk arrays have array support library (ASL)

Each disk array you use for shared storage with SF Oracle RAC requires an Array Support Library.

Use the following command to list all ASLs currently available on your system:

```
# vxddladm listsupport
```

Use the following command to list arrays on your system and the ASLs they currently use:

```
# vxdmpadm listenclosure all
```

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 the `SRVCTL` command. The command will change the `AUTO_START` attribute of CRS database and instance resources. [#838841]

To prevent automatic database starting

- ◆ Depending on the status of the database:

- If the database is already registered and running, change it to manual by executing 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
```


Issues for this release

This chapter includes the following topics:

- [Known issues](#)
- [Fixed issues](#)

Known issues

The following issues are reported for this release of SF Oracle RAC.

For Oracle issues:

See [“Oracle issues”](#) on page 41.

For SF Oracle RAC issues:

See [“SF Oracle RAC issues”](#) on page 45.

For issues specific to VCS:

See the *Veritas Cluster Server Release Notes*.

For issues specific to Storage Foundation:

See the *Veritas Storage Foundation Release Notes*.

Oracle issues

Oracle issues reported for this release:

Table 4-1 Oracle issues

Incident number	Description
1201863	Asynchronous I/O message
1200367	Oracle listener error

Table 4-1 Oracle issues (*continued*)

Incident number	Description
N/A	Oracle VIP Configuration Assistant
N/A	Oracle Cluster Verification Utility Warning message
540429	Handling of RAW files with ODM enabled for Oracle 10g
N/A	Stopping CRS before stopping VCS in Oracle 10g clusters
N/A	Avoid using lltconfig -u in an Oracle 10g RAC environment
N/A	Changing the Veritas agent for Oracle error handling

Asynchronous I/O message

The "Install Oracle Clusterware (CRS)" option does not check for the "Asynchronous I/O" package when using `installsfrac -configure (ssh)`. [#1201863]

Problem: When running the `rootpre.sh` program, messages like the following will be displayed:

```
Configuring Asynchronous I/O...
Asynchronous I/O is not installed on this system.
You will need to install it, and either configure it yourself using
smit aio' or rerun the Oracle root installation procedure.
```

```
Configuring POSIX Asynchronous I/O...
Posix Asynchronous I/O is not installed on this system.
You will need to install it, and either configure it yourself using
smit aio' or rerun the Oracle root installation procedure.
1.7.2.3
```

Resolution: Ignore the errors. The error message is generated because `rootpre.sh` is enabling the POSIX AIO and Legacy AIO devices for Oracle use. In AIX 6 V6.1, AIO (Asynchronous I/O) is installed and enabled automatically and the individual AIX Asynchronous I/O devices like `aio0` and `posix_aio0` no longer exist. Therefore this is not a problem. However, users should verify that no other script failures have occurred.

For more details for the AIX 6.1 update requirement:

See Oracle Note 282036.1 from metalink

A replacement `rootpre.sh` is available for download from Oracle MetaLink. Reference Oracle bug# 6613550 or ARU# 9638501.

Oracle listener error

Oracle listener experiences a core dump on AIX 6.1 and is unable to restart, receiving "IBM/AIX RISC System/6000 Error: 29: Illegal seek" message. At the time this Release Note is published, a fix is not yet available. [#1200367]

For the latest information, see the following TechNote:

<http://entsupport.symantec.com/docs/282024>

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), "en0" 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 re commended that you retry the configuration
assistants at this time. Not successf ully 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 if the cluster is operating satisfactorily.

Handling of RAW files with ODM enabled for Oracle 10g

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

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 TechNote: <http://entsupport.symantec.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 `hastop -all` command to stop VCS.

To enable VCS to control the CRS daemons.

See 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.

For a description of the actions:

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

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

The NOFAILOVER action means that the agent sets the state of the resource to OFFLINE and freezes the service group. 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.

SF Oracle RAC issues

SF Oracle RAC issues reported for this release:

Table 4-2 SF Oracle RAC issues

Incident number	Description
1217195	GAB and LLT panics after upgrading to AIX 6.1 SP3
N/A	Deporting and importing of shared disk groups
N/A	Stopping cluster nodes configured with I/O fencing
587136	Number of links required for the PrivNIC agent
1213257	Recovering a cloned Oracle RAC database
N/A	Stopping VCS does not unregister port f from GAB membership
924680, 1110676	Limitation with RDAC driver and FAStT array for coordinator disks not for DMP disks
857159	The gcoconfig command assigns priority 0 to all nodes
853363	Setting the discovery mode to host visible devices for Symmetrix arrays

GAB and LLT panics after upgrading to AIX 6.1 SP3

GAB and LLT panics after upgrading AIX 6.1 SP3 if the required iFix is not applied. [#1217195] For the most latest information on required iFixes, see:

<http://entsupport.symantec.com/docs/300577>

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.

Stopping cluster nodes configured with I/O fencing

The I/O fencing feature protects against data corruption resulting from a failed cluster interconnect or “split brain.” For details on the problems a failed interconnect can create and the protection I/O fencing provides:

See “VCS Communications, Membership, and I/O Fencing” in the *Veritas Cluster Server User’s Guide*.

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

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. [#587136]

The attribute table on page 459 of the *Veritas Storage Foundation for Oracle RAC Installation and Configuration Guide* should be replaced with the following attribute definition table.

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 4-3 Required attributes for PrivNIC agent

Attribute	Dimension	Description
Device	string - association	<p>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.</p> <p>Example:</p> <pre>Device@galaxy = {en1=0, en2=1, en3=2} Device@nebula = {en1=0, en2=1, en3=2}</pre>
Address	string-scalar	<p>The numerical private IP address.</p> <p>For example:</p> <pre>Address = "192.168.12.1"</pre>
NetMask	string - association	<p>The numerical netmask for the private IP address.</p> <p>For example:</p> <pre>Address = "255.255.255.0"</pre>

Recovering a cloned Oracle RAC database

If you clone an Oracle RAC database using the interactive mode, then the recovery of the clone database should be performed manually, following the Oracle recovery procedure for a RAC database. [#1213257, #1215075]

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.

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
```

Limitation with RDAC driver and FASTT array for coordinator disks not for DMP disks

Symptom: `vxdisk scandisks` triggers "path failure" message as some of the inquiry `ioctl` returns failure. [#924680][#1110676]

Problem: On heavy IO load, running `vxdisk scandisks` probes all the paths connected to the system. Some inquiry `ioctl()` fails causes the DMP node to get disabled. This causes the resource to fault or IO hang.

Workaround: None

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. [#857159]

Workaround: Edit the `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. [#853363]

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:

- "VAIAGENT" 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 4-4 Fixed issues in SF Oracle RAC version 5.0 MP1 Update 1 for AIX 6.1

Incident number	Description
1049285	IPC: Not removing rqhs from doneq after in skgxpdis() can cause ORA-0600
1053546	10.2.0.3 cssd-monitor problem
1069665	IPC: IPCVERSION file gets overwritten due to parallel build for different ipc library
1096492	LMX: make lmxupdate() call sleep() indirectly thru new func lmxwaitforwork(). (Fix for stuck "lmxupdate()" threads)
1121569	vcsmm causes Oracle processes crash with errno 2 (This happened internally while running 11g tests , but the fix could be used for 10g as well)
1130849	vcsmm causes Oracle processes to crash with errno 2

Table 4-4 Fixed issues in SF Oracle RAC version 5.0 MP1 Update 1 for AIX 6.1
(continued)

Incident number	Description
1160712	IPC: Oracle encountered vcsipc send error 12, not enough space, under high interconnect traffic
1161581	IPC: TITAN 311-737-090 LMS process hangs in skgxpwait() during sync mcpy, when the other node crashes
1169001	installsfrac - support for 10.2.0.3 installation
1169887	PrivNIC shows resource online even the interface is not configured with llt and no physical connection either
1194474	Allow 10.2.0.3 GUI to be invoked

Documentation

This chapter includes the following topics:

- [Documentation](#)
- [Documentation errata](#)

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 5-1 SF Oracle RAC documentation set

Document title	File name
<i>Veritas Storage Foundation for Oracle RAC Installation and Configuration Guide</i>	sfrac_install.pdf
<i>Veritas Storage Foundation for Oracle RAC Administrator's Guide</i>	sfrac_adm.pdf
<i>Veritas Storage Foundation for Oracle RAC Release Notes</i>	sfrac_notes.pdf
Veritas Cluster Server	
<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

Table 5-1 SF Oracle RAC documentation set (*continued*)

Document title	File name
<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
Veritas Storage Foundation	
<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
<i>Veritas Volume Manager Veritas Volume Manager Administrator's Guide</i>	vxvm_admin.pdf
<i>Veritas Volume Manager Troubleshooting Guide</i>	vxvm_tshoot.pdf
<i>Veritas File System Administrator's Guide</i>	vxfs_admin.pdf
Authentication Service Release Notes	Placeholder
Authentication Service Administrator's Guide	Placeholder
Placeholder	Placeholder
Placeholder	Placeholder

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. [#794321]

On page 113, replace this procedure:

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:

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

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

```
# vxdg -g vxfencoorddg adddisk c2t1d0
```

```
# vxdg -g vxfencoorddg adddisk c3t1d0
```

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

with this procedure:

To create the coordinator disk group

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

```
# vxdg init vxfencoorddg rhdisk75
```

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

```
# vxdg -g vxfencoorddg adddisk rhdisk76
```

```
# vxdg -g vxfencoorddg adddisk rhdisk77
```

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

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

```
# vxdg -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 99.

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.

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

The *Storage Foundation for Oracle RAC 5.0 Installation and Configuration Guide* contains incomplete information for adding a new node. 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 258.

To run the uninstall utility

- 1 Offline all Oracle parallel groups:

```
# hagrpl -offline oracle_group -sys nebula
```

- 2 Offline CRS:

- If CRS is under VCS control:

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

- If CRS is not under VCS control:

```
# /etc/init.crs stop
```

The “Adding and removing SF Oracle RAC on systems with Oracle 10g” chapter requires the following changes [#614479]:

- Add the `installsfrac -precheck` step.

On page 251, add the following step at the beginning of the procedure:

To check for installation readiness:

- Change directory to the folder containing the SF Oracle RAC licensing fileset.

```
# cd /cdrom/sfrac
```

- Run the `installsfrac` utility with the `-precheck` option. This command verifies that the current operating system, patch level, license, and disk space will support installation.

```
# ./installsfrac -precheck saturn
```

- The utility's precheck function proceeds noninteractively. When complete, the utility displays the results and saves them in a log file.
If the check is successful, proceed with the installation.
If the precheck function indicates licensing is required, you may proceed and add the license when running the installation utility.
If the check is unsuccessful, the precheck function indicates required actions.

- Change `vxfen`, `vcsmm`, and `lmx` paths for AIX.

On page 253, Step 9, replace the following commands:

```
# rm /etc/vxfenmode
# /etc/init.d/vxfen start
# /etc/init.d/vcsmm start
# /etc/init.d/lmx start
```

With:

```
with:
# rm /etc/vxfenmode
# /etc/init.d/vxfen.rc start
# /etc/init.d/vcsmm.rc start
# /etc/init.d/lmx.rc start
```

- Add RSH and RCP check for AIX.

On page 254, add the following step:

Check that the `rsh` or `rcp` command works for Oracle. For example, log in as user Oracle to the node *saturn* and test the command to *nebula*:

```
$ rsh nebula ls
file_a
file_b
$
```

Make sure that `rsh` and `rcp` work between all nodes.

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. [#609566]

On page 276, 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.

Using single-host and two-host terminology

The *Storage Foundation for Oracle RAC 5.0 Installation and Configuration Guide* includes references to “single-host” and “two-host” configurations in the `dbed_vmclonedb` sections that 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. [#840198]

For SF Oracle RAC configurations, change these references:

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

Finding FlashSnap status information

For Database FlashSnap status information, see Veritas Storage Foundation for Oracle Administrator’s Guide. [#855452] The 5.0 documentation disc contains the `sf_ora_admin.pdf`.

Miscellaneous errata

The *Storage Foundation for Oracle RAC 5.0 Installation and Configuration Guide* contained additional incorrect items [#622495]:

- In the chapter “Preparing to Install Oracle 10g RAC,” on page 208, correct the `ifconfig` commands. Replace:

```
# ifconfig en0:1 plumb
# ifconfig en0:1 inet 10.11.12.60 netmask 255.255.255.0
# ifconfig en0:1 up
```


With:

```
# ifconfig en0 inet 10.11.12.60 netmask 255.255.255.0  
broadcast 10.11.95.255 alias  
# ifconfig en0 up
```

- In the chapter “Configuring Oracle9i service groups,” on page 149, correct Figure 7.1. Replace “listener_eth_0” with “listener_en_0.”
- In the chapter “Upgrading and migrating Oracle software,” on page 230, correct the init.crs path. Replace:

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

With:

```
# /etc/init.crs stop
```

- In the chapter “Uninstalling SF Oracle RAC from Oracle 10g systems,” on page 266, correct the init.crs path. Replace:

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

With:

```
# /etc/init.crs stop
```

