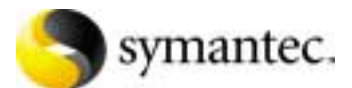


Veritas Storage Foundation[™] for Oracle RAC Release Notes

HP-UX 11i v3

5.0



Veritas Storage Foundation for Oracle RAC Release Notes

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Storage Foundation for Oracle RAC

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

Technical support

For technical assistance, visit

http://www.symantec.com/business/support/assistance_care.jsp

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.

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Introduction

This document provides important information regarding Veritas Storage Foundation™ for Oracle RAC (SF Oracle RAC) for HP-UX 11i v3. 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/293075>

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

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

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

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

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.

Item	Description
Network links	Two or more private links and one public link. Links must be 100BaseT or Gigabit Ethernet directly linking each node to the other node to form a private network that handles direct inter-system communication. Symantec recommends switches for the private network links. These links must be of the same type; you cannot mix 100BaseT and Gigabit.
DVD drive	One drive that is accessible to all nodes in the cluster.
Fibre channel or SCSI host bus adapters	SF Oracle RAC requires at least one built-in SCSI adapter per system to access the operating system disks, and at least one additional SCSI or Fibre Channel Host Bus Adapter per system for shared data disks.
Disks	Typical SF Oracle RAC configurations require that shared disks support applications that migrate between systems in the cluster. The SF Oracle RAC I/O fencing feature requires that all disks used as data disks or as coordinator disks must support SCSI-3 Persistent Reservations (PR). Note: On HP-UX 11i v3, you must use DMP devices for I/O fencing.
Disk space	SF Oracle RAC space needed for required depots: <ul style="list-style-type: none">■ Total: 3.1 GB■ /opt: 1.5 GB■ /usr: 225 MB■ /var: 32 MB■ /var/tmp: 600 MB■ /tmp: 612 MB■ / 230 MB
Swap space	Two times the main memory.

Supported hardware

Review the current compatibility list to confirm compatibility of your hardware:
<http://entsupport.symantec.com/docs/283161>

Supported software

HP-UX operating system

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

- HP-UX 11i Version 3

For Veritas Enterprise Administrator (VEA) functionality to work reliably on Itanium platform, you must have HP-UX patch PHSS_36311 installed prior to installing SF Oracle RAC. Check the *Veritas Storage Foundation Release Notes* for any additional information before you install and configure VEA.

HP-UX 11i v3 operating environments

HP-UX 11i v3 11i Operating Environments (OEs) are bundles of key applications available to users to help them install a complete operating system in a single-pass process. Symantec supports SF Oracle RAC for HP-UX 11i v3 on the following OEs:

HPUX11i-OE	HP-UX 11i v3 Foundation OE
HPUX11i-OE-Ent	HP-UX 11i v3 Enterprise OE
HPUX11i-OE-MC	HP-UX 11i v3 Mission Critical OE

To identify the OE currently installed on your system

- ◆ Run the `swlist` command:

```
# swlist | grep HPUX
```

Output resembles:

```
HPUX11i-OE-MC          B.11.31          HP-UX Mission
                      Critical Operating Environment Component
HPUXBaseAux           B.11.31          HP-UX Base OS
                      Auxiliary
HPUXBaseOS            B.11.31          HP-UX Base OS
OnlineDiag            B.11.31          HPUX 11.31
                      Support Tools Bundle, Feb 2007
```

The output of this command includes a line that identifies the installed OE. For example:

```
HPUX11i-OE-MC          B.11.31          HP-UX Mission
                      Critical Operating Environment Component
```


Veritas software

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

Oracle software

SF Oracle RAC supports the following Oracle software:

- Oracle 10g Release 2

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

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

No longer supported

Symantec no longer suggests use of cross-over cables with two-node SF Oracle RAC clusters.

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

Volume Manager in a shared disk environment (CVM)

Volume Manager cluster functionality does not support software RAID 5.

Space-optimized volume snapshots

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

Volume location for ocrvol and votevol

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.
- 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. [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 Database FlashSnap feature does not support RAID-5 volumes.
- The Storage Checkpoint and Database FlashSnap features of SF Oracle RAC do not support the GUI of the Veritas Storage Foundation for Oracle product.
- SF Oracle RAC does not support the Veritas FlashSnap agent for Symmetrix (EMC TimeFinder) mapping functionality (package: `VRTSfas`).

LLT low priority heartbeat links not recommended

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

Installation notes

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

Storage Foundation for Oracle RAC packages

Storage Foundation for Oracle RAC is a licensed product. The *Veritas Storage Foundation for Oracle RAC Installation and Configuration Guide* describes how to obtain a license that applies for Veritas Storage Foundation for Oracle RAC, Veritas Volume Manager, Veritas File System, and Veritas Cluster Server.

Software installed for Storage Foundation for Oracle RAC

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

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

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. See the *Veritas Storage Foundation for Oracle RAC Installation and Configuration Guide* for details on configuring I/O fencing in a cluster environment.

SF Oracle RAC 5.0 installer fails to invoke CRS/Oracle runInstaller on HP-UX 11i v3

The Oracle 10g or earlier versions of Oracle Universal Installer does not understand HP-UX 11i v3 as a supported operating system and will exit with an error if the environment variable OUI_ARGS is not set to -ignoreSysPrereqs before running the installsfrac -configure script.

- ◆ To set the environment variable OUI_ARGS:
 - Example for bash:

```
# export OUI_ARGS="-ignoreSysPrereqs"
```
 - Example for C Shell:

```
# setenv OUI_ARGS "-ignoreSysPrereqs"
```

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

Preventing automatic database startup for Oracle 10g Release 2

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.

To prevent automatic database starting

- ◆ Depending on the status of the database:
 - If the database is already registered and running, execute the following commands as Oracle user to change it to MANUAL:

```
$ 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 the database:

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

Known issues

The following issues were reported for this release:

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.

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

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

Bringing CVMVoIDg resource online after stopping VCS with -force

If you stop VCS with the `-force` option, CVMVoIDg resources in service groups other than the `CVM` service group do not start when you restart VCS. You must manually bring the CVMVoIDg resource online:

```
# hares -online cvmvoldg_resource -sys node_name
```

In service groups other than the `CVM` service group, volume resources for the CVMVoIDg resource remain running after you issue the `hastop -force` command. This situation occurs even though you must bring the CVMVoIDg resource online.

Deporting and importing of shared disk groups

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

The vxfcntlshdw command requires "+ +" in /.rhosts file

If you use `remsh` for communication between the nodes including the one on which you run the command, then the `vxfcntlshdw` requires that the `/.rhosts` file must contain a "+ +" character in the first line.

Removal of SF Oracle RAC configuration files

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

- `/etc/llttab`

- /etc/llthosts
- /etc/gabtab
- /etc/vcsmmtab
- /etc/vxfendg
- /etc/VRTSvcs/conf/config/main.cf
- /etc/vxfenmode
- /etc/vxfentab

Stopping cluster nodes configured with I/O fencing

The I/O fencing feature protects against data corruption resulting from a failed cluster interconnect or “split brain.” See “VCS Communications, Membership, and I/O Fencing” in the *VCS User's Guide* for details on the problems a failed interconnect can create and the protection I/O fencing provides.

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

Using the `reboot` command rather than the `shutdown` command bypasses shutdown scripts and can leave keys on the coordinator disks and data disks. Depending on the order of reboot and subsequent startup events, the cluster might warn of a possible split brain condition and fail to start up.

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

Accessing version 7 file system when removing VxFS

A disk layout version 7 file system created with VxFS 5.0 software is not accessible if you remove the VxFS 5.0 software and revert the system to VxFS 4.1. In addition, if a disk layout version 7 file system exists on a boot disk and you remove the VxFS 5.0 software, the host does not reboot successfully and remains at the `bcheckrc` prompt. To reboot the host successfully, first edit the `fstab` file and comment out entries for disk layout Version 7 file system.

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 Cluster Server 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 the agent sets the resource state to OFFLINE and freezes the service group.

You can stop the agent, edit `oraerror.dat`, and change the NOFAILOVER action to another action that is appropriate for your environment. The changes go into effect when you restart the agent.

Stopping 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 10gCluster 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 may not unregister port f from GAB membership.

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

- 1 Kill all the Oracle processes.

```
# kill -9 `ps -u oracle|awk '{print $1}'`
```
- 2 Unregister port f from GAB membership.

```
# fsclustadm cfsdeinit
```

CVM disks get stuck in an error state

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

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

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

```
# /opt/VRTSvcs/bin/hastop -all
```
- 2 Run the following commands on each cluster node to clear the error state of the disks.

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


- 3 Create a file that has all the VxVM disk names with the complete path. For example, `/dev/rdisk/c4t1d2`.
- 4 Check for SCSI keys on the VxVM devices.

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

 where *disk_filename* is a file that contains all of the fully qualified path to each disk.
- 5 Register with the disks in the *disk_filename*.

```
# vxfenadm -m -k <key> -f disk_filename
```
- 6 Remove the SCSI keys on the VxVM devices:

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

 where *victim_node_key* is the SCSI key listed while running the command in [step 4](#).
 Repeat the step till all the SCSI keys are cleared.
- 7 Remove the key registered in [step 5](#).

```
# vxfenadm -x -k <key> -f disk_filename
```
- 8 Run the following command on each of the cluster nodes to start VCS.

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

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), "lan0" is not public. Public interfaces should be used to configure virtual IPs.

Workaround: Invoke the vipca utility manually.

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

Oracle Cluster Verification Utility Warning message

During the final stage of Oracle 10g Release 2 installation, you may receive a warning message with the Oracle Cluster Verification Utility. For example:

```
Utility
=====
OUI-25031:Some of the configuration assistants failed. It is
strongly 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.

The gcoconfig command assigns priority 0 to all nodes

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

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

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

- Veritas Cluster Server GUI
- VCS commands
- Stop VCS and manually edit the `main.cf` file.

Note that this approach has HA downtime.

Failure to uninstall GAB during upgrade from SFRAC 4.1 to 5.0 on HP-UX 11i v3

The following errors may be reported in `/var/adm/sw/swagent.log` during upgrade of SFRAC 4.1 to 5.0 on HP-UX 11i v3. However, this failure will not affect the upgrade to SFRAC 5.0.

```
-----
* Beginning Analysis Phase.
* Target:          slpam13:/
* Target logfile:  slpam13:/var/adm/sw/swagent.log
* Reading source for file information.
ERROR: Cannot unconfigure gab.
gab may be in use.
Stop/kill all clients of gab
corresponding to following ports.

GAB /sbin/gabconfig ERROR V-15-2-25010 /sbin/gabconfig: open failed
: No such device

ERROR: The "checkremove" script for "VRTSgab" failed
(exit code "1").
The script location was
"/var/adm/sw/products/VRTSgab/pfiles/checkremove".
* This script had errors and the execution of this product
cannot proceed until the problem is fixed. Check the above
output from the script for further details.
```

NOTE: All filesets in the product "VRTSgab,l=/opt/VRTSgab,r=4.1" will be excluded because there was an error in this product.

```

* Summary of Analysis Phase:
ERROR:      Exclude      VRTSgab.VRTSGAB-KRN,l=/opt/VRTSgab,r=4.1
ERROR:      Exclude      VRTSgab.VRTSGAB-ENG-MAN,l=/opt/
                VRTSgab,r=4.1
ERROR:      Exclude      VRTSgab.GABRUNTIME,l=/opt/
                VRTSgab,r=4.1
ERROR:      3 of 3 filesets had Errors.
ERROR:      The Analysis Phase had errors.  See the above output for
                details.

```

Failure to uninstall LLT during upgrade from SFRAC 4.1 to 5.0 on HP-UX 11i v3

The following errors may be reported in /var/adm/sw/swagent.log during upgrade of SFRAC 4.1 to 5.0 on HP-UX 11i v3. However, this failure will not affect the upgrade to SFRAC 5.0.

```

-----
* Beginning the Unconfigure Execution Phase.
* Filesets:          3
* Files:             29
* Kbytes:            1694

* Beginning the Remove Execution Phase.
LLT lltconfig ERROR V-14-2-15000 open /dev/llt failed: No such
device
WARNING:  The installed kernel modules include multiple versions
of the module 'llt'.  Version 1.0.[42A943B2] will be
ignored.
WARNING:  The installed kernel modules include multiple versions
of the module 'gab'.  Version 1.0.[42A94400] will be
ignored.
* The requested changes have been applied to the
currently running configuration.
NOTE:    No change to the module 'llt' was needed.
NOTE:    No change to the module 'llt' was needed.
Module  State Cause Notes
llt     unused auto-loadable, unloadable
* Removing fileset "VRTSllt.VRTSLLT-RUN,l=
/opt/VRTSllt,r=4.1" (1of 3).
* Removing fileset "VRTSllt.VRTSLLT-KRN,l=
/opt/VRTSllt,r=4.1" (2of 3).
* Removing fileset
"VRTSllt.VRTSLLT-ENG-MAN,l=/opt/VRTSllt,r=4.1" (3 of 3).
WARNING:  The installed kernel modules include multiple versions
of the module 'gab'.  Version 1.0.[42A94400] will be
ignored.

```

```

* The requested changes have been applied to the currently
  running configuration.
ERROR: There is no module named 'llt'.
ERROR: `` kcmodule llt=unused'' failed
ERROR: The "postremove" script for "VRTSllt"
       failed (exit code "1").
       The script location was
       "/var/adm/sw/products/VRTSllt/pfiles/postremove".
* This script had errors but the execution of this product
  will still proceed. Check the above output from
  the script for further details.
-----
```

Fixed issues

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

Table 1-1 Fixed issues in SFRAC 5.0

Incident number	Description
1064498	PrivNIC does not failover the IP, if the link on which IP was configured is no more LLT link
1050119	In Oracle Version 10.2.0.3, on IA platform, linkrac fails to link oracle with VCSMM library.
1049285	Not removing requests from doneq in skgxpdis() can cause panic.
1044590	Oracle crash on one node leads to Oracle crash on another
1041104	In Oracle Version 10.2.0.3, cssd agent fails to recognize that CSSD is up and running in the cluster
963938	vcsmm panics during configure
900945	sample main.cf file for multiple Oracle 10g databases instances
850514	Oracle return error "Operation failed with status: 56" in alert log file
808472	cssd agent does not show correct status for Oracle 10gR1
790019	Disable the LMX helper thread by default
768962	Primary Processes should clean up VCSMM data structures before dying
644286	IPC errors while running OCE Oracle 10gR2
635646	Linkrac fails when executed after Oracle patch set is applied
626451	installfrac does not bring up GCO configuration
596047	vcsmmconfig -c hangs if the max slave parameter value differs from running cluster
595651	vcsmmdebug -s results in segmentation fault
595453	IPC errors while running OCE Oracle 10gR2 on HP-UX PA
587999	lmx unload may panic the machine after heavy lmx buffer transfers
579175	Oracle instance hangs during peak load

Fixed Issues

Incident number	Description
568762	IPC throws "NCON" messages in Oracle alert logs
564824	IPC throws error "Operation already in progress" in Oracle Alert Log
538897	vcsmm panics when process registers as slave with two primaries
535866	Port 'o' does not join after the reboot since module fails to load
534950	Fencing shuts down the larger cluster after a splitbrain
525049	vcsmm may panic the machine due to bug in its kernel logging
520819	vcsmm can miss a wakeup and this may result in oracle hang
509099	vcsmm unconfiguration fails with "Device busy" error
506182	Add support for CRS online/offline through VCS

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.

Storage Foundation for Oracle RAC Documentation Set

Document Title	File Name
Veritas Storage Foundation for Oracle RAC	
<i>Veritas Storage Foundation for Oracle RAC Installation and Configuration Guide</i>	<code>sfrac_install.pdf</code>
<i>Veritas Storage Foundation for Oracle RAC Release Notes</i>	<code>sfrac_notes.pdf</code>
Veritas Cluster Server	
<i>Veritas Cluster Server Installation Guide</i>	<code>vcs_install.pdf</code>
<i>Veritas Cluster Server Release Notes</i>	<code>vcs_notes.pdf</code>
<i>Veritas Cluster Server User's Guide</i>	<code>vcs_users.pdf</code>
<i>Veritas Cluster Server Bundled Agents Reference Guide</i>	<code>vcs_bundled_agents.pdf</code>
<i>Veritas Cluster Server Agent Developer's Guide</i>	<code>vcs_agent_dev.pdf</code>
<i>Veritas Cluster Server Agent for Oracle Installation and Configuration Guide</i>	<code>vcs_oracle_install.pdf</code>
Veritas Storage Foundation	
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<i>Veritas Storage Foundation Installation Guide</i>	<code>sf_install.pdf</code>
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TAO

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Digital Encryption Standard (DES) - MIT

MIT and Dennis Ferguson

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JavaTip87: Automate the Hourglass Cursor

Kyle Davis

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IO-Tty-1.02
libnet-1.19
List-Compare-0.31
Log dispatch perl module
Logfile rotate perl module
Module-Build-0.2611
MIME-Base64-3.07
HTML-Tagset-3.10
HTML-Parser-3.50
Net-DNS-0.49
Net-DNS-SEC-0.12
Net-Netmask-1.9011
Net-Telnet-3.03
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Sockets++ library

University of Texas

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