Veritas Storage Foundation™ and High Availability Solutions Read This First

Linux

4.1 Maintenance Pack 4 Rolling Patch 5

✴ symantec™

Veritas Storage Foundation and High Availability Solutions Read This First

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Technical support

For technical assistance, visit http://www.symantec.com/enterprise/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.

Contents

Veritas Storage Foundation and High Availability Solutions Read This First

This document provides release information about the products in the Veritas Storage Foundation and High Availability 4.1 Maintenance Pack (MP) 4 Rolling Patch (RP) 5 release.

For the latest information on updates, patches, and known issues regarding this release, see the following TechNote on the Symantec Technical Support website:

http://entsupport.symantec.com/docs/277033

Review this entire document before installing and upgrading your Veritas Storage Foundation and High Availability product.

For further details, depending on the product for which you want to install this Rolling Patch, refer to one of the following Release Notes documents:

■ *Veritas Cluster Server 4.1 Release Notes*

■ *Veritas Storage Foundation 4.1 Release Notes*

■ *Veritas Storage Foundation Cluster File System 4.1 Release Notes*

System requirements

This section describes the system requirements for this release.

Supported operating systems

The 4.1 MP4 RP5 release operates on the following architectures and operating systems:

■ SuSE Linux Enterprise Server 10 (SLES 10) with Service Pack 3 (2.6.16.60-0.54.5 kernel) on an AMD Opteron or Intel Xeon EM64T (x86_64).

Storage Foundation High Availability fixed issues

The following sections describe the Veritas Storage Foundation High Availability (HA) issues that were fixed in this release.

■ Veritas Volume Manager fixed issues

■ Veritas File System fixed issues

■ Veritas Cluster Server fixed issues

Veritas Volume Manager fixed issues

Table 1-1 describes fixed issues in the Veritas Volume Manager 4.1 MP4 RP5 release.

Table 1-1   Veritas Volume Manager 4.1 MP4 RP5 fixed issues

Incident	Description
1850368	SLES 10 DS4xxx (A/PF) disable one hostside HBA port caused volume failure and file system disable.
1729558	Fixed an issue in which multiple `vxplex attach` commands running in parallel on a volume led to clearing the DCO map and subsequentlyled to corruption in FMR2.
1848722	VOL_NOTE_MSG definition needs to be revisited.
1011402	Other than singleactive, rest of the I/O policies allows I/Os even when the cpp of dmpnode is NULL in case of nonA/A array.
1792795	supportability feature/messages for plex state change, DCO map clearance, usage of fast re-sync by vxplex.
1528160	An ioctl interrupted with EINTR causes frequent vxconfigd exit()'s on 4.1MP4RP3 on rhel5.

Veritas File System fixed issues

Table 1-2 describes fixed issues in the Veritas File System 4.1 MP4 RP5 release.

Table 1-2   Veritas File System 4.1 MP4 RP5 fixed issues

Incident	Description
1074103	Fixed an issue in which attempts to mount file system resulted in a message that the file system was already mounted, despite there being no entry in the `mtab` file for this file system.
1706540	Added the `vx_maxlink` tunable.
1748566	VxFS now throttles clone removals.
1836236	Fixed the cause of a time out that occurred if the file system was full.
1849402	`vxfsstat` metrics now show how many UNHASHED entries are in use.

Veritas Cluster Server fixed issues

Table 1-3 describes fixed issues in the Veritas Cluster Server 4.1 MP4 RP5 release.

Table 1-3   Veritas Cluster Server 4.1 MP4 RP5 fixed issues

Incidents	Description
1400037	The vxfen kernel debug log no longer gets filled up with status checking.
1424931	Improved the sending of the GAB_CONNECTS message.
1451716	`hasys -display xxxx` no longer causes a SIGSEGV error for a remote system.
1469789	There is now a cap on the maximum number of FDs to close before calling exec().
1482557	NIC agent now does a broadcast ping even if network hosts are non-pingable.
1705394	The clean of the IP resource no longer takes offline the underlying NIC resource.
1836519	The High Availability Daemon no longer segfaults while handling notifier messages.
1836573	SMTP notification email now contains the entity name in subject line.
1836631	hashadow no longer dumps core while restarting the High Availability Daemon.

Table 1-3   Veritas Cluster Server 4.1 MP4 RP5 fixed issues

Incidents	Description
1845078	The `gabconfig -c` command can no longer be run while port a is in the middle of iofence processing.
1880586	Added an aditional check in `gab_send_port_que`() for the queue size before looping.
1882528	Kernel client was enhanced to have multiple threads per port.
1890902	In KGTX, added gab_msg_hdr_t to the size passed to GAB_API_ALLOCMSG.

Veritas Storage Foundation and High Availability known issues

The following sections describe the Veritas Storage Foundation High Availability (HA) known issues in this release.

■ Veritas Volume Manager known issues

■ Veritas File System known issues

■ Veritas Storage Foundation Cluster File System known issues

■ Veritas Cluster Server known issues

Veritas Volume Manager known issues

The following are the Veritas Volume Manager issues that are known in this release.

Error messages during upgrade to VRTSvxvm

When you upgrade the VRTSvxvm package, if all the applications or processes that are accessing volumes or daemons are not cleanly shutdown, then you may see the following messages:

```
FATAL: Module vxspec is in use.
FATAL: Module vxio is in use.
FATAL: Module vxdmp is in use.
```

Workaround

After the upgrade, restart the system.

Cluster Volume Manager fails to start on a host with PowerPath running along with VxVM DMP (1444190)

When a host that has Powerpath running along with VxVM DMP is restarted, Cluster Volume Manager (CVM) may fail to start. This occurs due to a race condition during simultaneous execution of the Hardware Abstraction Layer (HAL) daemon and the Volume Manager configuration daemon (vxconfigd) on devices controlled by the EMC PowerPath driver.

Workaround

You need to disable the HAL daemon before you start CVM.

Run the following command to disable the HAL daemon:

```
# chkconfig --del haldaemon
```

After the HAL daemon is disabled, start CVM.

Support for MSA1500, EVA 8000, and DS6000K arrays

If you are using MSA1500, EVA 8000, or DS6000K arrays, read this TechNote before installing or upgrading to 4.1 MP4 RP5:

http://entsupport.symantec.com/docs/277033

Volume Manager cannot successfully claim PowerPath devices on SLES 10 SP3 and sometimes the system fails to boot (2026673)

Veritas Volume Manager (VxVM) is supposed to claim the TPD devices managed by PowerPath correctly, and this is ensured by the right start-up order of the VxVM and PowerPath startup scripts. However, the existing startup scripts do not ensure that PowerPath finishes claiming the devices prior to starting VxVM, which sometimes leads to VxVM not successfully claiming PowerPath devices.

Workaround

Add a PowerPath dependency for the VxVM startup script and re-order the PowerPath and VxVM startup sequence.

To add a PowerPath dependency for the VxVM startup script and re-order the PowerPath and VxVM startup sequence

1 Modify the `/etc/init.d/boot.vxvm` file and add the "boot.powerpath" service as `X-UnitedLinux-Should-Start` in the INIT INFO section:

```
# INIT INFO
# X-UnitedLinux-Should-Start: boot.ibmsis boot.scsidev
boot.powerpath
```

2 Run the `insserv` command to regenerate the startup aliases:

```
# insserv /etc/init.d/boot.vxvm
```

3 Reboot the system to make the change take effect:

```
# shutdown -r now
```

Veritas File System known issues

The following are the Veritas File System issues that are known in this release.

Performance degradation when Veritas NetBackup is used to backup VxFS snapshot file systems (1384247)

While using Veritas NetBackup to take a backup from a VxFS snapshot file system, some performance degradation has been observed.

Workaround

A hotfix will be made available for this issue. For availability, check the Late Breaking News TechNotes at the following location:

http://entsupport.symantec.com/docs/277033

File system shrink fails even when free space is available (1439489)

A file system shrink operation may fail even when free space is available in the file system. The shrink operation does not relocate extents associated with some metadata files like transaction log or inode list. If extents associated with such files are present beyond the requested file system size, then the shrink operation fails.

Workaround

There is no workaround for this issue.

Kernel panic on SLES 10 Service Pack 3 on x86_64 systems (2036319)

In rare cases, a kernel panic occurs on SLES 10 Service Pack 3 on x86_64 systems that have a high load of process creation and termination.

Workaround

There is no workaround for this issue.

Veritas Storage Foundation Cluster File System known issues

The following are the Veritas Storage Foundation Cluster File System (SFCFS) issues that are known in this release.

Installer script does not support SFCFS on the SLES 10 32-bit operating system (2046554)

You cannot install nor configure SFCFS on the SLES 10 32-bit operating system by using the installer script.

Workaround

You must install and configure SFCFS manually on the SLES 10 32-bit operating system.

Veritas Cluster Server known issues

The following are the Veritas Cluster Server issues that are known in this release.

Cluster Manager (Java Console) may display an error while loading templates (1433844)

You can access the Template View in the Cluster Manager from the **Tools > Templates** menu. If you have Storage Foundation configured in a VCS cluster setup, the following error may occur while the Cluster Manager loads the templates.

```
VCS ERROR V-16-10-65 Could not load :-
/etc/VRTSvcs/Templates/DB2udbGroup.tf
```

Workaround

Ignore the error.

vxfen startup does return an error if invalid values are specified for the vxfen_mode parameter in the /etc/vxfenmode configuration file (1845688)

The `/etc/vxfenmode` file specifies different ways in which VCS I/O fencing (vxfen) can be configured. The attribute `vxfen_mode` determines in what mode vxfen should work. The available options are as follows:

- scsi3 - Use SCSI3 persistent reservation disks.

- disabled - Run the driver, but do not do any actual fencing.

However, for any value other than "`vxfen_mode=disabled`", vxfen ignores the value string and configures the driver in enabled (SCSI3) mode. Similarly, if the `vxfenmode` file is missing or does not contain the entry for the `vxfen_mode` attribute, the vxfen startup does not return an error and configures the driver in SCSI3 mode.

Workaround
There is no workaround for this issue.

NFS client thrash gets interrupted during cluster failover due to a split-brain condition (2008094)

In case of a split brain condition while high NFS I/O load exists on some nodes, there is a chance that the subcluster losing the fencing race takes a while to panic. In the interim, the winning subcluster attempts to take over the service groups from the losing subcluster. The IP resources fail to come online, as the IP address remains pingable from the losing side. The (non-cluster) applications accessing NFS see I/O errors.

Workaround
There is no workaround for this issue.

Software limitations

There are no new software limitations in this release.

The following sections describe the Veritas Storage Foundation High Availability (HA) software limitations in this release.

■ Veritas Storage Foundation Cluster File System software limitations

Veritas Storage Foundation Cluster File System software limitations

The following are the Veritas Storage Foundation Cluster File System software limitations that are known in this release.

Obtaining information about mounted file system states (1764098)

For accurate information about the state of mounted file systems on Linux, refer to the contents of /proc/mounts. The mount command may or may not reference this source of information depending on whether the regular /etc/mtab file has been replaced with a symbolic link to /proc/mounts. The change is made at the discretion of the system administrator and the benefits are discussed in the mount online manual pages. A benefit of using /proc/mounts is that changes to SFCFS mount options are accurately displayed for all nodes.

Downloading the rolling patch archive

The patches included in the 4.1 MP4 RP5 release are available for download from the Symantec website. After downloading the 4.1 MP4 RP5 file, use the `gunzip` command and `tar` command to uncompress and extract the contents of the file.

For the 4.1 MP4 RP5 download archive and instructions, see the following TechNote on the Symantec Technical Support website:

http://entsupport.symantec.com/docs/277033

Packages included in this rolling patch

This section describes the Linux packages that are included in this rolling patch.

- Veritas Cluster Server packages
- Veritas Cluster Server Agents packages
- Veritas File System packages
- Veritas Storage Foundation packages
- Veritas Storage Foundation Cluster File System packages
- Veritas Volume Manager packages

Veritas Cluster Server packages

This sections describes the Veritas Cluster Server (VCS) Linux packages.

SUSE Linux Enterprise Server 10

Table 1-4 describes the SUSE Linux Enterprise Server 10 (SLES10) Veritas Cluster Server (VCS) packages that are included in this rolling patch:

Table 1-4   Veritas Cluster Server 4.1 MP4 RP5 SLES10 packages

Package	Description	Size
VRTSllt-4.1.40.50-MP4RP5_SLES10.i586.rpm	VERITAS Low Latency Transport	10.4 MB
VRTSllt-4.1.40.50-MP4RP5_SLES10.x86_64.rpm	VERITAS Low Latency Transport	6.3 MB
VRTSgab-4.1.40.50-MP4RP5_SLES10.i586.rpm	VERITAS Group Membership and Atomic Broadcast	4.4 MB
VRTSgab-4.1.40.50-MP4RP5_SLES10.x86_64.rpm	VERITAS Group Membership and Atomic Broadcast	2.6 MB
VRTSvxfen-4.1.40.50-MP4RP5_SLES10.i586.rpm	VERITAS I/O Fencing	3.8 MB
VRTSvxfen-4.1.40.50-MP4RP5_SLES10.x86_64.rpm	VERITAS I/O Fencing	2.4 MB
VRTSvcs-4.1.40.50-MP4RP5_SLES10.i586.rpm	VCS Engine and Commands	23 MB
VRTSvcsag-4.1.40.50-MP4RP5_SLES10.i586.rpm	VCS Bundled Agents	192k
VRTSvcsdr-4.1.40.50-MP4RP5_SLES10.i586.rpm	VCS Disk Reserver	1 MB
VRTSvcsdr-4.1.40.50-MP4RP5_SLES10.x86_64.rpm	VCS Disk Reserver	704k
VRTSjre-1.4.2.18-18.i386.rpm	Symantec JRE Redistribution	26 MB

Table 1-4   Veritas Cluster Server 4.1 MP4 RP5 SLES10 packages

Package	Description	Size
VRTScscm-4.4.40.50-MP4RP5_GENERIC.noarch.rpm	VERITAS Cluster Server Cluster Manager	3.2 MB
VRTScscw-4.1.40.50-MP4RP5_GENERIC.noarch.rpm	VERITAS Cluster Server Configuration Wizards	500k

Veritas Cluster Server Agents packages

This sections describes the Veritas Cluster Server (VCS) Agents Linux packages.

SUSE Linux Enterprise Server 10

Table 1-5 describes the SUSE Linux Enterprise Server 10 (SLES10) Veritas Cluster Server (VCS) Agents packages that are included in this rolling patch:

Table 1-5   Veritas Cluster Server Agents 4.1 MP4 RP5 SLES10 packages

Package	Description	Size
VRTSvcsdb-4.1.40.50-MP4RP5_GENERIC.noarch.rpm	Veritas High Availability Agent for DB2	14k
VRTScsocw-4.1.40.50-MP4RP5_GENERIC.noarch.rpm	Veritas Cluster Server Oracle and RAC Configuration Wizards	501k
VRTSvcsor-4.1.40.50-MP4RP5_SLES10.i586.rpm	Veritas High Availability Agent for Oracle	92k
VRTSvcssy-4.1.40.50-MP4RP5_SLES10.i586.rpm	Veritas High Availability Agent for Sybase	33k

Veritas File System packages

This sections describes the Veritas File System (VxFS) Linux packages.

SUSE Linux Enterprise Server 10

Table 1-6 describes the SUSE Linux Enterprise Server 10 (SLES10) Veritas File System (VxFS) packages that are included in this rolling patch:

Table 1-6   Veritas File System 4.1 MP4 RP5 SLES10 packages

Package	Description	Size
VRTSvxfs-common-4.1.40.50-MP4RP5_SLES10.i586.rpm	VERITAS File System	2.7 MB
VRTSvxfs-platform-4.1.40.50-MP4RP5_SLES10.i586.rpm	VERITAS File Systemi	33.7 MB
VRTSvxfs-platform-4.1.40.50-MP4RP5_SLES10.x86_64.rpm	VERITAS File Systemi	20.8 MB

Veritas Storage Foundation packages

This sections describes the Veritas Storage Foundation (SF) Linux packages.

SUSE Linux Enterprise Server 10

Table 1-7 describes the SUSE Linux Enterprise Server 10 (SLES10) Veritas Storage Foundation (SF) packages that are included in this rolling patch:

Table 1-7   Veritas Storage Foundation 4.1 MP4 RP5 SLES10 packages

Package	Description	Size
VRTScscm-4.4.40.50-MP4RP5_GENERIC.noarch.rpm	VERITAS Cluster Server Cluster Manager	3.2 MB
VRTScscw-4.1.40.50-MP4RP5_GENERIC.noarch.rpm	VERITAS Cluster Server Configuration Wizards	500k
VRTScsocw-4.1.40.50-MP4RP5_GENERIC.noarch.rpm	Veritas Cluster Server Oracle and RAC Configuration Wizards	501k
VRTSllt-4.1.40.50-MP4RP5_SLES10.i586.rpm	VERITAS Low Latency Transport	10.4 MB
VRTSllt-4.1.40.50-MP4RP5_SLES10.x86_64.rpm	VERITAS Low Latency Transport	6.3 MB
VRTSvcs-4.1.40.50-MP4RP5_SLES10.i586.rpm	VCS Engine and Commands	23 MB
VRTSvcsag-4.1.40.50-MP4RP5_SLES10.i586.rpm	VCS Bundled Agents	192k
VRTSvcsdb-4.1.40.50-MP4RP5_GENERIC.noarch.rpm	Veritas High Availability Agent for DB2	14k

Table 1-7 Veritas Storage Foundation 4.1 MP4 RP5 SLES10 packages

Package	Description	Size
VRTSvcsdr-4.1.40.50-MP4RP5_SLES10.i586.rpm	VCS Disk Reserver	1 MB
VRTSvcsdr-4.1.40.50-MP4RP5_SLES10.x86_64.rpm	VCS Disk Reserver	704k
VRTSvcsor-4.1.40.50-MP4RP5_SLES10.i586.rpm	Veritas High Availability Agent for Oracle	92k
VRTSvcssy-4.1.40.50-MP4RP5_SLES10.i586.rpm	Veritas High Availability Agent for Sybase	33k
VRTSvxfen-4.1.40.50-MP4RP5_SLES10.i586.rpm	VERITAS I/O Fencing	3.8 MB
VRTSvxfen-4.1.40.50-MP4RP5_SLES10.x86_64.rpm	VERITAS I/O Fencing	2.4 MB
VRTSvxfs-common-4.1.40.50-MP4RP5_SLES10.i586.rpm	VERITAS File System	2.7 MB
VRTSvxfs-platform-4.1.40.50-MP4RP5_SLES10.i586.rpm	VERITAS File Systemi	33.7 MB
VRTSvxfs-platform-4.1.40.50-MP4RP5_SLES10.x86_64.rpm	VERITAS File Systemi	20.8 MB
VRTSvxvm-common-4.1.40.50-MP4RP5_SLES10.i586.rpm	VERITAS Volume Manager	8.5 MB
VRTSvxvm-platform-4.1.40.50-MP4RP5_SLES10.i586.rpm	VERITAS Volume Manager	11.3 MB
VRTSvxvm-platform-4.1.40.50-MP4RP5_SLES10.x86_64.rpm	VERITAS Volume Manager	5.6 MB
VRTSjre-1.4.2.18-18.i386.rpm	Symantec JRE Redistribution	26 MB
VRTSgab-4.1.40.50-MP4RP5_SLES10.i586.rpm	VERITAS Group Membership and Atomic Broadcast	4.4 MB
VRTSgab-4.1.40.50-MP4RP5_SLES10.x86_64.rpm	VERITAS Group Membership and Atomic Broadcast	2.6 MB
VRTSlvmconv-4.1.40.50-MP4RP5_SLES10.i586.rpm	VERITAS Volume Manager, LVM configuration converter	64k

Veritas Storage Foundation Cluster File System packages

This sections describes the Veritas Storage Foundation Cluster File System (SFCFS) Linux packages.

SUSE Linux Enterprise Server 10

Table 1-8 describes the SUSE Linux Enterprise Server 10 (SLES10) Veritas Storage Foundation Cluster File System (SFCFS) packages that are included in this rolling patch:

Table 1-8   Veritas Storage Foundation Cluster File System 4.1 MP4 RP5 SLES10 packages

Package	Description	Size
VRTScscm-4.4.40.50-MP4RP5_GENERIC.noarch.rpm	VERITAS Cluster Server Cluster Manager	3.2 MB
VRTScscw-4.1.40.50-MP4RP5_GENERIC.noarch.rpm	VERITAS Cluster Server Configuration Wizards	500k
VRTSgab-4.1.40.50-MP4RP5_SLES10.i586.rpm	VERITAS Group Membership and Atomic Broadcast	4.4 MB
VRTSgab-4.1.40.50-MP4RP5_SLES10.x86_64.rpm	VERITAS Group Membership and Atomic Broadcast	2.6 MB
VRTSglm-4.1.40.50-MP4RP5_SLES10.i586.rpm	Veritas Global Lock Manager	2.4 MB
VRTSglm-4.1.40.50-MP4RP5_SLES10.x86_64.rpm	Veritas Global Lock Manager	1.4 MB
VRTSllt-4.1.40.50-MP4RP5_SLES10.i586.rpm	VERITAS Low Latency Transport	10.4 MB
VRTSllt-4.1.40.50-MP4RP5_SLES10.x86_64.rpm	VERITAS Low Latency Transport	6.3 MB
VRTSlvmconv-4.1.40.50-MP4RP5_SLES10.i586.rpm	VERITAS Volume Manager, LVM configuration converter	64k
VRTSvcs-4.1.40.50-MP4RP5_SLES10.i586.rpm	VCS Engine and Commands	23 MB
VRTSvcsag-4.1.40.50-MP4RP5_SLES10.i586.rpm	VCS Bundled Agents	192k
VRTSvcsdr-4.1.40.50-MP4RP5_SLES10.i586.rpm	VCS Disk Reserver	1 MB
VRTSvcsdr-4.1.40.50-MP4RP5_SLES10.x86_64.rpm	VCS Disk Reserver	704k
VRTSvxfen-4.1.40.50-MP4RP5_SLES10.i586.rpm	VERITAS I/O Fencing	3.8 MB
VRTSvxfen-4.1.40.50-MP4RP5_SLES10.x86_64.rpm	VERITAS I/O Fencing	2.4 MB
VRTSvxfs-common-4.1.40.50-MP4RP5_SLES10.i586.rpm	VERITAS File System	2.7 MB
VRTSvxfs-platform-4.1.40.50-MP4RP5_SLES10.i586.rpm	VERITAS File Systemi	33.7 MB

Table 1-8   Veritas Storage Foundation Cluster File System 4.1 MP4 RP5 SLES10 packages

Package	Description	Size
VRTSvxfs-platform-4.1.40.50-MP4RP5_SLES10.x86_64.rpm	VERITAS File Systemi	20.8 MB
VRTSvxvm-common-4.1.40.50-MP4RP5_SLES10.i586.rpm	VERITAS Volume Manager	8.5 MB
VRTSvxvm-platform-4.1.40.50-MP4RP5_SLES10.i586.rpm	VERITAS Volume Manager	11.3 MB
VRTSvxvm-platform-4.1.40.50-MP4RP5_SLES10.x86_64.rpm	VERITAS Volume Manager	5.6 MB

Veritas Volume Manager packages

This sections describes the Veritas Volume Manager (VxVM) Linux packages.

SUSE Linux Enterprise Server 10

Table 1-9 describes the SUSE Linux Enterprise Server 10 (SLES10) Veritas Volume Manager (VxVM) packages that are included in this rolling patch:

Table 1-9   Veritas Volume Manager 4.1 MP4 RP5 SLES10 packages

Package	Description	Size
VRTSlvmconv-4.1.40.50-MP4RP5_SLES10.i586.rpm	VERITAS Volume Manager, LVM configuration converter	64k
VRTSvxvm-common-4.1.40.50-MP4RP5_SLES10.i586.rpm	VERITAS Volume Manager	8.5 MB
VRTSvxvm-platform-4.1.40.50-MP4RP5_SLES10.i586.rpm	VERITAS Volume Manager	11.3 MB
VRTSvxvm-platform-4.1.40.50-MP4RP5_SLES10.x86_64.rpm	VERITAS Volume Manager	5.6 MB
VRTSvmdoc-4.1.40.50-MP4RP5_GENERIC.noarch.rpm	VERITAS Volume Manager documentation	9 MB
VRTSvmman-4.1.40.50-MP4RP5_GENERIC.noarch.rpm	VERITAS Volume Manager manual pages	364k

Installing the Veritas software for the first time

This section describes how to install a Veritas Storage Foundation and High Availability Solutions product for the first time on a host and install 4.1 MP4 RP5.

Review the 4.1 Maintenance Pack (MP) 3 Installation Guide and Release Notes for your product.

To install Veritas Storage Foundation and High Availability Solutions **for the first time**

1   Mount the 4.1 MP3 software media and navigate to the folder that contains the installation program. Choose one of the following to start the installation:

   ■   For Storage Foundation:

      # `./installsf -installonly [-rsh] node1 node2 ... nodeN`

   ■   For Storage Foundation Cluster File System:

      # `./installsfcfs -installonly [-rsh] node1 node2 ... nodeN`

   ■   For Veritas Cluster Server:

      # `./installvcs -installonly [-usersh] node1 node2 ... nodeN`

   The `-installonly` option is required to perform the installation without configuring the software.

2   Install Cluster Server 4.1 Maintenance Pack 4 (MP4).
    For further details, depending on the product that you want to install, refer to one of the following Release Notes documents:

   ■   Veritas Storage Foundation 4.1 Maintenance Pack 4 Release Notes

   ■   Veritas Storage Foundation Cluster File System 4.1 Maintenance Pack 4 Release Notes

   ■   Veritas Cluster Server 4.1 Maintenance Pack 4 Release Notes

3   Review the installation prerequisites for upgrading to 4.1 MP4 RP5.
    See "Prerequisites for upgrading to 4.1 MP4 RP5" on page 26.

4   Run the following command to change directory.
    # `cd /extractdir/cd1/arch/productname/rpms`
    extractdir is the directory under which you extracted the downloaded RP5 archive file.
    arch is either sles10_i586 or sles10_x86_64.
    productname is storage_foundation, storage_foundation_cluster_file_system, or cluster_server, depending on the product that you are installing.

5 Run one of the following commands to upgrade to 4.1 MP4 RP5.

- On Veritas Storage Foundation for DB2 hosts:

  Install all rpms except the `VRTSdb2ed-common` rpm.

  ```
  # rpm -Uvh VRTS[!d]*.rpm
  ```
  Install the `VRTSdb2ed-common` rpm.

  ```
  # rpm -Uvh --noscripts \
  ```
  VRTSdb2ed-common-4.1.40.50-MP4RP5_SLES10.x86_64.rpm

- On Veritas Storage Foundation, Veritas Storage Foundation Cluster File System, or Veritas Cluster Server hosts:

  ```
  # rpm -Uvh *MP4RP5*.rpm
  # rpm -Uvh VRTSjre*.rpm
  ```

  See "Packages included in this rolling patch" on page 18.

6 Configure the product using the `-configure` option.

For further details, depending on the product that you want to configure, refer to one of the following Installation Guide documents:

- Veritas Storage Foundation 4.1 MP3 Installation Guide

- Veritas Storage Foundation Cluster File System 4.1 Installation and Administration Guide

- Veritas Cluster Server 4.1 MP3 Installation Guide

7 Restart the host.

Prerequisites for upgrading to 4.1 MP4 RP5

The following list describes prerequisites for upgrading to the 4.1 MP4 RP5 release:

■ For any product in the Storage Foundation stack, you must have the 4.1 Maintence Pack (MP) 3 release or later installed before you can upgrade that product to the 4.1 MP4 RP5 release.

■ The Operating System must be upgraded to SUSE Linux Enterprise Server (SLES) 10 with Service Pack 3 before upgrading to 4.1 MP4 RP5.

■ Each system must have sufficient free space to accommodate patches.

Prerequisites for upgrading on Veritas Cluster Server

Table 1-10 describes which Cluster Server (VCS) product you must have installed on the host before you upgrade to Rolling Patch (RP) 5 for Veritas High Availability Solutions 4.1 Maintenance Pack (MP) 4:

Table 1-10   Required Veritas Cluster Server release

Operating system	VCS product
SUSE Linux Enterprise Server 10	VCS 4.1 MP3 (or later)

Prerequisites for upgrading on Veritas Storage Foundation or Veritas Storage Foundation Cluster File System

Table 1-11 describes which Veritas Storage Foundation (SF) or Veritas Storage Foundation Cluster File System (SFCFS) product you must have installed on the host before you upgrade to Rolling Patch 5 (RP5) for Veritas High Availability Solutions 4.1 Maintenance Pack (MP) 4:

Table 1-11   Required Veritas Storage Foundation or Veritas Storage Foundation Cluster File System release

Operating system	SF or SFCFS product
SUSE Linux Enterprise Server 10	SF 4.1 MP3 or SFCFS 4.1 MP3 (or later)

Upgrading 4.1 MP3 or later to 4.1 MP4 RP5

This section describes how to upgrade from the 4.1 Maintence Pack (MP) 3 release or later to the 4.1 MP4 RP5 release on a cluster or a standalone system.

■ Performing a phased upgrade to 4.1 MP4 RP5 on a cluster

Use the procedures to perform a phased upgrade to 4.1 MP4 RP5 on a cluster that has VCS or SFHA.

■ Upgrading to 4.1 MP4 RP5 on a standalone system

Use the procedure to upgrade to 4.1 MP4 RP5 on a system that has Storage Foundation installed.

Performing a phased upgrade to 4.1 MP4 RP5 on a cluster

Performing a phased upgrade on a cluster requires stopping cluster failover functionality during the entire procedure. However, if you use SFCFS and Cluster Volume Manager (CVM), the SFCFS and CVM services remain available.

The following are the stages of performing a phased upgrade on a cluster:

■ Select a group of one or more cluster nodes to upgrade (group A), and leave a group of one or more nodes running (group B).

■ Move all of the service groups from the group A to group B.

■ For the nodes in group A, start the upgrade.

■ Get the nodes in group B ready.

■ Activate the nodes in group A, then bring the service groups online.

■ Upgrade the nodes in group B.

Depending on your cluster's configuration, select one of the following procedures to upgrade to 4.1 MP4 RP5:

■ Performing a phased upgrade to 4.1 MP4 RP5 for Veritas Cluster Server

■ Performing a phased upgrade to 4.1 MP4 RP5 on a Storage Foundation Cluster File System cluster

■ Upgrading to 4.1 MP4 RP5 on a standalone system

Performing a phased upgrade to 4.1 MP4 RP5 for Veritas Cluster Server

The following procedure describes performing a phased upgrade for Veritas Cluster Server (VCS).

To perform a phased upgrade to 4.1 MP4 RP5 on a VCS cluster

1 Log in as superuser.

2 Verify that `/opt/VRTS/bin` is in your PATH so you can execute all product commands.

3 Switch the service group to a node that is running.
   # **hagrp -switch service_group -to nodename**

4 Make the VCS configuration writable. On a node that you want to upgrade, type:
   # **haconf -makerw**

5 Freeze the HA service group operations. Enter the following command on each node if you selected a group of nodes to upgrade:
   # **hasys -freeze -persistent nodename**

6 Make the VCS configuration read-only:
   # **haconf -dump -makero**

7 Select the group of nodes that are to be upgraded first, and follow step 9 through step 21 for these nodes.

8 Close any instance of VCS GUI that is running on the node.

9 Stop VCS. Enter the following command on each node in the group that is upgraded:
   # **hastop -local**

10 Stop the VCS command server:
   # **killall CmdServer**

11 Stop cluster fencing, GAB, and LLT.
   # **/etc/init.d/vxfen stop**
   # **/etc/init.d/gab stop**
   # **/etc/init.d/llt stop**

12 If required, you can upgrade the nodes at this stage, and patch the nodes to a supported kernel version.
   See "System requirements" on page 8.

13 Repeat step 9 through step 11, if the system reboots after upgrading the operating system. You need to perform this to stop the components started, if any, by the init scripts.

14 Run the following command to change directory.

    # **cd /*extractdir*/cd1/*arch*/cluster_server/rpms**

    extractdir is the directory under which you extracted the downloaded RP5 archive file.

    arch is either sles10_i586 or sles10_x86_64.

15 On each node, run the following command to upgrade to 4.1 MP4 RP5.

    # **rpm -Uvh *MP4RP5*.rpm**
    # **rpm -Uvh VRTSjre*.rpm**

    See "System requirements" on page 8.

    See "Veritas Cluster Server packages" on page 18.

16 Shut down and reboot each of the upgraded nodes. After the nodes come up, application failover capability is available for that group.

17 Run the following commands to start VCS:

    # **/etc/init.d/llt start**
    # **/etc/init.d/gab start**
    # **/etc/init.d/vxfen start**
    # **/etc/init.d/vcs start**

18 Make the VCS configuration writable again from any node in the upgraded group:

    # **haconf -makerw**

19 Unfreeze the service group operations. Perform this task on each node if you had upgraded a group of nodes:

    # **hasys -unfreeze -persistent *nodename***

20 Make the VCS configuration read-only:

    # **haconf -dump -makero**

21 Switch the service group to the original node:

    # **hagrp -switch *service_group* -to *nodename***

22 Repeat step 9 through step 21 for the second group of nodes.

Performing a phased upgrade to 4.1 MP4 RP5 on a Storage Foundation Cluster File System cluster

The following procedure describes performing a phased upgrade on a Veritas Storage Foundation Cluster File System (SFCFS) cluster.

To perform a phased upgrade to 4.1 MP4 RP5 on an SFCFS cluster

1　Log in as superuser.

2　Verify that /opt/VRTS/bin is in your PATH so you can execute all product commands.

3　Switch the service group to a node that is running.

   # **hagrp -switch *service_group* -to *nodename***

4　From any node in the cluster, make the VCS configuration writable:

   # **haconf -makerw**

5　Enter the following command to freeze HA service group operations on each node:

   # **hasys -freeze -persistent *nodename***

6　Make the configuration read-only:

   # **haconf -dump -makero**

7　Select the group of nodes that are to be upgraded first, and follow step 8 through step 35 for these nodes.

8　Stop VCS by entering the following command on each node in the group being upgraded:

   # **hastop -local**

9　Stop the VCS command server:

   # **killall CmdServer**

10　Unregister CFS from GAB.

   # **fsclustadm cfsdeinit**

11　Stop cluster fencing, GAB, and LLT.

   # **/etc/init.d/vxfen stop**
   # **/etc/init.d/gab stop**
   # **/etc/init.d/llt stop**

12 Check if each node's root disk is under VxVM control by running this command.

```
# df -v /
```

The root disk is under VxVM control if /dev/vx/dsk/rootvol is listed as being mounted as the root (/) file system. If so, unmirror and unencapsulate the root disk as described in the following steps:

a Use the vxplex command to remove all the plexes of the volumes rootvol, swapvol, usr, var, opt and home that are on disks other than the root disk.

For example, the following command removes the plexes mirrootvol-01, and mirswapvol-01 that are configured on a disk other than the root disk:

```
# vxplex -o rm dis mirrootvol-01 mirswapvol-01
```

Do not remove the plexes on the root disk that correspond to the original disk partitions.

b Enter the following command to convert all the encapsulated volumes in the root disk back to being accessible directly through disk partitions instead of through volume devices. There must be at least one other disk in the rootdg disk group in addition to the root disk for vxunroot to succeed.

```
# /etc/vx/bin/vxunroot
```

Following the removal of encapsulation, the system is rebooted from the unencapsulated root disk.

13 If required, you can upgrade the nodes at this stage, and patch them to a supported kernel version.

See "System requirements" on page 8.

14 On each node, use the following command to check if any Storage Checkpoints are mounted:

```
# df -T | grep vxfs
```

If any Storage Checkpoints are mounted, on each node in the cluster unmount all Storage Checkpoints.

```
# umount /checkpoint_name
```

15 On each node, use the following command to check if any VxFS file systems are mounted:

```
# df -T | grep vxfs
```

a If any VxFS file systems are present, on each node in the cluster unmount all of the VxFS file systems:

```
# umount /filesystem
```

b   On each node, verify that all file systems have been cleanly unmounted:

echo "8192B.p S" | fsdb -t vxfs *filesystem* | grep clean
flags 0 mod 0 clean *clean_value*

A *clean_value* value of 0x5a indicates the file system is clean, 0x3c indicates the file system is dirty, and 0x69 indicates the file system is dusty. A dusty file system has pending extended operations.

c   If a file system is not clean, enter the following commands for that file system:

fsck -t vxfs *filesystem*
mount -t vxfs *filesystem mountpoint*
umount *mountpoint*

This should complete any extended operations that were outstanding on the file system and unmount the file system cleanly.

There may be a pending large fileset clone removal extended operation if the umount command fails with the following error:

file system device busy

You know for certain that an extended operation is pending if the following message is generated on the console:

Storage Checkpoint asynchronous operation on *file_system* file system still in progress.

d   If an extended operation is pending, you must leave the file system mounted for a longer time to allow the operation to complete. Removing a very large fileset clone can take several hours.

e   Repeat the following command to verify that the unclean file system is now clean:

echo "8192B.p S" | fsdb -t vxfs *filesystem* | grep clean
flags 0 mod 0 clean *clean_value*

16   If you have created any Veritas Volume Replicator (VVR) replicated volume groups (RVGs) on your system, perform the following steps:

a   Stop all applications that are involved in replication. For example, if a data volume contains a file system, unmount it.

b   Use the vxrvg stop command to stop each RVG individually:

vxrvg -g *diskgroup* stop *rvg_name*

c   On the Primary node, use the vxrlink status command to verify that all RLINKs are up-to-date:

vxrlink -g *diskgroup* status *rlink_name*

To avoid data corruption, do not proceed until all RLINKs are up-to-date.

17 Stop activity to all VxVM volumes.

For example, stop any applications such as databases that access the volumes, and unmount any file systems that have been created on the volumes.

18 On each node, stop all VxVM volumes by entering the following command for each disk group:

```
# vxvol -g diskgroup stopall
```
To verify that no volumes remain open, use the following command:

```
# vxprint -Aht -e v_open
```

19 Check if the VEA service is running:

```
# /opt/VRTS/bin/vxsvcctrl status
```
If the VEA service is running, stop it:

```
# /opt/VRTS/bin/vxsvcctrl stop
```

20 Run the following command to change directory.

```
# cd /extractdir/cd1/arch/\
storage_foundation_cluster_file_system/rpms
```
extractdir is the directory path under which you extracted the downloaded RP5 archive file.

arch is either sles10_i586 or sles10_x86_64.

21 On each node, run the following command to upgrade to 4.1 MP4 RP5.

```
# rpm -Uvh *.rpm
```
See "System requirements" on page 8.

See "Veritas Storage Foundation packages" on page 20.

22 Shut down and reboot each of the upgraded nodes. After the nodes come back up, application failover capability is available for that group.

23 If you need to re-encapsulate and mirror the root disk on each of the nodes, follow the procedures in the "Administering Disks" chapter of the *Veritas Volume Manager Administrator's Guide*.

24 If necessary, reinstate any missing mount points in the /etc/fstab file on each node.

25 Run the following commands to start the SFCFS processes:

```
# /etc/init.d/llt start
# /etc/init.d/gab start
# /etc/init.d/vxfen start
# /etc/init.d/vcs start
```

26 Make the VCS configuration writable again from any node in the upgraded group:

```
# haconf -makerw
```

27 Enter the following command on each node in the upgraded group to unfreeze HA service group operations:

`hasys -unfreeze -persistent `*`nodename`*

28 Make the configuration read-only:

`haconf -dump -makero`

29 Switch the service group to the original node:

`hagrp -switch `*`service_group`*` -to `*`nodename`*

30 Bring the CVM service group online on each node in the upgraded group:

`hagrp -online cvm -sys `*`nodename`*

31 Restart all the volumes by entering the following command for each disk group:

`vxvol -g `*`diskgroup`*` startall`

32 If you stopped any RVGs in , restart each RVG:

`vxrvg -g `*`diskgroup`*` start `*`rvg_name`*

33 Remount all VxFS file systems on all nodes:

`mount `*`/filesystem`*

34 Remount all Storage Checkpoints on all nodes:

`mount `*`/checkpoint_name`*

35 Check if the VEA service was restarted:

`/opt/VRTS/bin/vxsvcctrl status`
If the VEA service is not running, restart it:

`/opt/VRTS/bin/vxsvcctrl start`

36 Repeat through for the second group of nodes.

Upgrading to 4.1 MP4 RP5 on a standalone system

The following procedure upgrades a standalone system that runs Storage Foundation.

To upgrade to 4.1 MP4 RP5 on a standalone system

1 Log in as superuser.

2 Verify that /opt/VRTS/bin is in your PATH so you can execute all product commands.

3 Check if the root disk is under VxVM control by running this command:

`df -v /`
The root disk is under VxVM control if /dev/vx/dsk/rootvol is listed as being mounted as the root (/) file system. If so, unmirror and unencapsulate the root disk as described in the following steps:

a Use the vxplex command to remove all the plexes of the volumes rootvol, swapvol, usr, var, opt and home that are on disks other than the root disk.

For example, the following command removes the plexes
`mirrootvol-01`, and `mirswapvol-01` that are configured on a disk
other than the root disk:

vxplex -o rm dis mirrootvol-01 mirswapvol-01
Do not remove the plexes on the root disk that correspond to the
original disk partitions.

b   Enter the following command to convert all the encapsulated volumes
in the root disk back to being accessible directly through disk partitions
instead of through volume devices. There must be at least one other
disk in the `rootdg` disk group in addition to the root disk for
`vxunroot` to succeed.

/etc/vx/bin/vxunroot
Following the removal of encapsulation, the system is rebooted from
the unencapsulated root disk.

4   If required, you can upgrade the system at this stage, and patch it to a
supported kernel version.

5   Use the following command to check if any VxFS file systems or Storage
Checkpoints are mounted:

df -T | grep vxfs

6   Unmount all Storage Checkpoints and file systems:

umount *`/checkpoint_name`*
umount *`/filesystem`*

7   Verify that all file systems have been cleanly unmounted:

echo "8192B.p S" | fsdb -t vxfs *`filesystem`* **| grep clean**
flags 0 mod 0 clean *clean_value*
A *clean_value* value of $0x5a$ indicates the file system is clean, $0x3c$
indicates the file system is dirty, and $0x69$ indicates the file system is dusty.
A dusty file system has pending extended operations.

a   If a file system is not clean, enter the following commands for that file
system:

fsck -t vxfs *`filesystem`*
mount -t vxfs *`filesystem mountpoint`*
umount *`mountpoint`*
This should complete any extended operations that were outstanding
on the file system and unmount the file system cleanly.

There may be a pending large fileset clone removal extended operation
if the `umount` command fails with the following error:

file system device busy
You know for certain that an extended operation is pending if the
following message is generated on the console:

Storage Checkpoint asynchronous operation on *file_system*
file system still in progress.

    b   If an extended operation is pending, you must leave the file system mounted for a longer time to allow the operation to complete. Removing a very large fileset clone can take several hours.

    c   Repeat step 7 to verify that the unclean file system is now clean.

8   If you have created any Veritas Volume Replicator (VVR) replicated volume groups (RVGs) on your system, perform the following steps:

    a   Stop all applications that are involved in replication. For example, if a data volume contains a file system, unmount it.

    b   Use the `vxrvg stop` command to stop each RVG individually:

        `# `**`vxrvg -g diskgroup stop rvg_name`**

    c   On the Primary node, use the `vxrlink status` command to verify that all RLINKs are up-to-date:

        `# `**`vxrlink -g diskgroup status rlink_name`**

        To avoid data corruption, do not proceed until all RLINKs are up-to-date.

9   Stop activity to all VxVM volumes. For example, stop any applications such as databases that access the volumes, and unmount any file systems that have been created on the volumes.

10   Stop all VxVM volumes by entering the following command for each disk group:

    `# `**`vxvol -g diskgroup stopall`**

    To verify that no volumes remain open, use the following command:

    `# `**`vxprint -Aht -e v_open`**

11   Check if the VEA service is running:

    `# `**`/opt/VRTS/bin/vxsvcctrl status`**

    If the VEA service is running, stop it:

    `# `**`/opt/VRTS/bin/vxsvcctrl stop`**

12   Run the following command to change directory.

    `# `**`cd /extractdir/cd1/arch/storage_foundation/rpms`**

    extractdir is the directory under which you extracted the downloaded RP5 archive file.

    arch is either sles10_i586 or sles10_x86_64.

13   Run the following command to upgrade to 4.1 MP4 RP5:

        `# `**`rpm -Uvh *.rpm`**

    See "System requirements" on page 8.

    See "Veritas Storage Foundation packages" on page 20.

14   Shut down and reboot the system.

15   If necessary, reinstate any missing mount points in the `/etc/fstab` file.

16 Restart all the volumes by entering the following command for each disk
    group:

    # **vxvol -g *diskgroup* startall**

17 If you stopped any RVGs in step 8, restart each RVG:

    # **vxrvg -g *diskgroup* start *rvg_name***

18 Remount all VxFS file systems and Storage Checkpoints:

    # **mount */filesystem***
    # **mount */checkpoint_name***

19 Check if the VEA service was restarted:

    # **/opt/VRTS/bin/vxsvcctrl status**
    If the VEA service is not running, restart it:

    # **/opt/VRTS/bin/vxsvcctrl start**

20 If you need to re-encapsulate and mirror the root disk, follow the
    procedures in the "Administering Disks" chapter of the *Veritas Volume
    Manager Administrator's Guide.*

Upgrading the operating system and upgrading to 4.1 MP4 RP5

You can upgrade the operating system on a Storage Foundation host where you plan to upgrade to the 4.1 Maintenance Pack 4 (MP4) Rolling Patch 5 (RP5) release. The following upgrade path is supported for 4.1 MP4 RP5:

■ Upgrading SUSE Linux Enterprise Server 10 (SLES 10) to Service Pack 3

To upgrade to a later version of SLES 10

1 Stop Veritas Storage Foundation.

2 Upgrade SLES 10 to SLES 10 Service Pack 3

3 Upgrade to 4.1 MP4 RP5.
See "Upgrading 4.1 MP3 or later to 4.1 MP4 RP5" on page 27.

4 Start Veritas Storage Foundation.

Verifying software versions

To list the Veritas patches installed on your system, enter the following command:

`# rpm -qa | egrep VRTS`

Removing 4.1 MP4 RP5

Roll back of the 4.1 MP4 RP5 to the release 4.1 version is not supported for certain products. Symantec recommends that you perform the steps in the following sections to remove all the installed Veritas software, and then perform a complete reinstallation of the release 4.1 software.

- Removing 4.1 MP4 RP5 from Veritas Cluster Server
- Removing 4.1 MP4 RP5 on Veritas Storage Foundation or Veritas Storage Foundation Cluster File System

Removing 4.1 MP4 RP5 from Veritas Cluster Server

Use the following procedure to remove VCS 4.1 MP4 RP5 from your cluster manually.

To remove 4.1 MP4 RP5 from VCS manually

1   Log in as superuser.

2   Verify that /opt/VRTS/bin is in your PATH so you can execute all product commands.

3   Stop VCS along with all the resources. Then, stop the remaining resources manually:

    # **/etc/init.d/vcs stop**

4   Stop the VCS command server:

    # **killall CmdServer**

5   Uninstall VCS:

    # **cd /opt/VRTS/install**
    # **./uninstallvcs [-usersh]**

6   If vxfen was originally configured in enabled mode, type the following on all the nodes:

    # **rm /etc/vxfenmode**

7   Reboot all nodes.
    After uninstalling the packages, refer to the *Veritas Cluster Server Release Notes* for 4.1 MP4 to reinstall the 4.1 MP4 software.

Removing 4.1 MP4 RP5 on Veritas Storage Foundation or Veritas Storage Foundation Cluster File System

You can use the following procedure to uninstall 4.1 MP4 RP5 on Veritas Storage Foundation (SF) or Veritas Storage Foundation Cluster File System (SFCFS).

To uninstall 4.1 MP4 RP5 on Veritas Storage Foundation or Veritas Storage Foundation Cluster File System

1   Log in as superuser.

2   Verify that `/opt/VRTS/bin` is in your PATH so you can execute all product commands.

3   Unmount all Veritas File System (VxFS) or Veritas Storage Foundation Cluster File System (SFCFS) file systems.

4   Stop VCS.
    ```
    # hastop -all
    ```

5   If cluster fencing was originally configured in enabled mode, type the following on all the nodes:
    ```
    # rm /etc/vxfenmode
    ```

6   Check if the root disk is under VxVM control by running this command:
    ```
    # df -v /
    ```
    The root disk is under VxVM control if `/dev/vx/dsk/rootvol` is listed as being mounted as the root (/) file system. If so, unmirror and unencapsulate the root disk as described in the following steps:

    a   Use the `vxplex` command to remove all the plexes of the volumes `rootvol`, `swapvol`, `usr`, `var`, `opt` and `home` that are on disks other than the root disk.
        For example, the following command removes the plexes `mirrootvol-01`, and `mirswapvol-01` that are configured on a disk other than the root disk:
        ```
        # vxplex -o rm dis mirrootvol-01 mirswapvol-01
        ```
        Do not remove the plexes on the root disk that correspond to the original disk partitions.

    b   Enter the following command to convert all the encapsulated volumes in the root disk back to being accessible directly through disk partitions instead of through volume devices. There must be at least one other disk in the `rootdg` disk group in addition to the root disk for `vxunroot` to succeed.
        ```
        # /etc/vx/bin/vxunroot
        ```
        Following the removal of encapsulation, the system is rebooted from the unencapsulated root disk.

7 Use the following command to check if any VxFS file systems or Storage Checkpoints are mounted:

df -T | grep vxfs

8 Unmount all Storage Checkpoints and file systems:

umount */checkpoint_name*
umount */filesystem*

9 If you have created any Veritas Volume Replicator (VVR) replicated volume groups (RVGs) on your system, perform the following steps:

a Stop all applications that are involved in replication. For example, if a data volume contains a file system, unmount it.

b Use the vxrvg stop command to stop each RVG individually:

vxrvg -g *diskgroup* stop *rvg_name*

c On the Primary node, use the vxrlink status command to verify that all RLINKs are up-to-date:

vxrlink -g *diskgroup* status *rlink_name*

To avoid data corruption, do not proceed until all RLINKs are up-to-date.

10 Stop activity to all VxVM volumes. For example, stop any applications such as databases that access the volumes, and unmount any file systems that have been created on the volumes.

11 Stop all VxVM volumes by entering the following command for each disk group:

vxvol -g *diskgroup* stopall

To verify that no volumes remain open, use the following command:

vxprint -Aht -e v_open

12 Check if the VEA service is running:

/opt/VRTS/bin/vxsvcctrl status

If the VEA service is running, stop it:

/opt/VRTS/bin/vxsvcctrl stop

13 To shut down and remove the installed Veritas packages, use the appropriate product-specific uninstallation script in the /opt/VRTS/install directory. For example, to uninstall the Storage Foundation or Veritas Storage Foundation *for DB2* packages, use the following commands:

cd /opt/VRTS/install
./uninstallsf [**-usersh**]

You can use this command to remove the packages from one or more systems. The -usersh option is required if you are using the remote shell (RSH) rather than the secure shell (SSH) to uninstall the software simultaneously on several systems.

Provided that the remote shell (RSH) or secure shell (SSH) has been configured correctly, this command can be run on a single node of the cluster to install the software on all the cluster nodes.

14 Uninstall all the remaining infrastructure VRTS rpms manually on each cluster node.

```
# ./uninstallinfr node1 node2
```

After uninstalling the Veritas software, refer to the appropriate product's 4.1 MP4 *Release Notes* document to reinstall the 4.1 MP4 software.