

# Symantec™ Storage Foundation and High Availability Solutions 6.1

What's new in this release

AIX, Linux, Solaris

# What's New In This Release

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Symantec Corporation  
350 Ellis Street  
Mountain View, CA 94043

<http://www.symantec.com>

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- Hardware information

- Available memory, disk space, and NIC information
- Operating system
- Version and patch level
- Network topology
- Router, gateway, and IP address information
- Problem description:
  - Error messages and log files
  - Troubleshooting that was performed before contacting Symantec
  - Recent software configuration changes and network changes

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<http://www.symantec.com/connect/storage-management>

# What's new in this release

This document includes the following topics:

- [Introduction](#)
- [Featured product enhancements in 6.2](#)
- [Changes related to product name branding](#)
- [Changes related to installation and upgrades](#)
- [Changes related to Symantec Dynamic Multi-Pathing \(DMP\)](#)
- [Changes related to Symantec Storage Foundation \(SF\)](#)
- [Changes related to Symantec Cluster Server \(VCS\)](#)
- [Changes related to Symantec Storage Foundation and High Availability \(SFHA\)](#)
- [Changes related to Symantec Storage Foundation Cluster File System High Availability \(SFCFSHA\)](#)
- [Changes related to Symantec Storage Foundation for Oracle RAC \(SF Oracle RAC\)](#)
- [Changes related to Symantec Storage Foundation for Sybase ASE CE \(SF Sybase CE\)](#)
- [Changes related to Symantec ApplicationHA](#)
- [Changes related to product documentation](#)

## Introduction

This document covers the major new features, enhancements, and changes that are introduced in 6.2 for the Symantec Storage Foundation and High Availability

Solutions products. See the *Release Notes* for your product for a list of all changes in 6.2.

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**Note:** The new features and enhancements listed in this document apply to AIX, Linux, and Solaris unless mentioned otherwise.

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## Featured product enhancements in 6.2

Symantec Storage Foundation and High Availability Solutions products 6.2 include the following major new features:

- Caching on Solid-State Drives on Linux using:
  - Storage Foundation SmartIO  
See [“SmartIO: Support for caching on Solid-State Drives on Linux”](#) on page 15.
- Flexible Storage Sharing on Linux using:
  - Cluster Volume Manager (CVM) in Storage Foundation Cluster File System High Availability (SFCFSHA)  
See [“Support for Flexible Storage Sharing on Linux”](#) on page 34.
- Centralized installations using the Deployment Server
  - See [“Support for centralized installations using the Deployment Server”](#) on page 11.
- AdaptiveHA using:
  - Symantec Cluster Server  
See [“AdaptiveHA”](#) on page 22.

Video presentations for these features are available on the Symantec Connect website at:

## Changes related to product name branding

Beginning with the 6.1 release, Storage Foundation and High Availability Solutions product names are rebranded.

[Table 1-1](#) lists the rebranded Storage Foundation and High Availability Solutions products.

**Table 1-1** Rebranded Storage Foundation and High Availability Solutions products

Old product name	New product names with Symantec branding
Veritas Storage Foundation	Symantec Storage Foundation (SF)



**Table 1-1** Rebranded Storage Foundation and High Availability Solutions products *(continued)*

Old product name	New product names with Symantec branding
Veritas Dynamic Multi-Pathing	Symantec Dynamic Multi-Pathing (DMP)
Veritas Replicator Option	Symantec Replicator Option
Veritas File Replicator Option	Symantec File Replicator Option (VFR)
Veritas Volume Replicator	Symantec Volume Replicator (VVR)
Veritas Storage Foundation Cluster File System HA	Symantec Storage Foundation Cluster File System HA (SFCFSHA)
Veritas Storage Foundation for Oracle RAC	Symantec Storage Foundation for Oracle RAC (SFRAC)
Veritas Storage Foundation for Sybase ASE CE	Symantec Storage Foundation for Sybase ASE CE
Veritas Storage Foundation HA	Symantec Storage Foundation HA (SFHA)
Veritas Cluster Server	Symantec Cluster Server (VCS)
Veritas Disaster Recovery Advisor	Symantec Disaster Recovery Advisor (DRA)
Veritas Storage Foundation and High Availability Solutions	Symantec Storage Foundation and High Availability Solutions (SFHAS)
Veritas High Availability Agent Pack	Symantec High Availability Agent Pack
Veritas File System Software Development Kit	Symantec File System Software Development Kit

Symantec rebranding does not apply to the following:

- Product acronyms
- Command names
- Error messages
- Alert messages
- Modules and components
- Feature names
- License key description

- Veritas Operations Manager product branding

## Changes related to installation and upgrades

The product installer includes the following changes in 6.2.

### Support for SFHA 6.1 installations from any supported operating system to any other supported operating system

The following applies to all products except Symantec Storage Foundation for Sybase ASE CE (SF Sybase CE):

You can use the Deployment Server or the web-based installer to install your 6.1 Symantec products on a target system that runs any supported platform, even if the source system and target system are running on different platforms. Prior to 6.1, releases still require the same platform, architecture, distribution, and version of the operating system.

For SF Sybase CE:

You can use the Deployment Server to install your 6.1 Symantec products on a target system that runs any supported platform, even if the source system and target system are running on different platforms. Prior to 6.1, releases still require the same platform, architecture, distribution, and version of the operating system.

See the *Installation Guide* for more information.

### Support for Solaris 11 Live Upgrade

You can use Live Upgrade on Solaris 11 systems to perform an upgrade of the product and the Solaris operating system. For Live Upgrade process, an alternate boot environment is created on the primary boot disk by ZFS storage application. All boot environments are saved in the current disk. Thus, an alternate boot disk is not needed anymore.

See the *Installation Guide* for more information.

### Improved patching and updating process

You can now download product maintenance releases and public hot fix releases directly from the Symantec Operations Readiness Tools (SORT) website using the installer. When you use the `installer` command with the `-version` option, the installer now lists the available GA releases, maintenance releases, and hot fix releases. If you have Internet access, you can follow the installer prompts to download available patches and hot fixes to your local system.

Downloading patches and hot fixes requires the installer to make outbound networking calls. If you know your systems are behind a firewall, or do not want the installer to make outbound networking calls, you can disable external network attempts by running the installer using the no Internet patch center (`-noipc`) option. When using the `-noipc` option, the installer does not try to connect to the SORT website. For example:

```
# ./installer -version -noipc system1 system2
```

See the *Installation Guide* for more information.

## Automatic download of installer hot fixes

If you are running the 6.1 product installer, and your system has Internet access, the installer automatically imports any needed installer hot fix, and begins using it.

If your system does not have Internet access, you can still download installer hot fixes manually using the [Symantec Operations Readiness Tools](#) patch finder tool.

Automatic downloading of installer hot fixes requires the installer to make outbound networking calls. If you know your systems are behind a firewall, or do not want the installer to make outbound networking calls, you can disable external network attempts by running the installer using the no Internet patch center (`-noipc`) option.

See the *Installation Guide* for more information.

## Support for centralized installations using the Deployment Server

The Deployment Server is a script that makes it easier to install or upgrade SFHA releases. The Deployment Server lets you store multiple release images in one central location and deploy them to systems of any supported UNIX or Linux platform (6.1 or later). Prior to 6.1, releases still require the same platform, architecture, distribution, and version of the operating system. You can use the Deployment Server if you want to install or upgrade multiple releases and or multiple platforms.

The Deployment Server lets you do the following as described in [Table 1-2](#).

**Table 1-2** Deployment Server functionality

Feature	Description
Manage release images	<ul style="list-style-type: none"> <li>■ View available Storage Foundation releases.</li> <li>■ Download maintenance and hot fix release images from the Symantec Operations Readiness Tools (SORT) website into a repository.</li> <li>■ Load the downloaded release image files from FileConnect and SORT into the repository.</li> <li>■ View and remove release image files stored in the repository.</li> </ul>
Check versions	<ul style="list-style-type: none"> <li>■ Discovers packages and patches installed on designated systems and informs you of the product and version installed, including installed hot fixes.</li> <li>■ Identify base, maintenance, and hot fix level upgrades to your system and download maintenance and hot fix releases.</li> <li>■ Query SORT for the most recent updates.</li> </ul>
Install or upgrade systems	<ul style="list-style-type: none"> <li>■ Install or upgrade a release stored in the repository on selected systems.</li> <li>■ In release 6.1 and later:                             <ul style="list-style-type: none"> <li>■ Install hot fix level releases.</li> <li>■ Install SFHA from any supported UNIX or Linux operating system to any other supported UNIX or Linux operating system</li> <li>■ Automatically load the script-based installer hot fixes that apply to that release</li> </ul> </li> </ul>

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**Note:** The Deployment Server is available only for the script-based installer, not the web-based installer.

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See the *Installation Guide* for more information.

## Support for simultaneously installing or upgrading base releases, maintenance patches, and hot fixes

Beginning with version 6.1, Symantec offers you a method to easily install or upgrade your systems directly to a base, maintenance, or hot fix level in one step using Install Bundles. Install Bundles is the ability for installers to merge so customers can install or upgrade directly to maintenance or hot fix levels in one execution. Install Bundles consists of executing the installer from a GA release with a pointer to a higher maintenance or hot fix release. The installer installs them both as if they were combined in the same release image. The various scripts, packages, and

patch components are merged and multiple releases are installed together as if they are one install entity.

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**Note:** This feature is not supported by the Deployment Server.

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There are five possible methods of integration. All upgrades must be executed from the highest level script.

- Base + maintenance
- Base + hot fix
- Maintenance + hot fix
- Base + maintenance + hot fix
- Base or maintenance + multiple hot fixes

See the *Installation Guide* for more information.

## Web installation program supports phased upgrade

You can now perform a phased upgrade of your product with the web-based installer. The installer detects and upgrades the product that is currently installed on the specified system or systems.

See the *Installation Guide* for more information.

# Changes related to Symantec Dynamic Multi-Pathing (DMP)

The following sections describe changes in this release related to Symantec Dynamic Multi-Pathing (DMP).

## DMP support for ZFS root on Solaris

Starting with this release, Dynamic Multi-Pathing (DMP) supports the ZFS root file system. When you install DMP with native support enabled, or enable native support with the tunable `dmp_native_support`, DMP also migrates the ZFS root pool to DMP. Reboot the system for the change to take effect.

DMP support for ZFS root requires Solaris 11 update 1 or later.

For more information about configuring ZFS root, see the *Symantec Dynamic Multi-Pathing Administrator's Guide - Solaris*.

## Enhancements to DMP support for rootvg on AIX

The root volume group (rootvg) is supported on DMP devices. This release includes the following enhancements:

- The operating system commands `bosboot`, `ADI`, `mksysb restore`, and related operations no longer require an additional DMP step. In previous releases, these operations required some steps to run the `vxddmpadm native release` command and the `vxddmpadm native acquire` command. These steps are no longer required. The commands `extendvg` and `reducevg`, which are less frequently used than other boot management commands, still require steps to release and acquire the device paths. See the administrator's guide for detailed steps.
- The outputs for the `lspv` command and the `lsvg` command are changed for the rootvg devices that DMP controls. In previous releases, the output showed the DMP device name. In this release, the output shows the device path names.
- Certain upgrade paths require that you uninstall the `VRTSvxvm` fileset. In previous releases, uninstalling the `VRTSvxvm` fileset failed if the DMP root support was enabled. The upgrade required that you disable DMP root support first, which required an additional reboot of the system. In this release, uninstalling the `VRTSvxvm` fileset automatically disables DMP root support and the uninstallation succeeds. Removing a `VRTSvxvm` patch also automatically disables DMP root support, even if the `vxconfigd` daemon is not running. The new behavior reduces the number of reboots that are required to uninstall or upgrade.

## DMP support for thin reclamation commands

In this release, Dynamic Multi-Pathing (DMP) adds support for the `UNMAP` command for thin reclamation. The Array Support Library (ASL) for each array uses the most suitable reclamation method supported for the array. In previous releases, DMP performed reclamation with the `WRITE_SAME` method for SCSI and the `TRIM` method for SSD devices. You can use the `vxdisk -p list` command to show the reclaim interface that is supported for a particular device.

For more information, see the *Administrator's Guide*.

## Changes related to Symantec Storage Foundation (SF)

Symantec Storage Foundation includes the following changes in 6.2:

## SmartIO: Support for caching on Solid-State Drives on Linux

Solid-State Drives (SSDs) are devices that do not have spinning disks. Today's solid-state technologies, such as DRAM and NAND flash, provide faster data access, are more efficient, and have a smaller footprint than traditional spinning disks. The data center uses solid-state technologies in many form factors: in-server, all flash arrays, all flash appliances, and mixed with traditional HDD arrays. Each form factor offers a different value proposition. SSDs also have many connectivity types: PCIe, FC, SATA, and SAS.

Due to the current cost per gigabyte of SSD devices, the best value of SSDs is not as high capacity storage devices. The benefit of adopting SSDs is to improve performance and reduce the cost per I/O per second (IOPS). Data efficiency and placement is critical to maximizing the returns on any data center's investment in solid state.

The SmartIO feature of Storage Foundation and High Availability Solutions (SFHA Solutions) enables data efficiency on your solid-state devices through I/O caching. Using SmartIO to improve efficiency, you can optimize the cost per IOPS. SmartIO does not require in-depth knowledge of the hardware technologies underneath. SmartIO uses advanced, customizable heuristics to determine what data to cache and how that data gets removed from the cache. The heuristics take advantage of SFHA Solutions' knowledge of the characteristics of the workload.

SmartIO supports read and write caching for VxFS file systems mounted on VxVM volumes, in several caching modes and configurations.

- Read caching for applications running on VxVM volumes
- Read caching for applications running on VxFS file systems
- Writeback caching on applications running on VxFS file systems
- Database caching on VxFS file systems
- Database caching on VxVM volumes

To use SmartIO, you set up a cache area on the target device. You can do this task simply with one command, while the application is online. When the application issues an I/O request, SmartIO checks to see if the I/O can be serviced from the cache. As applications access data from the underlying volumes or file systems, certain data is moved to the cache based on the internal heuristics. Subsequent I/Os are processed from the cache.

You can also customize which data is cached, by adding advisory information to assist the SmartIO feature in making those determinations.

See the *Symantec™ Storage Foundation and High Availability Solutions SmartIO for Solid State Drives Solutions Guide* for details.

## Changes related to Veritas Volume Manager

### Enhancements to the disk cloning operations

In this release, the following enhancements are made to the disk cloning operations:

- You must specify the `-f` option to partially import the clone disk group with `updateid`.
- Disks with the `udid_mismatch` flag are marked as `clone_disk` for importing, even if the source disks are not visible to the host.
- You can use the `-c` option to import disks with the `udid_mismatch` flag or the `clone_disk` flag. This option converts the disk group to a standard disk group.
- The command `vxdisk -c updateudid diskname` removes the `udid_mismatch` flag and the `clone_disk` flag.
- The `vx dg adddisk` command now supports the `-c` option. You can use it to add disks with the `clone_disk` flag to standard disk groups.
- You cannot create disk groups on `udid_mismatch` or `clone_disk` disks.
- If disks are falsely marked as `udid_mismatch`, you can use `vx dg -c init` option to create disk groups on them.
- If you import `udid_mismatch` or `clone_disk` disks with `-n newname` option, they will not be treated as clone disk groups.
- Using `vx dg import` with `-c` option converts the clone disk groups to standard (non clone) disk groups with `update dgid`, `updateudid` and `guid` of all objects.
- If the disk group has multiple clone copies, and you import the disk group with a `tagname`, the disks that have tags set will be selected. The tag-based import operation gives higher priority to disks with the tags set rather than the set of disks that were last imported. In previous releases, if multiple clone copies had the same disk group id, the import operation gave preference to the last import time.

### Enhancements to the Dynamic Reconfiguration tool

This section describes enhancements to the Dynamic Reconfiguration tool in this release. The Dynamic Reconfiguration tool now:

- Enables you to remove stale entries from the OS device tree.
- Does not display internal devices or LVM devices for removal. The Dynamic Reconfiguration tool now removes the stale entries properly.



- Prompts you to rename devices during a Dynamic Reconfiguration operation, if appropriate, and if `avid=no` in the naming scheme. If you agree, the tool renames the devices and refreshes the device list.  
 For example, if you have removed the LUN named `xyz_8`, which leaves the entries `xyz_7` and `xyz_9`. The DR tool prompts you whether you want to rename the LUNs. If you agree, `xyz_9` is renamed to `xyz_8`.
- Logs messages for each use of the tool, in the format  
`dmpdr_yyyymmdd_HHMM.log`.
- Accepts a file containing a list of devices as input to the removal operation.
- Displays all LUNs that are not operating as candidates for removal.
- Supports pattern matching to select disks for removal. For example, you can use an asterisk (\*) to match multiple characters and a question mark (?) to match a single character. This functionality replaces the option to specify a range of devices.
- If you quit a disk removal operation without physically removing the disks, the Dynamic Reconfiguration tool prompts you to run `vxdisksetup` over the selected disks to avoid data corruption.

## Changes related to Veritas File System

### Support for 64-bit quotas

Starting in release 6.1, 64-bit quotas are supported on disk layout Version 10. Users were earlier limited to set quota usage limits only up to 1 terabyte, restricting functionality in high data usage environments. With the support for 64-bit quotas, the quota usage limit can be set up to 4 exabytes.

As for 32-bit quotas, this continues to be supported on disk layout Version 9 or earlier. The same quota commands can be used for both 32-bit and 64-bit quotas.

As for 64-bit quotas, there are two new quotas files. For group quotas the file name is `quotas.grp.64` and for user quotas the file name is `quotas.64`. These files will be created on each file system after the disk layout version upgrade is completed.

See the *Administrator's Guide* for more information about quota files on Veritas File System.

See the *Installation Guide* for more information on upgrading disk layout versions.

## maxlink support

Added support for more than 64K sub-directories. If maxlink is disabled on a file system, the sub-directory limit will be 32K by default. If maxlink is enabled on a file system, this allows you to create up to  $4294967295(2^{32} - 1)$  sub-directories.

On AIX:

By default maxlink is disabled.

On Linux and Solaris:

By default maxlink is enabled.

See the *Administrator's Guide*.

## Disk layout Version 10

In this release, disk layout Version 10 is now the default version.

On Linux:

Version 10 disk layout enables support for SmartIO and maxlink.

On AIX and Solaris:

Version 10 disk layout enables support for maxlink.

See the *Administrator's Guide*.

## vxfsstat command can display per file system memory and VOP statistics

The `vxfsstat` command can now display per file system memory and VOP statistics. The following options display the statistics:

- B Displays per file system metadata buffer cache statistics.
- I Displays per file system inode cache and DNLC statistics.
- x An already existing option that displays per file system statistics, and now additionally displays the newly added memory and VOP counters. VOP counters include VOP time and VOP count.

## Changes related to replication

Symantec Storage Foundation and High Availability Solutions includes the following changes related to replication in 6.2:

## New vfradmin job promote and vfradmin job recover commands simplify changing replication direction

The `vfradmin` command now has the `job promote` keyword and `job recover` keyword that enable you to change the replication direction with a single command instantiation. You use `job recover` after a disaster occurred, and `job promote` under normal circumstances.

See the `vfradmin(1M)` manual page.

## VVR replication performance improvements using bulk transfer

To effectively use network bandwidth for replication, data is replicated to a disaster recovery (DR) site in bulk at 256 KB. This bulk data transfer reduces Volume Replicator (VVR) CPU overhead and increases the overall replication throughput. With compression enabled, bulk data transfer improves the compression ratio and reduces the primary side CPU usage. Bulk data transfer is not supported with bunker replication, and in cross-platform replication.

## VVR I/O throughput improvements using batched writes

Batched writing of multiple application writes to the SRL increases application I/O throughput and lowers VVR CPU utilization. This is achieved by allocating a log location for a set of application writes, and then batching the writes together to form a single write to the SRL, and therefore replacing the multiple writes to the SRL at the primary RVG.

## Changes related to SFDB tools

The following sections describe the changes related to Storage Foundation for Databases (SFDB) tools in 6.2.

### Reverse Resync for Oracle database recovery

In this release, the SFDB tools reintroduce the Reverse Resync feature for Oracle database recovery.

Reverse Resynchronization or Reverse Resync process helps in recovering a database from its volume snapshots using FlashSnap service.

Storage Foundation Database FlashSnap service is used to reverse resynchronize an online point-in-time copies image of a database in an Oracle environment.

Reverse Resync feature was supported in 5.X release. This feature was discontinued for 6.0 and 6.0.1 releases. In the current release, Reverse Resync feature is reintroduced with the following changes:

- You can perform ReverseResyncBegin operation after ReverseResyncAbort operation
- You can control the database recovery in ReverseResyncBegin operation using the new (optional) parameters:

`Reverse_Resync_Recovery`

`Reverse_Resync_Archive_Log`

Use the following commands for reverse resynchronization of the snapshot volume:

- `vxsfdm -o rrbegin` to start the Reverse Resync operation
- `vxsfdm -o rrcommit` to commit the Reverse Resync changes
- `vxsfdm -o rrabort` to abort or cancel the Reverse Resync operation and to go back to the original data volumes

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**Note:** Reverse resync is not supported for RAC databases.

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## Supported DB2 configurations

In this release, SFDB tools are supported with DB2 10.1 release.

## Supported Oracle configurations

In 6.1 release, SFDB tools support Oracle 12c release for Oracle databases.

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**Note:** For Oracle 12c, the SFDB tools do not support the Multitenant database features, including the CDB and PDB databases.

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## Support for instant mode snapshots for Oracle RAC databases

In 6.1, the SFDB tools support instant mode snapshots for Oracle RAC databases.

# Changes related to Symantec Cluster Server (VCS)

The following sections contain changes related to VCS kernel components such as LLT, GAB, and I/O fencing, and clusters in secure mode.

For more information on changes related to VCS, see the *Symantec Cluster Server Release Notes*.

## Changes related to virtualization support in VCS

### Disaster recovery support for RHEV-based virtual machines using VCS

You can now configure disaster recovery (DR) for virtual machines on Linux that are created using Redhat Enterprise Virtualization (RHEV). You can replicate the storage used for virtual machine boot disks to a DR site using a replication technology, such as Hitachi TrueCopy, EMC SRDF, and so on. VCS replication agents manage the replication configuration and the VCS KVMGuest agent supports network reconfiguration when hypervisors are separated by geographical distances.

### VCS-initiated live migration support in virtual environments

VCS supports the live migration initiation of virtual machine resources - LPAR, KVMGuest and LDOM on AIX, Linux and Solaris platforms respectively using VCS commands. This feature enables native live migration functionality as it is performed through the architecture and VCS only includes the ability to pass commands to the architecture as a part of the cluster framework. Refer to the following links for more information.

See [“LPAR agent enhancements”](#) on page 24.

See [“VCS can initiate virtual machine migration”](#) on page 24.

See [“LDom agent enhancements”](#) on page 25.

### Live migration of service groups

VCS now supports live migration capabilities for service groups that have resources to monitor virtual machines. The process of migrating a service group involves concurrently moving the service group from the source system to the target system with minimum downtime. A new entry point titled “migrate” is introduced for agent developer for this process. This entry point is available with the Script60Agent. The behavior of migrate entry point can be controlled using new attributes - MigrateTimeout, MigrateWaitLimit and SupportedOperations.

For more information, see the *Symantec Cluster Server Administrator's Guide* and *Symantec Storage Foundation and High Availability Solutions Virtualization Guide*.

## Changes to the VCS engine

### OpenVCSCommunicationPort attribute to determine whether to allow external communication port

The OpenVCSCommunicationPort attribute determines whether or not the external communication port for VCS is open for communication.

If the external communication port for VCS is not open, the following restrictions apply:

- You cannot use Java Console to administer VCS.
- On AIX:  
 RemoteGroup resources and users set up with the `hawparsetup` command cannot access VCS.
- On Linux:  
 RemoteGroup resources cannot access VCS.
- On Solaris:  
 RemoteGroup resources and users set up with the `hazonesetup` command cannot access VCS.

### AdaptiveHA

AdaptiveHA enables VCS to make dynamic decisions about selecting the system with maximum available resources to fail over an application. VCS dynamically monitors the available capacity of systems in terms of CPU, Memory, and Swap to select the most resourceful system. For more information on AdaptiveHA, refer to the *Symantec Cluster Server Administrator's Guide*.

### Attributes modified to implement AdaptiveHA

To implement AdaptiveHA in VCS, the following attributes have been modified:

- HostUtilization: Indicates the percentage usage of the resources on the host as computed by the HostMonitor agent.
- FailOverPolicy: Governs how VCS calculates the target system for failover. Added a new policy value BiggestAvailable to this service group attribute.  
 BiggestAvailable: VCS selects a system based on the forecasted available capacity for all the systems in the SystemList. The system with the highest forecasted available capacity is selected. This policy can be set only if the cluster attribute Statistics is enabled and the service group attribute Load is defined. Load must be defined in terms of CPU, Memory, or Swap in absolute units as specified in MeterUnit attribute.

- **Load:** This is a FailOverPolicy attribute value that comprises of system capacity and service group load.
- **HostMonitor:** Contains list of host resources that the HostMonitor agent monitors.
- **AvailableCapacity:** Indicates the system's available capacity.
- **Capacity:** Represents total capacity of a system.

---

**Note:** AvailableCapacity, Capacity, Load, and DynamicLoad attributes have multi-dimensional values

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## Changes to VCS bundled agents

This section describes changes to the bundled agents for VCS.

See the *Symantec Cluster Server Administrator's Guide* and *Symantec Cluster Server Bundled Agents Reference Guide* for more information.

### **IMF support for Apache HTTP server agent**

The Apache HTTP server agent is IMF-aware and uses the AMF kernel driver for IMF notification. The agent also performs detailed monitoring on the Apache resource. You can tune the frequency of detailed monitoring with the LevelTwoMonitorFreq attribute. The SecondLevelMonitor attribute is deprecated.

### **Support for direct mount inside non-global zones using Mount agent**

You can mount VxFS directly inside a non-global zone. To mount VxFS inside a non-global zone, override the ContainerOpts attribute at the resource level and set the value of the RunInContainer attribute to 1.

### **Support for level two monitoring in Application agent when MonitorProgram attribute is configured**

If the Application resource is configured with MonitorProcesses, PidFiles or both along with MonitorProgram, you can configure the Application resource to run MonitorProgram as a level two monitor. To enable level two monitoring, set the LevelTwoMonitorFreq attribute to a value greater than zero. The default value of LevelTwoMonitorFreq attribute for Application resource is 1 (one).

With this change, the Application agent can leverage AMF for instant notification even when MonitorProgram is configured along with MonitorProcess or PidFiles or both.

## Proxy agent logs improved to provide more detail

The Proxy agent log messages now provide more detail such as the reason for the agent going to unknown or faulted state. Debug messages are also logged when the Proxy resource goes online or offline.

## Apache agent takes a resource offline when process stops

Apache agent is now modified to take the resource offline immediately when the Apache processes stop as part of offline entry point.

## LPAR agent enhancements

LPAR agent for AIX has been enhanced to include the following capabilities:

### Support for migration of LPAR resource through VCS

A new migrate entry point is added to the LPAR agent to initiate live migration of LPAR through VCS.

### Added support for LPAR profile management with LPAR live migration

LPAR agent is enhanced to support LPAR failover along with live migration of LPAR. When an LPAR resource is live migrated from a physical source server to a physical target server, the migration process deletes the LPAR profile on the physical source server. If the migrated LPAR on target physical server faults or if the LPAR service group is required to switch back from the target server, the LPAR cannot be brought online on the physical source server due to unavailability of the LPAR profile configuration. In order to facilitate the failover of the LPAR back to the physical source server, you must first create the LPAR profile configuration. The LPAR agent is enhanced to read LPAR configuration file as configured in ProfileFile attribute and create the LPAR on failover physical server while bringing the LPAR resource online. Similarly, the LPAR agent is enhanced to delete the LPAR configuration while bringing LPAR offline depending on RemoveProfileOnOffline attribute value.

## VCS can initiate virtual machine migration

KVMGuest agent is enhanced to implement newly introduced migrate entry point for initiating a virtual machine in KVM and RHEV environments.

## New agent function for the Mount agent

The Mount agent supports the attr\_changed function. This function unlocks the mount when you change the value of the VxFSMountLock attribute from either 1 or 2 to 0.



## LDom agent enhancements

LDom agent for Solaris has been enhanced to include the following capabilities:

- New action entry point `vmmigrate`:  
 A new action entry point `vmmigrate` is added to verify the ability of an LDom resource to migrate to another node using the `hagr -migrate` command.

See [“Attributes introduced in VCS 6.2”](#) on page 31.

## Default value of MonitorCPU attribute for LDom agent on Solaris changed to 0 (zero)

A resource was declared as faulted when the MonitorCPU attribute was enabled and if CPU usage of all the virtual CPUs attached to the LDom was equal to either 0% or 100%.

Setting the default value of the MonitorCPU attribute to 0 prevents the resource from faulting.

## Changes to LLT, GAB, and I/O fencing

This section covers new features or enhancements made to LLT, GAB, and I/O fencing.

### Disable LLT, GAB, and I/O fencing on a single node cluster

Disable LLT, GAB, and I/O fencing kernel modules on a single node Symantec Cluster Server (VCS) cluster if you only want to manage applications and use the application restart capabilities of VCS for the node.

Note that disabling the kernel modules means that you cannot provide high availability to applications across multiple nodes. However, in future, if you decide to extend the cluster to multiple nodes, you can enable the modules and make the applications highly available.

For more information, refer to the *Symantec Cluster Server Installation Guide*.

### Kernel components will no longer install package metadata inside non-global zones on Solaris 10

VCS kernel components `VRTSllt`, `VRTSgab`, `VRTSvxfen`, and `VRTSamf` packages will no longer install package meta data inside non-global zones on Solaris 10 operating system.

## Changes to LLT

Symantec Cluster Server includes the following changes to LLT in 6.2:

### LLT and GAB support RDMA technology on Linux for faster interconnect between nodes

Remote direct memory access (RDMA) is a direct memory access capability that allows server to server data movement directly between application memories with minimal CPU involvement. LLT and GAB support RDMA for faster interconnect between nodes. RDMA is supported on InfiniBand and RDMA over Converged Ethernet (RoCE) networks. RDMA provides high throughput, low latency, and minimized host CPU usage thereby improving application performance. RDMA provides performance boost for the use cases of the Flexible Storage Sharing with Cluster Volume Manager (CVM) and Cluster File System (CFS), and IO Shipping with CVM in clustered environments.

For more information, refer to the *Symantec Cluster Server Installation Guide* and *Symantec Cluster Server Administrator's Guide*.

### LLT command changes

The following command changes are introduced in this release.

Updates in `lltconfig`:

- On Linux, LLT supports a new link type called "rdma". You can use this link type to dynamically add an RDMA link under LLT at run time.
- A new option `lltconfig -l` is introduced. When you add a new link, you can use the `-l` option to specify that the link is a low priority link.

Updates in `lltstat` on Linux:

- A new option `lltstat -r` is introduced. Use the `-r` option in conjunction with the `-nvv` option. The `-r` option additionally displays the status of the RDMA channel connectivity.
- The output of `lltstat -lv` option has changed. The verbose information is displayed in a different format. For ether and udp links, this option does not display the verbose information. For the rdma links, this option displays information about the packets that are sent or received over the rdma and udp channels.

Updates in `lltping`:

- A new option `lltping -F` is introduced. Use this option to check the LLT connectivity over RDMA channel.

Updates in `llttest`:

- A new option `llttest -F` is introduced. Use this option to test the LLT protocol over RDMA channel.

## Changes to GAB

Symantec Cluster Server (VCS) includes the following changes to GAB in 6.2:

### Adaptive GAB tunables to prevent false failover

You can configure the VCS environment variables, `VCS_GAB_TIMEOUT_SECS` and `VCS_GAB_PEAKLOAD_TIMEOUT_SECS`, to make GAB adaptive to different load conditions on a node (per CPU load). GAB calculates the timeout range for the load period based on the load average number provided by the operating system and the variable values that are set for HAD. GAB kills HAD after the timeout period.

For more information, see the *Symantec Cluster Server Administrator's Guide*.

## Changes to I/O fencing

Symantec Cluster Server (VCS) includes the following changes to I/O fencing in 6.2:

### I/O fencing supports majority-based fencing mechanism, a new fencing mechanism that does not need coordination points

I/O fencing supports a new fencing mode called majority-based I/O fencing. Majority-based I/O fencing mode does not need coordination points to provide protection against data corruption and data consistency in a clustered environment. Use majority-based I/O fencing when there are no additional servers and or shared SCSI-3 disks to be used as coordination points. It provides a reliable arbitration method and does not require any additional hardware setup, such as CP Servers or shared SCSI3 disks.

In the event of a network failure, the majority sub-cluster wins the fencing race and survives the race. Note that even if the majority sub-cluster is hung or unresponsive, the minority sub-cluster loses the fencing race and the cluster panics. The cluster remains unavailable till the issue is resolved.

For more information, refer to the *Symantec Cluster Server Installation Guide* and *Symantec Cluster Server Administrator's Guide*.

### Clear coordination point server registrations using the `vxfcntlpre` utility

The `vxfcntlpre` utility is enhanced to clear registrations from coordination point servers for the current cluster in addition to the existing functionality to remove SCSI3 registrations and reservation keys from the set of coordinator disks and shared data disks. The local node from where you run the utility must have the

UUID files for the current cluster at `/etc/vx/.uuids` directory in the `clusuuid` file.

Note that you may experience delays while clearing registrations on the coordination point servers because the utility tries to establish a network connection with IP addresses used by the coordination point servers. The delay may occur because of a network issue or if the IP address is not reachable or is incorrect.

For more information, refer to the *Symantec Cluster Server Administrator's Guide*.

### **Set the order of coordination points while configuring I/O fencing**

You can use the `-fencing` option in the installer to set the order of coordination points.

Decide the order of coordination points (coordination disks or coordination point servers) in which they participate in a race during a network partition. The order of coordination points you set in the installer is updated to the `/etc/vxfenmode` file. I/O fencing approaches the coordination points based on the order listed in the `vxfenmode` file.

So, the order must be based on the possibility of I/O Fencing reaching a coordination point for membership arbitration.

For more information, refer to the *Symantec Cluster Server Installation Guide*.

### **Refresh keys or registrations on the existing coordination points using the install program**

You can use the `-fencing` option with the installer to refresh registrations on the existing coordination points.

Registration loss on the existing coordination points may happen because of an accidental array restart, corruption of keys, or some other reason. If the coordination points lose the registrations of the cluster nodes, the cluster may panic when a network partition occurs. You must refresh registrations on coordination points when the CoordPoint agent notifies VCS about the loss of registrations on any of the existing coordination points.

You can also perform a planned refresh of registrations on coordination points when the cluster is online without application downtime on the cluster.

For more information, refer to the *Symantec Cluster Server Installation Guide*.

### **Preferred fencing with Group policy resets the node weight if the VCS engine instance on that node is killed**

Preferred fencing with Group policy resets the node weight to zero if the VCS engine instance on that node is killed. During a network partition, the node with the VCS engine instance running on it is given preference over a node that does not have

the VCS engine instance running even though the node with the VCS engine has lower priority applications. The surviving sub-cluster wins the race for coordination points. As the surviving sub-cluster has VCS engine running it has the ability to make the applications on the lost sub-cluster highly available.

For more information refer to the *Symantec Cluster Server Administrator's Guide*.

### **CPI automatically installs a CP server-specific license while configuring CP server on a single-node VCS cluster**

The installer automatically installs a CP server-specific license if you are configuring CP server on a single-node VCS cluster. It also ensures that Veritas Operations Manager (VOM) identifies the license on a single-node coordination point server as a CP server-specific license and not as a VCS license.

For more information, see the *Symantec Cluster Server Installation Guide*.

### **Site-based preferred fencing policy**

The fencing driver gives preference to the node with higher site priority during the race for coordination points. VCS uses the site-level attribute Preference to determine the node weight.

For more information, see the *Symantec Cluster Server Administrator's Guide*.

### **The security attribute in `/etc/vxfenmode` file is obsolete**

From VCS 6.1, the Coordination Point (CP) client will communicate with CP server using HTTPS protocol. The 'security' parameter in `/etc/vxfenmode` is therefore deprecated and setting it to 1 or 0 has no effect whatsoever.

### **Support for HTTPS communication between CP server and application client cluster nodes**

CP server and its application client cluster nodes can communicate securely over HTTPS, an industry standard protocol. Prior to release 6.1, communication between the CP server and its clients happened over the Inter Process Messaging (IPM) protocol, which is a Symantec proprietary protocol. Secure communication over IPM-based communication uses Symantec Product Authentication Services (AT) to establish secure communication between CP server and client nodes. With secure communication using HTTPS, CP server functionality is backward-compatible with previous releases. To support client nodes on releases before 6.1, CP server supports IPM-based communication in addition to HTTP-based communication. However, client nodes from 6.1 onwards only support HTTPS-based communication.

For more information, refer to the *Symantec Cluster Server Installation Guide* and *Symantec Cluster Server Administrator's Guide*.

## Changes to the Oracle agent

This section mentions the changes made to the Symantec Cluster Server agent for Oracle.

### **VCS agent for Oracle uses the Oracle health check APIs to determine intentional offline of an Oracle instance**

The Symantec Cluster Server agent for Oracle uses the Oracle health check APIs to determine whether the Oracle instance on a node was shut down gracefully or aborted. When an Oracle instance is shut down gracefully outside of VCS control the agent acknowledges the operation as intentional offline.

From the VCS 6.1 release onwards, the pre-built health check binaries will not be shipped. You need to run the `build_oraapi.sh` script to build the Oracle health check binaries based on the Oracle Version.

For more information, refer to the *Symantec Cluster Server Agent for Oracle Installation and Configuration Guide*.

### **VCS will no longer ship Oracle health check binaries**

From the VCS 6.1 release, the pre-built health check binaries will not be shipped. You need to run the `build_oraapi.sh` script to build the Oracle health check binaries based on the Oracle Version.

## Changes to campus clusters

### **Multi-site management**

You can create sites to use in an initial failover decision in campus clusters by configuring the SiteAware cluster level attribute. You can define sites and add systems to the sites that you have defined. A system can belong to only one site. Site definitions are uniform across VCS, Veritas Operations Manager, and VxVM. You can define site dependencies to restrict connected applications to fail over within the same site.

If sites are configured for a cluster, a service group tries to stay within its site before choosing a host in another site. For example, in a campus cluster with two sites, site A and site B, you can define a site dependency among service groups in a three-tier application infrastructure consisting of Web, application, and database to restrict the failover within the same site.

You must have the Veritas Operations Manager 6.0 to define sites and dependencies and configure site for a cluster.

Refer to the *Administrator's Guide* for more information.

## Changes to wizard support

You can use the Symantec High Availability Configuration wizard to configure application monitoring for generic applications running on Linux on a physical host.

### Configuring applications through a wizard is supported in VCS on Linux

You can configure applications in VCS using the Symantec High Availability Configuration wizard. You can launch this wizard through Veritas Operations Manager (VOM), from a browser window, or by using the `haappwizard` utility. In case of VMware-based Linux virtual machines, the wizard can also be launched through a vSphere client. In this release, the following applications can be configured through the wizard:

**Table 1-3** Environment-based supported application configuration

Environment	Configuration supported
Linux on VMware guests	Generic application Oracle WebSphere MQ SAP
Linux on physical hosts	Generic application

For more details on configuration, refer to the respective application guides. In future releases, configuration of more applications may happen through the wizard.

## Attributes introduced in VCS 6.2

The following section describes the attributes introduced in VCS 6.2.

### Cluster level attributes

DefaultGuestAccess	Enables guest access for any authenticated user to the secure cluster.
GuestGroups	Contains a list of user groups that have guest access.

## LDom agent attributes

Meter	Defines the meters based on which the failover decision is taken for the service group containing the LDom resource.
MeterControl	At every ForecastCycle, an extra flag is passed to the meter entry point to perform the forecasting. This flag is currently not used by the LDom agent.
MeterTimeout	The maximum time for the meter entry point to complete.
AvailableMeters	Defines the meters that the agent supports.

## LPAR agent attributes

DROpts	Stores the primary and disaster recovery network configuration for the LPAR.
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## SFCache agent attributes

CacheObjectName	Specifies the cache object name; it can be a mount point or disk group/volume.
CacheArea	Specifies the name of the cache area.
CacheMode	Specifies the caching mode.
CacheFaultPolicy	Specifies the action to be performed in case of a cache fault.
CacheFaultActionPath	Specifies the path of the script that you can invoke in case of a cache fault.

## IP agent attributes

IpadmIfProperties	Interface properties for the <code>ipadm set-ifprop</code> command.  IpadmIfProperties attribute is applicable for Solaris 11 only. On Solaris 10, this attribute value is ignored.
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lpadmAddrProperties

Address properties for the `lpadm set-addrprop` command.

lpadmAddrProperties attribute is applicable for Solaris 11 only. On Solaris 10, this attribute value is ignored.

## Resource level attributes

Utilization

The virtual machine agent meters the CPU and memory requirement of the virtual machine and populates this attribute value for the virtual machine resource.

## System attributes

ServerAvailableCapacity

The HostMonitor agent meters the free CPU and memory on the physical server which are available to other virtual machines and populates this attribute.

ServerAvailableForecast

The HostMonitor agent forecasts the free CPU and memory of the physical server and populates this attribute value.

ServerCapacity

The HostMonitor agent meters the total CPU and memory of the physical server and populates this attribute value.

ServerReservedCapacity

This is an internal attribute populated by the VCS engine.

# Changes related to Symantec Storage Foundation and High Availability (SFHA)

Storage Foundation and High Availability (SFHA) includes the new features and changes introduced in 6.2 of the underlying products.

See [“Changes related to Symantec Storage Foundation \(SF\)”](#) on page 14.

See [“Changes related to Symantec Cluster Server \(VCS\)”](#) on page 20.

# Changes related to Symantec Storage Foundation Cluster File System High Availability (SFCFSHA)

Symantec Storage Foundation Cluster File System High Availability (SFCFSHA) includes the new features and changes introduced in 6.2 of the underlying products.

See [“Changes related to Symantec Storage Foundation \(SF\)”](#) on page 14.

See [“Changes related to Symantec Cluster Server \(VCS\)”](#) on page 20.

## The SVS functionality has moved to SFCFSHA

Symantec VirtualStore (SVS) functionality moved to the Storage Foundation Cluster File System High Availability (SFCFSHA) product except for the VirtualStore VMware vCenter and View plug-in. SVS VMware vCenter and View plug-in has been discontinued.

The following 3 SVS components will be shipped with SFCFSHA:

- svodatastore(1M)
- svsiscsiadm(1M)
- svsdbsnap(1M)

See the *Symantec Storage Foundation Cluster File System High Availability Administrator's Guide* for more information.

You can upgrade SVS to SFCFSHA 6.1.

See the *Symantec Storage Foundation Cluster File System High Availability Installation Guide* for more information.

## Support for Flexible Storage Sharing on Linux

Cluster Volume Manager (CVM) introduced the Flexible Storage Sharing (FSS) feature, which enables network sharing of local storage, cluster wide. The local storage can be in the form of Direct Attached Storage (DAS) or internal disk drives. Network shared storage is enabled by using a network interconnect between the nodes of a cluster.

FSS allows network shared storage to co-exist with physically shared storage, and logical volumes can be created using both types of storage creating a common storage namespace. Logical volumes using network shared storage provide data redundancy, high availability, and disaster recovery capabilities, without requiring physically shared storage, transparently to file systems and applications.

FSS use cases include support for current SFCFSHA and SF Oracle RAC use cases, off-host processing, DAS SSD benefits leveraged with existing SFHA

Solutions features, FSS with File System level caching, and campus cluster configuration.

Installing SFCFS automatically enables the FSS feature and no separate license is required.

SFRAC certification for the FSS feature is currently in progress.

For more information about FSS, see the *Administrator's Guide*.

## Changes related to Symantec Storage Foundation for Oracle RAC (SF Oracle RAC)

SF Oracle RAC includes the new features and changes introduced in 6.2 of the underlying products.

### CSSD agent enhancements

The CSSD agent is no longer a generic Application agent. It now has its own CSSD type definition that allows simpler configuration and flexible resource-handling.

The remaining changes are as follows:

- New attribute `RestartDaemons` introduced for Oracle RAC 11g Release 2 and later versions.  
The default value is set to 1 and indicates whether or not the Oracle Grid Infrastructure processes `ohasd`, `cssd`, `crsd`, and `evmd` are restarted if the status of these processes is unhealthy.
- Intelligent Monitoring Framework (IMF) is now supported for the `ohasd`, `cssd`, `crsd`, and `evmd` daemons.  
By default, IMF monitoring is enabled with a monitoring value of 3.
- The `Clean` function now uses the `force` option to forcibly stop Oracle Grid Infrastructure on nodes running Oracle RAC 11g Release 2.

As a result of these improvements, you will see the following changes during an upgrade:

- The agent type is set to `CSSD`.
- The installer prompts for the Oracle Clusterware home directory. This is optional. The agent uses this information to locate Oracle Clusterware process binaries. If the value is not provided, the agent reads the information from the Oracle configuration file.

## Changes related to Symantec Storage Foundation for Sybase ASE CE (SF Sybase CE)

SF Sybase CE includes the new features and changes introduced in 6.2 of the underlying products.

This release is supported only on Solaris SPARC.

See the *Release Notes* for details on supported operating system versions.

## Changes related to Symantec ApplicationHA

Symantec ApplicationHA includes the following changes in 6.2:

### Change of packaging in the ApplicationHA 6.1 installation media

With this release, Symantec ApplicationHA is packaged along with the Storage Foundation and High Availability (SFHA) 6.1 installation media. This change eliminates the need to download and manage separate installation media for ApplicationHA.

The CD browser displays a separate tab for installing ApplicationHA. When you select the ApplicationHA tab, two separate links; ApplicationHA (for VMare) and ApplicationHA (for Hyper-V) are available to install ApplicationHA based on the virtualization environment.

### Keyless licensing

Keyless licensing is a user-friendly licensing option for deploying and managing Storage Foundation and High Availability (SFHA) product installations.

Keyless licensing uses a management server model (via Veritas Operations Manager) to ensure fair and authorized installation and upgrades of all SFHA component products, including Symantec ApplicationHA. This method eliminates the need to maintain a large inventory of license keys for various instances and releases of SFHA stack products installed in your data center.

### Support for centralized installations using the Deployment Server

The Deployment Server lets you store multiple release images in one central location and deploy them to systems of any supported platform.

You can load and store product binaries for Symantec products dating back to version 5.1 in a central repository. You can use the Deployment Server for performing the following tasks:

- Version checking
- Release image management
- Install or upgrade systems
- Update metadata and preferences

## Added support for VMware versions

The following VMware versions are now supported:

- vSphere Client 5.0 Update 1 a/b, 5.1, 5.5
- vCenter Server 5.0 Update 1 a/b, 5.1, and 5.5
- VMware ESXi Server 5.0 Patch 4, 5.1, and 5.5
- VMware SRM Server 5.1, and 5.5

## Changes related to product documentation

The Symantec Storage Foundation and High Availability Solutions (SFHA Solutions) 6.1 release includes the following changes to the product documentation.

[Table 1-4](#) lists the documents introduced in this release.

**Table 1-4** New documents

New documents	Notes
<i>Symantec™ Storage Foundation and High Availability Solutions SmartIO for Solid State Drives Solutions Guide - Linux</i>	Provides information about the new SmartIO feature for Storage Foundation and High Availability Solutions.
<i>Symantec™ Storage Foundation and High Availability Solutions Virtualization Guide - Linux on ESXi</i>  (This document is available online only.)	Provides information about using Storage Foundation and High Availability Solutions in the VMware ESXi virtualization environment.

The SFHA Solutions 6.1 release includes Symantec ApplicationHA. The ApplicationHA documentation set is included in this release.

[Table 1-5](#) lists the documentation for Symantec ApplicationHA.

For Linux, SFHA Solutions 6.1 release also includes the Symantec High Availability Console and its documentation set.

[Table 1-6](#) lists the documentation for the Symantec High Availability Console component.

**Table 1-5** Symantec ApplicationHA documentation

Document title	File name	Description
<i>Symantec ApplicationHA Release Notes</i>	applicationha_notes_61_vmware_lin.pdf	Describes the new features and software and system requirements. This document also contains a list of limitations and issues known at the time of the release.
<i>Symantec ApplicationHA Installation and Upgrade Guide</i>	applicationha_install_61_vmware_lin.pdf	Describes the steps for installing and configuring and managing Symantec ApplicationHA. Some of the most common troubleshooting steps are also documented in this guide.
<i>Symantec ApplicationHA User's Guide</i>	applicationha_users_61_vmware_lin.pdf	Provides information about configuring ApplicationHA in a local VMware cluster environment and the VMware site recovery environment. Some of the most common troubleshooting steps are also documented in the guide.
<i>Symantec ApplicationHA Agent for Oracle Configuration Guide</i>	applicationha_oracle_agent_61_vmware_lin.pdf	Describes how to configure application monitoring for Oracle.
<i>Symantec ApplicationHA Agent for SAP NetWeaver Configuration Guide</i>	applicationha_sap_agent_61_vmware_lin.pdf	Describes how to configure application monitoring for SAP NetWeaver.
<i>Symantec ApplicationHA Agent for WebLogic Server Configuration Guide</i>	applicationha_weblogicserver_agent_61_vmware_lin.pdf	Describes how to configure application monitoring for WebLogic Server.
<i>Symantec ApplicationHA Generic Agent Configuration Guide</i>	applicationha_gen_agent_61_vmware_lin.pdf	Describes how to configure application monitoring for a generic application.
<i>Symantec ApplicationHA Agent for WebSphere MQ Configuration Guide</i>	applicationha_webspheremq_agent_61_vmware_lin.pdf	Describes how to configure application monitoring for WebSphere MQ.
<i>Symantec ApplicationHA Agent for WebSphere Application Server Configuration Guide</i>	applicationha_websphereas_agent_61_vmware_lin.pdf	Describes how to configure application monitoring for WebSphere Application Server.
<i>Symantec ApplicationHA Agent for DB2 Configuration Guide</i>	applicationha_db2_agent_61_vmware_lin.pdf	Describes how to configure application monitoring for DB2.
<i>Symantec ApplicationHA Agent for Apache HTTP Server Configuration Guide</i>	applicationha_apache_agent_61_vmware_lin.pdf	Describes how to configure application monitoring for Apache HTTP Server.

**Table 1-5** Symantec ApplicationHA documentation (*continued*)

Document title	File name	Description
<i>Symantec™ ApplicationHA Agent for JBoss Application Server Configuration Guide</i>	applicationha_jboss_agent_61_vmware_lin.pdf	Describes how to configure application monitoring for JBoss Application Server.
<i>Symantec™ ApplicationHA Agent for MySQL Configuration Guide</i>	applicationha_mysql_agent_61_vmware_lin.pdf	Describes how to configure application monitoring for MySQL.
<i>Symantec ApplicationHA Release Notes</i>	applicationha_notes_61_kvm_lin.pdf	Describes the new features and software and system requirements. This document also contains a list of limitations and issues known at the time of the release.
<i>Symantec ApplicationHA Installation Guide</i>	applicationha_install_61_kvm_lin.pdf	Describes the steps for installing and configuring Symantec ApplicationHA. Some of the most common troubleshooting steps are also documented in this guide.
<i>Symantec ApplicationHA User's Guide</i>	applicationha_users_61_kvm_lin.pdf	Provides information about configuring and managing Symantec ApplicationHA in Kernel-based Virtual Machine (KVM) virtualization environments. Some of the most common troubleshooting steps are also documented in the guide.
<i>Symantec ApplicationHA Agent for Oracle Configuration Guide</i>	applicationha_oracle_agent_61_kvm_lin.pdf	Describes how to configure application monitoring for Oracle.
<i>Symantec ApplicationHA Generic Agent Configuration Guide</i>	applicationha_gen_agent_61_kvm_lin.pdf	Describes how to configure application monitoring for a generic application.
<i>Symantec ApplicationHA Agent for WebSphere MQ Configuration Guide</i>	applicationha_webspheremq_agent_61_kvm_lin.pdf	Describes how to configure application monitoring for WebSphere MQ.
<i>Symantec ApplicationHA Agent for WebSphere Application Server Configuration Guide</i>	applicationha_websphereas_agent_61_kvm_lin.pdf	Describes how to configure application monitoring for WebSphere Application Server.
<i>Symantec ApplicationHA Agent for DB2 Configuration Guide</i>	applicationha_db2_agent_61_kvm_lin.pdf	Describes how to configure application monitoring for DB2.
<i>Symantec ApplicationHA Agent for Apache HTTP Server Configuration Guide</i>	applicationha_apache_agent_61_kvm_lin.pdf	Describes how to configure application monitoring for Apache HTTP Server.

**Table 1-5** Symantec ApplicationHA documentation (*continued*)

Document title	File name	Description
Symantec™ ApplicationHA Agent for MySQL Configuration Guide  (This document is available online)	applicationha_mysql_agent_61_kvm_lin.pdf	Describes how to configure application monitoring for MySQL.
<i>Symantec ApplicationHA Release Notes</i>	applicationha_notes_61_ldom_sol.pdf	Describes the new features and software and system requirements. This document also contains a list of limitations and issues known at the time of the release.
<i>Symantec ApplicationHA Installation Guide</i>	applicationha_install_61_ldom_sol.pdf	Describes the steps for installing and configuring Symantec Storage Foundation and High Availability Solutions. Some of the most common troubleshooting steps are also documented in this guide.
<i>Symantec ApplicationHA User's Guide</i>	applicationha_users_61_ldom_sol.pdf	Provides information about configuring and managing Symantec Storage Foundation and High Availability Solutions in Oracle VM Server for SPARC (OVM) virtualization environments. Some of the most common troubleshooting steps are also documented in the guide.
<i>Symantec ApplicationHA Agent for Oracle Configuration Guide</i>	applicationha_oracle_agent_61_ldom_sol.pdf	Describes how to configure application monitoring for Oracle.
<i>Symantec ApplicationHA Generic Agent Configuration Guide</i>	applicationha_gen_agent_61_ldom_sol.pdf	Describes how to configure application monitoring for a generic application.
<i>Symantec Storage Foundation and High Availability Solutions Agent for Apache HTTP Server Configuration Guide</i>	applicationha_apache_agent_61_ldom_sol.pdf	Describes how to configure application monitoring for Apache HTTP Server.
<i>Symantec ApplicationHA Release Notes</i>	applicationha_notes_61_lpar_aix.pdf	Describes the new features and software and system requirements. This document also contains a list of limitations and issues known at the time of the release.



**Table 1-5** Symantec ApplicationHA documentation (*continued*)

Document title	File name	Description
<i>Symantec ApplicationHA Installation Guide</i>	applicationha_install_61_lpar_aix.pdf	Describes the steps for installing and configuring Symantec ApplicationHA. Some of the most common troubleshooting steps are also documented in this guide.
<i>Symantec ApplicationHA User's Guide</i>	applicationha_users_61_lpar_aix.pdf	Provides information about configuring and managing Symantec ApplicationHA in Logical Partition (LPAR) virtualization environments. Some of the most common troubleshooting steps are also documented in the guide.
<i>Symantec ApplicationHA Agent for Oracle Configuration Guide</i>	applicationha_oracle_agent_61_lpar_aix.pdf	Describes how to configure application monitoring for Oracle.
<i>Symantec ApplicationHA Generic Agent Configuration Guide</i>	applicationha_gen_agent_61_lpar_aix.pdf	Describes how to configure application monitoring for a generic application.
<i>Symantec ApplicationHA Agent for DB2 Configuration Guide</i>	applicationha_db2_agent_61_lpar_aix.pdf	Describes how to configure application monitoring for DB2.
<i>Symantec ApplicationHA Agent for Apache HTTP Server Configuration Guide</i>	applicationha_apache_agent_61_lpar_aix.pdf	Describes how to configure application monitoring for Apache HTTP Server.

**Table 1-6** Symantec High Availability Console documentation

Document title	File name	Description
<i>Symantec High Availability Console Release Notes</i>	sha_console_notes_61.pdf	<p>Provides release information such as system requirements, changes, fixed incidents, known issues, and limitations of the Symantec High Availability Console.</p> <p>The component is essential to deploy Symantec Cluster Sever (VCS) or Symantec ApplicationHA in a VMware virtual environment by using the VMware vSphere Client GUI.</p>

**Table 1-6** Symantec High Availability Console documentation (*continued*)

Document title	File name	Description
<i>Symantec High Availability Console Installation and Upgrade Guide</i>	sha_console_install_61.pdf	Provides information required to install or upgrade the Symantec High Availability Console.

[Table 1-7](#) lists the documents that are deprecated in this release.

**Table 1-7** Deprecated documents

Deprecated documents	Notes
<i>Symantec VirtualStore Administrator's Guide</i>	Symantec VirtualStore (SVS) functionality moved to the Storage Foundation Cluster File System High Availability (SFCFSHA) product except for the VirtualStore VMware vCenter and View plug-in. SVS VMware vCenter and View plug-in has been discontinued.  See the <i>Symantec Storage Foundation Cluster File System High Availability Administrator's Guide</i> for more information
<i>Symantec VirtualStore Installation Guide</i>	You can upgrade SVS to SFCFSHA 6.1.  See the <i>Symantec Storage Foundation Cluster File System High Availability Installation Guide</i> for more information
<i>Symantec VirtualStore Release Notes</i>	See the <i>Symantec Storage Foundation Cluster File System High Availability Release Notes</i> for more information