

Veritas Storage Foundation™ and High Availability Solutions 6.0.1 What's new in this release - AIX, HP-UX, Linux, Solaris

What's New In This Release

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What's new in this release

This document includes the following topics:

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Introduction

This document covers the major new features, enhancements, and changes that are introduced in 6.0.1 for the Veritas Storage Foundation and High Availability

Solutions products. See the *Release Notes* for your product for a list of all changes in 6.0.1.

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

6.0.2 release provides vSphere-integrated options to install VCS, monitor application status, and manage licenses

For the VMware virtual environment, the Symantec High Availability Solution 6.0.2 release leverages a Console component to provide vSphere-integrated options to monitor the application status. A plugin enables the integration of Symantec High Availability with the VMware vSphere Client and provides the following options to the VMware vSphere Client:

- **Menu to install the guest components**
A right-click menu to install the guest components when you select a cluster, a datacenter, or a virtual machine from the VMware vCenter Server inventory
- **Symantec High Availability tab**
To configure and control application availability on virtual machines that are managed from the VMware vCenter Server
- **Symantec High Availability dashboard**
To administer the configured applications on virtual machines in a VMware datacenter
- **Menu to manage licenses**
To update the licenses by adding or removing specific license keys on the systems where you have installed the Symantec High Availability guest components

See the 6.0.2 product documentation for more details.

Changes related to installation and upgrades

The product installer includes the following changes in 6.0.1.

Locally-installed installation and uninstallation scripts now include the release version

When you run local scripts (`/opt/VRTS/install`) to configure Veritas products, the names of the installed scripts now include the release version.

Note: If you install your Veritas product from the install media, continue to run the `installprod` command without including the release version.

To run the script from the installed binaries, run the `installprod<version>` command.

Where `<version>` is the current release version with no periods or spaces.

For example, to configure the 6.0.1 version of SF, run this command:

```
# /opt/VRTS/install/installsf601 -configure
```

VxVM private region backup pre-checks for disk groups prior to upgrade

The installer verifies that recent backups of configuration files of all the disk groups in VxVM private region have been saved in the `/etc/vx/cbr/bk` directory prior to doing an upgrade. If not, a warning message is displayed.

Warning: Backup `/etc/vx/cbr/bk` directory.

Support for Solaris 11 Automated Installer

You can use the Oracle Solaris Automated Installer (AI) to install the Solaris 11 operating system on multiple client systems in a network. AI performs a hands-free installation (automated installation without manual interactions) of both x86 and SPARC systems. You can also use AI media (AI bootable image, provided by Oracle, which can be downloaded from the Oracle Web site) to install the Oracle Solaris OS on a single SPARC or x86 platform. All cases require access to a package repository on the network to complete the installation.

Changes in supported Linux virtualization technologies

Veritas Storage Foundation and High Availability (SFHA) Solutions 6.0.1 products support the following virtualization technologies in Linux environments:

- Kernel-based Virtual Machine (KVM) technology for Red Hat Enterprise Linux (RHEL)

- Kernel-based Virtual Machine (KVM) technology for SUSE Linux Enterprise Server (SLES)

SFHA Solutions products provide the following functionality for KVM guest virtual machines:

- Storage visibility
- Storage management
- High availability
- Cluster failover
- Replication support

Table 1-1 SFHA Solutions supported configurations in guest and host for KVM technologies

Objective	Recommended SFHA Solutions product configuration	KVM technology
Storage visibility for KVM guest virtual machines	Dynamic Multi-Pathing (DMP) in the KVM guest virtual machines	RHEL SLES
Storage visibility for KVM hosts	DMP in the KVM hosts	RHEL SLES
Storage management features and replication support for KVM guest virtual machines	Storage Foundation (SF) in the KVM guest virtual machines	RHEL SLES
Advanced storage management features and replication support for KVM hosts	Storage Foundation Cluster File System (SFCFSHA) in the KVM hosts	RHEL SLES
End-to-end storage visibility in KVM hosts and guest virtual machines	DMP in the KVM host and guest virtual machines	RHEL SLES
Storage management features and replication support in the KVM guest virtual machines and storage visibility in the KVM host	DMP in the KVM host and SF in the KVM guest virtual machines	RHEL SLES

Table 1-1 SFHA Solutions supported configurations in guest and host for KVM technologies (*continued*)

Objective	Recommended SFHA Solutions product configuration	KVM technology
Application monitoring and availability for KVM guest virtual machines	Symantec ApplicationHA in the KVM guest virtual machines	RHEL
Virtual machine monitoring and failover for KVM hosts	Veritas Cluster Server (VCS) in the KVM hosts	RHEL SLES
Application failover for KVM guest virtual machines	VCS in the KVM guest virtual machines	RHEL SLES
Application availability and virtual machine availability	Symantec Application HA in the KVM guest virtual machines and VCS in the KVM host	RHEL
Application failover across KVM guest virtual machines and physical hosts	VCS in KVM guest virtual machines and KVM physical host machines	RHEL SLES

VCS provides virtual to virtual (in-guest) clustering support for the following Linux virtualization environments:

- Red Hat Enterprise Virtualization (RHEV)
- Microsoft Hyper-V
- Oracle Virtual Machine (OVM)

For implementation details:

See the *Veritas Storage Foundation™ and High Availability Solutions Virtualization Guide for Linux*.

For VMware support, see *Veritas Storage Foundation in a VMware ESX Environment*.

SFHA now detects VCS and SF licenses for SFHA installation and configuration

In 6.0.1, you can install and configure SFHA if you install a pair of valid VCS and SF keys. The VCS and SF keys may not show when you run `vxkeyless display`. However, you can still install and use SFHA if you install the SF and VCS keys.

Support for tunables file templates

You can use the installer to create a tunables file template. If you start the installer with the `-tunables` option, you see a list of all supported tunables, and the location of the tunables file template.

Installer support to configure Coordination Point servers

This installer enhancement applies to the High Availability products that support server-based I/O fencing.

You can now use the `-configcps` option in the installer to configure CP servers. This functionality to configure CP servers is now integrated with the installer. The `configure_cps.pl` script used earlier to configure CP servers is now deprecated.

You can also configure CP servers by generating response files. You can use the `-responsefile '/tmp/sample1.res'` option in the installer to configure CP servers.

See the *Installation Guide* for more details.

Changes related to Veritas Dynamic Multi-Pathing (DMP)

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

Dynamic Reconfiguration tool

Dynamic Multi-Pathing provides a Dynamic Reconfiguration tool. The Dynamic Reconfiguration tool is an interactive tool to automate dynamic reconfiguration of LUNs or HBAs. Dynamic reconfiguration includes addition, removal or replacement of LUNs, and replacement of certain HBAs, without requiring a reboot. The Dynamic Reconfiguration tool simplifies the process, so that you do not need a complex set of DMP and operating system related commands.

Support for DMP within multiple Solaris I/O Domains

In this release, DMP metanodes can be directly exported to the guest domains in the Oracle VM server environment. You can enable DMP in the control and alternate I/O domains. For details, see the *Veritas Storage Foundation and High Availability Solutions Virtualization Guide - Solaris*.

Enhanced support for Fusion-io iodrive and iodrive2 on Linux

In this release, support for Fusion-io iodrive and iodrive2 is enhanced to support TRIM operations. TRIM operations erase unused blocks of data to improve SSD performance. The future writes on the Fusion-io cards are more efficient.

The product components, Veritas File System (VxFS) and Veritas Volume Manager (VxVM), use the TRIM operations to free up the blocks that do not contain valid data. The TRIM capability is similar to thin reclamation, and is performed with the same commands.

DMP, SF, SFHA, and SFCFSA support the TRIM operation for Fusion-io devices for Red Hat Linux 6.0 (RHEL6) and SUSE Linux Enterprise Server 11 (SLES11).

DMP support for Fusion-io iodrive and iodrive2 cards on Solaris

This release introduces DMP support for Fusion-io iodrive and iodrive2 cards on Solaris.

Changes related to Veritas Storage Foundation (SF)

Veritas Storage Foundation includes the following changes in 6.0.1:

Changes related to device support

In this release, Veritas Dynamic Multi-Pathing (DMP) supports Fusion-io devices on Solaris x86_64.

Veritas Volume Manager (VxVM) operations such as initializing the Fusion-io disks in simple or sliced format, creating a disk group, and creating volumes and file systems are supported on Fusion-io devices.

Fusion-io devices cannot be added to disk groups configured for Cross-platform Data Sharing (CDS). The CDS disk format is not supported on Fusion-io devices.

Changes related to Veritas Volume Manager

Enhancements to vxassist for controlling storage allocations and managing volume intents

In this release, the `vxassist` command has been enhanced to provide more flexibility and control in volume allocations and intent management.

The following list describes the enhancements:

- A rich set of new predefined disk classes.

The new disk classes cover comprehensive characteristics of the available storage. These disk properties are automatically discovered. You can use these disk classes to select the required type of storage for allocations.

- Ability to define alias names for predefined disk classes.
For administrative convenience, you can customize alias names that are shorter or more user-friendly.
- Ability to change the precedence order for the predefined disk classes that are supported for mirror or stripe separation and confinement.
You can now customize the precedence order for the predefined disk classes that are supported for mirror or stripe separation and confinement. The mirror or stripe operation honors the higher priority disk class specified in the custom precedence order.
- Ability to define new disk classes.
You can associate user-defined properties to disks that satisfy a particular criterion. This functionality enables you to customize device classification or grouping. You can use these custom disk classes to specify storage selections.
- New clauses for precise disk selection.
The new `use` and `require` clauses enable you to select storage from well-defined sets of intended disk properties. The `require` type of clauses select disks from an intersection set where all specified properties are met. The `use` type of clauses select disks from a union set where at least one of the specified properties is met. The `use` and `require` constraints are made persistent by default, for disk group version 180 and onwards.
- Management commands for the volume intents.
Use the volume intent management commands to manage the `use` and `require` type of persistent intents. You can set, clear, update, and list the `use` and `require` intents for the volume, after the volume is created.

For more information about `vxassist` and these enhancements, see the *Administrator's Guide* and the `vxassist(1M)` manual page.

Upgrade for instant snap Data Change Objects (DCOs)

Instant snap Data Change Objects (DCOs), formerly known as version 20 DCOs, support the creation of instant snapshots for VxVM volumes. Starting with release 6.0, the internal format for instant DCOs changed. Upgrade the instant snap DCOs and DCO volumes to ensure compatibility with the latest version of VxVM. The upgrade operation can be performed while the volumes are online.

The upgrade operation does not support upgrade from version 0 DCOs.

See the *Administrator's Guide* and the `vxsnap(1M)` manual page.

Changes related to Veritas File System

Support for Thin Reclamation on a Thin Reclaimable LUN and TRIMs for an SSD on Linux

The `fsadm -R` command and the `vxfs_ts_reclaim()` call can perform Thin Reclamation on a Thin Reclaimable LUN and TRIMs for an SSD. In a volume set, the action taken is as per the type of device.

For more information, see the `fsadm(1M)` manual page.

The `glmstat` command can display GLM cache memory usage information

You can use the `glmstat -M` command to display GLM cache memory usage information.

For more information, see the `glmstat(1M)` manual page.

The `vxfsstat` command can display pinned memory counters information

On Linux and Solaris:

You can use the `vxfsstat -m` command to display pinned memory counters information.

For more information, see the `vxfsstat(1M)` manual page.

SmartTier can compress or uncompress files

SmartTier can compress or uncompress files during relocation, or can perform in-place compression or uncompression of an entire tier.

File compression

On AIX and HP-UX:

You can compress files to reduce the space used, while retaining the accessibility of the files and having the compression be transparent to applications. Compressed files look and behave almost exactly like uncompressed files: the compressed files have the same name, and can be read and written as with uncompressed files.

See the *Administrator's Guide*.

Changes related to replication

Veritas Storage Foundation and High Availability Solutions includes the following changes related to replication in 6.0.1:

Protection of the VFR target file system from accidental writes (on Linux)

The `protected=off|on` option of the `mount_vxfs` command protects the target file system from accidental writes. Modifications to the target file system by anything other than the file replication job may cause replication to fail. The new `protected=off|on` option mounts the file system at the target system as read-write, and only allows the replication daemon to apply updates, thus preventing accidental writes that could cause replication to fail.

Finer granularity of replication at the file and directory level using VFR consistency groups (on Linux)

VxFS supports replication at the file and directory level to a single target using a consistency group. A consistency group consists of an include list and an exclude list, which specify a combination of files and directories within a file system that needs to be replicated as a single consistent unit, and files and directories that should not be replicated, respectively. Both include and exclude lists are optional, and if no path is specified in the include list, the entire file system is replicated. The consistency group must be configured on both the source and the target systems.

VVR CPU utilization improvements with fine granular locking and optimizations

CPU usage is reduced due to VVR lock and code optimization. I/O throughput is improved due to faster I/O processing.

CPU utilization improvements and memory optimizations in VVR compression engine

CPU usage is reduced while compression is enabled. The reduced CPU footprint is achieved by memory pre-allocation optimizations, and changing the compression window size and memory levels to provide optimum compression performance.

VVR replication performance improvements in TCP protocol

Overall improvement of replication throughput due to introducing the following:

- An I/O throttling implementation at the VVR layer to improve network bandwidth usage for TCP. (Not applicable to UDP protocol).
- Per RVG read-back memory pool to avoid contention of memory between the RVGs in the SRL read-back.
- A separate read-back thread to read the data from the SRL. This is disabled by default.

Improved resiliency in case of VVR data volume failure in clustered storage environments using CVM I/O shipping framework

In the event of a data volume failure, there may be some writes to the SRL that do not also write to the data volume due to an I/O failure. To make the data consistent, the writes are flushed to the data volume. In previous releases, there was no mechanism to flush the writes from the node with storage connectivity; to avoid data inconsistency, the data volume was detached cluster wide. Using the I/O shipping framework, in flight I/Os (where the I/O finishes on the SRL but does not write to the data volume) are now shipped to the node with storage connectivity and written to the data volume. As a result, the data volume remains consistent and is available on all nodes that have storage connectivity.

Changes related to SFDB tools

The following sections describe the changes related to Storage Foundation for Databases (SFDB) tools in 6.0.1.

Support for FlashSnap and Database Storage Checkpoint for DB2

This feature is supported on AIX and Linux.

In this release, the SFDB tools support FlashSnap (Third-mirror break-off snapshots) and Database Storage Checkpoint operations for DB2 databases.

You can capture an online image of actively changing data at a given instant: a point-in-time copy. You can perform system backup, upgrade and other maintenance tasks on point-in-time copies while providing continuous availability of your critical data. You can also offload processing of the point-in-time copies onto another host.

Database FlashSnap lets you make backup copies of your volumes online and with minimal interruption to users.

Database Storage Checkpoint quickly creates a persistent image of a file system at an exact point in time. It reduces I/O overhead by identifying and maintaining

only the file system blocks that have changed since the last Storage Checkpoint or backup via a copy-on-write technique.

Support for creation of Golden Image snapshots using FlashSnap for Oracle

In this release, the SFDB tools support the creation of Golden Image snapshots using FlashSnap for Oracle databases.

Online mode, third-mirror-break-off type snapshot i.e. online FlashSnap snapshot of a database instance contains all the information needed to create a clone of the database instance. It can act as a template for creating clone database instances. You can thus allocate a FlashSnap snapshot that can be used as a master copy for creating one or more clone instances. The clone instances created from a FlashSnap image, termed as the 'golden image', are incremental copies of the master or the golden image. These depend on the FlashSnap image for their operations.

Support for Flashsnap at the VVR Secondary site for Oracle

In this release, the SFDB tools support Flashsnap operation at the VVR Secondary site for Oracle databases.

Online mode snapshots (i.e. traditional, third-mirror-break-off snapshots) are supported in VVR replication environment. Also, support for more than one secondary site is added. For online mode snapshots in VVR environment, IBC (In-Band Control) messages are used to synchronize activities on the Primary and Secondary sites. Snapshot is initiated from VVR Secondary site.

Introduction of the Compression Advisor tool for Oracle

In this release, the SFDB tools provide the Compression Advisor tool for Oracle databases.

Veritas File System (VxFS) provides the `vxcompress` utility that can be used to compress individual files transparent to the underlying applications. An application reading a compressed file automatically receives the uncompressed data that is uncompressed in memory only; the on-disk part of the data remains compressed. If an application writes to a compressed file, parts of the file are uncompressed on disk.

Compression Advisor provides extended compression functionality for Oracle database files in Oracle single instance and Oracle RAC environments. The Compression Advisor command `sfacompadm` resides in the `/opt/VRTS/bin` directory, and it must be run by the DBA user.

Changes related to Veritas 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 *Veritas Cluster Server Release Notes*.

Changes to the VCS engine

Enhanced -propagate functionality to support more dependency types

The `-propagate` option can be used if the dependency tree contains global and/or remote dependency. The following dependency types are supported for both online propagate and offline propagate options:

- online global soft
- online global firm
- online remote soft
- online remote firm

Cluster security with FIPS mode

VCS provides an option to secure your cluster with FIPS. With this option, the communication with the cluster is encrypted using FIPS approved algorithms. The FIPS compliance is introduced with the following guiding factors:

- FIPS compliance is a configurable option available with product . When existing product deployments are upgraded from product 6.0 or earlier versions to , FIPS compliance is not automatically enabled.
- To enable FIPS mode, you must ensure that the cluster is new and configured without setting any security condition. To configure FIPS mode on a cluster which is already secured, refer to the steps under *Enabling and disabling secure mode for the cluster* in *Veritas Cluster Server Administrator Guide*.
- does not support FIPS in GCO or CP server based cluster.

VCS supports failover of file replication on Linux

Failover of file replication is made highly available using VCS and a new VFRJob agent. The VFRJob agent starts scheduling of the VFR Job, monitors the VFR Job status, and also stops its scheduling. The new VFRJob agent is used to make the replication job highly available on the source system. The VFRJob type resource

is a failover resource and provides high availability (HA) for the VFRJob. It monitors VFR Job on the resource system when the file system is mounted and the target system where the file system is being replicated. The target system can either be in the same cluster or it can be outside of the cluster.

In case the system, which also hosts the file system, performing the file system replication faults, the depends file system fails over to another system in the cluster and the VFRJob resource also fails over to that system. Thus, the VFRJob agent makes the VFR Job highly available. The VFRJob on the source system is the vxfstaskd daemon. The daemon is a scheduler and it must be in running state on the source system. On the target system where the file system is to failover, the vxfsrepld daemon must be running.

Postonline and postoffline triggers must be enabled after a manual upgrade

The preonline and postoffline triggers must be enabled if you perform a manual upgrade from VCS versions 5.x to 6.0 or later. You can enable the triggers if required by setting the TriggersEnabled attribute of the service group.

PreOnline, TriggersEnabled and ContainerInfo have a global (cluster-wide) value

The service group attributes PreOnline, TriggersEnabled and ContainerInfo have a global (cluster-wide) value. The value can be localized for every system.

Changes related to IMF

This release includes the following changes to Intelligent Monitoring Framework (IMF):

Open IMF architecture

The Open IMF architecture builds further upon the IMF functionality by enabling you to get notifications about events that occur in user space. The architecture uses an IMF daemon (IMFD) that collects notifications from the user space notification providers (USNPs) and passes the notifications to the AMF driver, which in turn passes these on to the appropriate agent. IMFD starts on the first registration with AMF by an agent that requires Open IMF.

The Open IMF architecture provides the following benefits:

- IMF can group events of different types under the same VCS resource and is the central notification provider for kernel space events and user space events.

- More agents can become IMF-aware by leveraging the notifications that are available only from user space.
- Agents can get notifications from IMF without having to interact with USNPs.

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

New IMF-aware agent in product 6.0.1

The following agent is IMF-aware in product 6.0.1:

- DiskGroup agent

Changes to VCS bundled agents

This section describes changes to the bundled agents for VCS.

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

New bundled agent on Linux

VFRJob agent: Veritas File Replication Job (VFRJob) agent provides high availability for VFR Job on a source system. VFR Job is responsible for scheduling replication of either cluster or non-cluster file systems.

See the *Veritas Bundled Agent Reference Guide* for more details on the VFRJob agent.

Added support for solaris10 brand zones

Oracle Solaris has added support for solaris10 brand zone on Solaris 11 system. Zone agent is updated to support solaris10 brand zone on Solaris 11 system.

Separate attributes to add and delete network route

This enhancement applies to the IPMultiNICB agent on Solaris.

A new attribute DeleteRouteOptions is introduced in the IPMultiNICB resource configuration that allows you to use different commands to delete the network route when you offline the resource. When RouteOptions and DeleteRouteOptions attributes are configured, RouteOptions attribute is used to add the route and DeleteRouteOptions attribute is used to delete the route. However when RouteOptions attribute is not configured, DeleteRouteOptions attribute is ignored.

Refer to the *Veritas Cluster Server Bundled Agent Reference Guide* for more information.

Changes to Share agent

On Solaris 11, VCS 6.0.1 requires at least one directory to be shared across reboot on a node in order to configure Share agent.

On HP-UX, VCS 6.0.1 requires at least one entry in `/etc/dfs/dfstab` file on a node in order to configure Share agent.

Use the following command to share a directory across reboots:

```
#share /xyz
```

Changes in Apache agent requirements on Solaris 11

On Solaris 11 platform, VCS Apache agent requires the following package as prerequisite:

```
pkg:/compatibility/ucb
```

In absence of the above package the following error is displayed:

```
Can't exec "/usr/ucb/ps": No such file or
directory at /opt/VRTSvcs/bin/Apache/Proc.pm line 699.
Use of uninitialized value $sErrorString in scalar chomp
at /opt/VRTSvcs/bin/Apache/Proc.pm line 720.
```

Change to NFS agent

Setting UseSMF attribute of NFS resource to 0 is not supported on Solaris 11.

Enhancement to the CoordPoint agent

The CoordPoint agent monitors changes to the Coordinator Disk Group constitution, such as when a disk is deleted from the Coordinator Disk Group due to accidental execution of a VxVM administrative command or if the VxVM private region of a disk is corrupted.

The agent performs detailed monitoring on the CoordPoint resource and reports faults. You can tune the frequency of the detailed monitoring by setting the `LevelTwoMonitorFreq` attribute introduced in this release. For example, if you set this attribute to 5, the agent monitors the Coordinator Disk Group constitution in every fifth monitor cycle.

For more information on the CoordPoint agent, see the *Veritas Cluster Server Bundled Agents Reference Guide*.

For information on configuring the CoordPoint agent using script-based installer and manually configuring the CoordPoint agent to monitor coordinator disks, see the *Veritas Cluster Server Installation Guide*.

For more information on replacing I/O fencing coordinator disks or coordinator diskgroup when the cluster is online, see the *Veritas Cluster Server Administrator's Guide*.

Mount agent enhancements on Linux

The mount agent is enhanced to allow multiple bindfs mounts from the same block device.

See the *Veritas Cluster Server Bundled Agent Reference Guide* for more information.

Application agent enhancements

Application agent has undergone the following enhancement:

- The ProPCV support for Application agent to prevent the processes configured in the MonitorProcesses attribute is supported since earlier release. If the ProPCV attribute is enabled for a service group, the processes configured under MonitorProcesses attribute for the Application resource in the group are prevented from starting on other cluster nodes once the resource is online on a cluster node.

With this release the ProPCV feature is enhanced for Application agent. With this enhancement, the Application agent now supports the prevention of the program configured under StartProgram attribute. When the ProPCV is enabled, the StartProgram will be prevented from starting on other cluster nodes once the Application resource is online on a node.

See *Bundled Agent Reference Guide* and *Veritas Cluster Server Administrator's Guide* for more information.

LVMVG agent on AIX now uses ODM entry to check volume group import time stamp instead of managing its own file

LVMVG agent used to manage its own file to store the time at which the volume group was last imported on the node. In VCS 6.0.1, the agent uses the timestamp ODM entry of volume group to get the time when the volume group was last imported on the system. The synchronization occurs when the timestamp value in the timestamp ODM entry of the volume group is older than the time stamp value in the descriptor area of the volume group.

KVMGuest agent manages virtual machines running in SLES KVM environment

The KVMGuest agent brings virtual machines online and offline, and monitors them in the SLES KVM environment. KVMGuest agent uses virsh commands to manage the virtual machine.

For more information, refer to *Veritas Cluster Server Bundled Agent Reference Guide*.

IPMultiNICB and MultiNICB must be configured in IPMP mode on Solaris 11

Since IPMP mode is the only supported mode to configure MultiNICB agent in product 6.0.1, IPMultiNICB and MultiNICB resources on Solaris 11 system must be configured in the following order:

1. Create IPMP interface manually for the interfaces under MultiNICB control. Refer to *Oracle Solaris Administration: Network interfaces and Network Virtualization Guide* for more details.
2. Specify the IPMP interface name in IPMPDevice attribute of MultiNICB resource.
3. Set UseMpathd and ConfigCheck attributes of MultiNICB resource to 1 and 0 respectively.
4. Make sure that the IPMP interface and corresponding base interfaces are configured correctly and are up before enabling MultiNICB resource.

LPAR agent supports redundant HMCs

LPAR agent supports redundant HMC configurations where VCS can use any HMC which is up and running to manage and monitor the LPARs.

If the LPAR environment has redundant HMCs configured and if one of the HMC goes down, LPAR agent can manage the managed LPARs without any issues. For this feature, ensure that MCName and MCUser attributes are populated with details of both HMCs.

High availability support to LPARs in case of one or more VIO servers crash

LPAR agent provides high availability against one or more VIO servers crash for the managed LPARs. If all the VIO servers specified are down, managed LPARs are failed over to another host.

When all the VIO servers providing virtual resources to the managed LPARs are down, VCS fails over the managed LPARs to another host. Ensure that VIOSName attribute of the LPAR resources is populated with the list of all VIO servers servicing the managed LPAR. If VIOSName is not populated, managed LPARs do not fail over when of VIO server(s) crash. If any one of the VIO servers specified in VIOSName attribute is running, LPAR agent does not failover the managed LPARs until all VIO servers crash.

Attributes introduced in product 6.0.1

The following section describe the attributes introduced in product 6.0.1.

On AIX:

LPAR agent attribute

- **VIOName:** Stores the names of the virtual input output servers (VIO servers) that provide virtual resources to the LPAR.
- **MCName:** Stores the names of the HMCs that manage LPARs.

On Linux:

KVMGuest agent attributes:

- **RHEVMInfo:** Specifies the RHEV environment information. The attribute contains five keys:
 - **Enabled:** Specifies the virtualization environment
 - **URL:** RHEV-M URL for REST API communication
 - **User:** RHEV-M user for REST API communication
 - **Password:** Encrypted password of RHEV-M user
 - **Cluster:** RHEV cluster to which the VCS host belongs
- **ResyncVMCfg:** The ResyncVMCfg attribute is set by the havmconfigsnc utility. If this attribute is set, the agent redefines the virtual machine configuration if it already exists using the SyncDir attribute. If the SyncDir attribute is not set, GuestConfigFilePath attribute is used.

On Solaris:

MultiNICB agent attribute:

- **IPMPDevice:** Stores the IPMP interface name. To configure MultiNICB resource in IPMP mode on Solaris 11, set the value of this attribute to the valid name of IPMP interface created for interfaces under MultiNICB control. At the same time, make sure that UseMpathd attribute of MultiNICB is set to 1. This attribute is applicable only to Oracle Solaris 11.

IPMultiNICB agent attribute:

- **DeleteRouteOptions:** String to delete a route when un-configuring an interface. When RouteOptions and DeleteRouteOptions attributes are configured, RouteOptions attribute is used to add route and DeleteRouteOptions attribute is used to delete route. When RouteOptions attribute is not configured, DeleteRouteOptions attribute is ignored.

LDom agent attributes

Changes related to Veritas Cluster Server (VCS)

- **ResyncVMCfg:** The ResyncVMCfg attribute is set by the `havmconfignsync` utility. If this attribute is set, the agent redefines the virtual machine configuration if it already exists using the CfgFile attribute.

On AIX, HP-UX, Linux, and Solaris:

Service group attribute

- **UserAssoc:** This attribute can be used for any purpose.

Cluster level attribute

- **FipsMode:** Indicates whether FIPS mode is enabled for the cluster. The value depends on the mode of the broker on the system.

Changes related to virtualization support in VCS 6.0.1

Virtualization support on Solaris

The following new virtualization features are introduced on Solaris:

- For Oracle Solaris 11, VCS supports zone root creation only on ZFS filesystem.

Changes in supported Linux virtualization technologies

Veritas Storage Foundation and High Availability (SFHA) Solutions 6.0.1 products support the following virtualization technologies in Linux environments:

- Kernel-based Virtual Machine (KVM) technology for Red Hat Enterprise Linux (RHEL)
- Kernel-based Virtual Machine (KVM) technology for SUSE Linux Enterprise Server (SLES)

SFHA Solutions products provide the following functionality for KVM guest virtual machines:

- Storage visibility
- Storage management
- High availability
- Cluster failover
- Replication support

Table 1-2 SFHA Solutions supported configurations in guest and host for KVM technologies

Objective	Recommended SFHA Solutions product configuration	KVM technology
Storage visibility for KVM guest virtual machines	Dynamic Multi-Pathing (DMP) in the KVM guest virtual machines	RHEL SLES
Storage visibility for KVM hosts	DMP in the KVM hosts	RHEL SLES
Storage management features and replication support for KVM guest virtual machines	Storage Foundation (SF) in the KVM guest virtual machines	RHEL SLES
Advanced storage management features and replication support for KVM hosts	Storage Foundation Cluster File System (SFCFSHA) in the KVM hosts	RHEL SLES
End-to-end storage visibility in KVM hosts and guest virtual machines	DMP in the KVM host and guest virtual machines	RHEL SLES
Storage management features and replication support in the KVM guest virtual machines and storage visibility in the KVM host	DMP in the KVM host and SF in the KVM guest virtual machines	RHEL SLES
Application monitoring and availability for KVM guest virtual machines	Symantec ApplicationHA in the KVM guest virtual machines	RHEL
Virtual machine monitoring and failover for KVM hosts	Veritas Cluster Server (VCS) in the KVM hosts	RHEL SLES
Application failover for KVM guest virtual machines	VCS in the KVM guest virtual machines	RHEL SLES
Application availability and virtual machine availability	Symantec Application HA in the KVM guest virtual machines and VCS in the KVM host	RHEL

Table 1-2 SFHA Solutions supported configurations in guest and host for KVM technologies (*continued*)

Objective	Recommended SFHA Solutions product configuration	KVM technology
Application failover across KVM guest virtual machines and physical hosts	VCS in KVM guest virtual machines and KVM physical host machines	RHEL SLES

VCS provides virtual to virtual (in-guest) clustering support for the following Linux virtualization environments:

- Red Hat Enterprise Virtualization (RHEV)
- Microsoft Hyper-V
- Oracle Virtual Machine (OVM)

For implementation details:

See the *Veritas Storage Foundation™ and High Availability Solutions Virtualization Guide for Linux*.

For VMware support, see *Veritas Storage Foundation in a VMware ESX Environment*.

KVMGuest agent manages virtual machines running in Red Hat Enterprise Virtualization (RHEV) Environment

The KVMGuest agent brings virtual machines online and offline, and monitors them in the RHEV environment.

KVMGuest agent uses REST API to communicate with the Red Hat Enterprise Virtualization - Manager (RHEV-M) and to manage the virtual machine. You can use this agent to make the virtual machines in RHEV environment highly available and to monitor them.

This agent supports Red Hat Enterprise Virtualization 3.0. For more information, please refer the *Veritas Cluster Server Bundled Agent Reference Guide* and *Veritas Storage Foundation and High Availability Solutions Virtualization Guide for Linux*.

Utility to synchronize virtual machine configuration across the cluster nodes

The `havmconfsync` utility provides ability to synchronize virtual machine configuration across the cluster nodes.

This utility is available on Linux and Solaris.

You can use the `havmconfigsync` utility to synchronize virtual machine configuration from one online node to other nodes in the cluster. To do so, run `havmconfigsync <vm_name>` on any of the nodes in the cluster passing the virtual machine name as the parameter. It detects the node on which virtual machine is online and saves the configuration of the running virtual machine to a shared storage.

On Linux:

The location of the shared storage is identified by the file specified in the `SyncDir/GuestConfigPath` attribute.

On Solaris:

The location of the shared storage is identified by the file specified in `CFGFile` attribute.

Make sure the path of the file specified is on a shared storage, either parallel or failover.

The utility saves the backup of the original configuration file before updating the new configuration.

On Linux:

On the other nodes in the cluster, during failover or switch, the online operation redefines the KVMGuest configuration by removing the existing configuration and defining the VM using the new configuration saved on the shared storage.

On Solaris:

On the other nodes in the cluster, during failover or switch, the online operation redefines the LDom configuration by removing the existing configuration and redefining the VM using the new configuration saved on the shared storage.

Note: The `havmconfigsync` utility is not supported on Solaris x86.

Changes to LLT

This release includes the following change to LLT:

Setting the value of `peerinact` in the `/etc/llttab` file

Symantec recommends not to set the value of `peerinact` to 0. To achieve the infinite timeout functionality for `peerinact`, you must set `peerinact` to a large value. The supported range of value is between 1 through 2147483647.

Changes related to Veritas Storage Foundation and High Availability (SFHA)

Storage Foundation and High Availability (SFHA) includes the new features and changes introduced in 6.0.1 of the underlying products.

See [“Changes related to Veritas Storage Foundation \(SF\)”](#) on page 13.

See [“Changes related to Veritas Cluster Server \(VCS\)”](#) on page 19.

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

SFCFSHA includes the new features and changes introduced in 6.0.1 of the underlying products.

See [“Changes related to Veritas Storage Foundation \(SF\)”](#) on page 13.

See [“Changes related to Veritas Cluster Server \(VCS\)”](#) on page 19.

Changes related to Symantec VirtualStore (SVS)

Symantec VirtualStore includes the new features and changes introduced in 6.0.1 of the underlying products.

Symantec VirtualStore includes the following changes in 6.0.1:

Citrix XenDesktop

SymantecVirtualStore (SVS) 6.0.1 is capable of rapidly creating space-optimized virtual machine clones for use with Citrix XenDesktop. The VirtualStore vCenter plugin provides integration between VMware vSphere, Citrix XenDesktop, and VirtualStore, making virtual machine management painless.

Symantec VirtualStore 6.0.1 with VMware vSphere 5.0

Symantec VirtualStore (SVS) 6.0.1 has been tested and Symantec certifies that all SVS features and capabilities, including those of the file system and vSphere plug-in, perform correctly when used in conjunction with VMware vSphere 5.0.

Changes related to Veritas Storage Foundation for Oracle RAC (SF Oracle RAC)

SF Oracle RAC includes the new features and changes introduced in 6.0.1 of the underlying products.

Support for VMware environments

You can install and configure SF Oracle RAC on VMware guest machines. The virtual machines that belong to an SF Oracle RAC cluster must reside on separate ESX hosts.

Fast failover of failed links by PrivNIC and MultiPrivNIC agents

The PrivNIC and MultiPrivNIC agents can now fail over the IP address of a failed link to an available link when the link status is detected as `trouble`. If LLT is unable to reach the peer node in two seconds, the link status is marked `trouble` and the agents fail over the IP address to an available link if the value of the agent attribute `EnableUseTroubleState` is set to 1 in the type definition of the PrivNIC and MultiPrivNIC resource configuration files.

An additional enhancement includes reducing the value of the `MonitorInterval` attribute of the agents to the default value of 10 seconds.

Support for Oracle RAC in a zone environment

This release supports the installation and configuration of multiple non-global zones in a global zone.

SF Oracle RAC and the necessary agents run in the global zone. Oracle RAC runs in the non-global zone. You must configure non-global zones with an exclusive-IP zone. The exclusive-IP zone does not share the network interface with global-zone.

Using SF Oracle RAC, you can start, stop, and monitor a non-global zone and provide high availability to Oracle RAC instances inside the non-global zone.

SF Oracle RAC installation and configuration checks removed from installer

The option `SF Oracle RAC installation and configuration checks` is no longer available in the installer.

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

SF Sybase CE includes the new features and changes introduced in 6.0.1 of the underlying products.

About product

Veritas Storage Foundation™ for Sybase® Adaptive Server Enterprise Cluster Edition (product) by Symantec leverages proprietary storage management and high availability technologies to enable robust, manageable, and scalable deployment of application on UNIX platforms. The solution uses cluster file system technology that provides the dual advantage of easy file system management as well as the use of familiar operating system tools and utilities in managing databases.

product integrates existing Symantec storage management and clustering technologies into a flexible solution which administrators can use to:

- Create a standard toward application and database management in data centers. product provides flexible support for many types of applications and databases.
- Set up an infrastructure for application that simplifies database management while fully integrating with application clustering solution.
- Apply existing expertise of Symantec technologies toward this product.

The solution stack comprises the Veritas Cluster Server (VCS), Veritas Cluster Volume Manager (CVM), Veritas Cluster File System (CFS), and Veritas Storage Foundation, which includes the base Veritas Volume Manager (VxVM) and Veritas File System (VxFS).

Benefits of product

SF Sybase CE provides the following benefits:

- Use of a generic clustered file system (CFS) technology or a local file system (VxFS) technology for storing and managing application installation binaries.
- Support for file system-based management. product provides a generic clustered file system technology for storing and managing application data files as well as other application data.
- Use of Cluster File System (CFS) for the application quorum device.
- Support for a standardized approach toward application and database management. A single-vendor solution for the complete product software stack lets you devise a standardized approach toward application and database

management. Further, administrators can apply existing expertise of Veritas technologies toward product.

- Easy administration and monitoring of product clusters using Veritas Operations Manager.
- Enhanced scalability and availability with access to multiple application instances per database in a cluster.
- Prevention of data corruption in split-brain scenarios with robust SCSI-3 Persistent Reservation (PR) based I/O fencing.
- Support for sharing all types of files, in addition to application database files, across nodes.
- Increased availability and performance using Veritas Dynamic Multi-Pathing (DMP). DMP provides wide storage array support for protection from failures and performance bottlenecks in the Host Bus Adapters (HBAs) and Storage Area Network (SAN) switches.
- Fast disaster recovery with minimal downtime and interruption to users. Users can transition from a local high availability site to a wide-area disaster recovery environment with primary and secondary sites. If a node fails, clients that are attached to the failed node can reconnect to a surviving node and resume access to the shared database. Recovery after failure in the product environment is far quicker than recovery for a failover database.
- Support for block-level replication using VVR.

New versioning process for SFHA Solutions products

Symantec made some changes to simplify the versioning process to ensure that customers have a unified experience when it comes to deploying our different products across Storage, Availability, Backup, Archiving and Enterprise Security products. With this change, all the products will have a 3 digit version. In complying with this approach, the current SFHA Solutions release is available as version 6.0.1.

New directory location for the documentation on the software media

The PDF files of the product documentation are now located in the `/docs` directory on the software media. Within the `/docs` directory are subdirectories for each of the bundled products, which contain the documentation specific to that product. The `sfha_solutions` directory contains documentation that applies to all products.

New directory location for the documentation on the software media