

Veritas™ Cluster Server Release Notes

AIX

5.1 Service Pack 1



Veritas™ Cluster Server Release Notes

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- Version and patch level
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Documentation

Product guides are available on the media in PDF format. Make sure that you are using the current version of the documentation. The document version appears on page 2 of each guide. The latest product documentation is available on the Symantec website.

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For information regarding the latest HOWTO articles, documentation updates, or to ask a question regarding product documentation, visit the Storage and Clustering Documentation forum on Symantec Connect.

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Release Notes

This document includes the following topics:

- [About this document](#)
- [Component product release notes](#)
- [About Veritas Cluster Server](#)
- [About Symantec Operations Readiness Tools](#)
- [Important release information](#)
- [Changes in version](#)
- [VCS system requirements](#)
- [Features no longer supported](#)
- [Fixed issues](#)
- [Known issues](#)
- [Software limitations](#)
- [Documentation errata](#)
- [Documentation](#)

About this document

This document provides important information about Veritas Cluster Server (VCS) version 5.1 SP1 for AIX. Review this entire document before you install VCS.

The information in the Release Notes supersedes the information provided in the product documents for VCS.

This is Document version: 5.1SP1.3 of the *Veritas Cluster Server Release Notes*. Before you start, ensure that you are using the latest version of this guide. The latest product documentation is available on the Symantec Web site at:

<http://www.symantec.com/business/support/overview.jsp?pid=15107>

Component product release notes

In addition to reading this Release Notes document, review the component product release notes before installing the product.

Product guides are available at the following location in PDF formats:

/product_name/docs

Symantec recommends copying the files to the `/opt/VRTS/docs` directory on your system.

This release includes the following component product release notes:

- *Veritas Storage Foundation Release Notes (5.1 SP1)*

About Veritas Cluster Server

Veritas™ Cluster Server by Symantec (VCS) is a clustering solution that eliminates downtime, facilitates server consolidation and failover, and effectively manages a wide range of applications in heterogeneous environments.

About VCS agents

VCS bundled agents manage a cluster's key resources. The implementation and configuration of bundled agents vary by platform.

For more information about bundled agents, refer to the *Veritas Cluster Server Bundled Agents Reference Guide*.

The Veritas High Availability Agent Pack gives you access to agents that provide high availability for various applications, databases, and third-party storage solutions. The Agent Pack is available through Symantec™ Operations Readiness Tools (SORT).

For more information about SORT, see <https://sort.symantec.com/home>.

For information about agents under development and agents that are available through Symantec consulting services, contact your Symantec sales representative.

VCS provides a framework that allows for the creation of custom agents. Create agents in situations where the Veritas High Availability Agent Pack, the bundled agents, or the enterprise agents do not meet your needs.

For more information about the creation of custom agents, refer to the *Veritas Cluster Server Agent Developer's Guide*. You can also request a custom agent through Symantec consulting services.

About compiling custom agents

Custom agents developed in C++ must be compiled using the IBM C for AIX Compiler Version 7.0. Use the `-brtl` flag for runtime linking with the framework library.

About Symantec Operations Readiness Tools

Symantec™ Operations Readiness Tools (SORT) is a set of Web-based tools and services that lets you proactively manage your Symantec enterprise products. SORT automates and simplifies administration tasks, so you can manage your data center more efficiently and get the most out of your Symantec products. SORT lets you do the following:

- Collect, analyze, and report on server configurations across UNIX or Windows environments. You can use this data to do the following:
 - Assess whether your systems are ready to install or upgrade Symantec enterprise products
 - Tune environmental parameters so you can increase performance, availability, and use
 - Analyze your current deployment and identify the Symantec products and licenses you are using
- Upload configuration data to the SORT Web site, so you can share information with coworkers, managers, and Symantec Technical Support
- Compare your configurations to one another or to a standard build, so you can determine if a configuration has "drifted"
- Search for and download the latest product patches
- Get notifications about the latest updates for:
 - Patches
 - Hardware compatibility lists (HCLs)
 - Array Support Libraries (ASLs)

- Array Policy Modules (APMs)
- High availability agents
- Determine whether your Symantec enterprise product configurations conform to best practices
- Search and browse the latest product documentation
- Look up error code descriptions and solutions

Note: Certain features of SORT are not available for all products.

To access SORT, go to:

<http://sort.symantec.com>

Important release information

- The latest product documentation is available on the Symantec Web site at:
<http://www.symantec.com/business/support/overview.jsp?pid=15107>
- For important updates regarding this release, review the Late-Breaking News TechNote on the Symantec Technical Support website:
<http://entsupport.symantec.com/docs/334998>
- For the latest patches available for this release, go to:
<http://sort.symantec.com/>

Changes in version

This section lists the changes for Veritas Cluster Server.

Changes related to the installation

The product installer includes the following changes.

Rolling upgrade support

To reduce downtime, the installer supports rolling upgrades. A rolling upgrade requires little or no downtime. A rolling upgrade has two main phases. In phase 1, the installer upgrades kernel packages on a subcluster. In phase 2, non-kernel packages are upgraded.

All high availability products support a rolling upgrade. You can perform a rolling upgrade from 5.1 or from any RPs to the current release.

You can perform a rolling upgrade using the script-based or Web-based installer. See the *Veritas Cluster Server Installation Guide*.

Installer-related changes to configure LLT private links, detect aggregated links, and configure LLT over UDP

For all high availability products, the installer provides the following new features in this release to configure LLT private links during the VCS configuration:

- The installer detects and lists the aggregated links that you can choose to configure as private heartbeat links.
- The installer provides an option to detect NICs on each system and network links, and sets link priority to configure LLT over Ethernet.
- The installer provides an option to configure LLT over UDP.

See the *Veritas Cluster Server Installation Guide*.

Installer changes related to I/O fencing configuration

In VCS 5.1 or SFHA 5.1, the installer started I/O fencing in disabled mode even if you had not chosen to configure I/O fencing. In 5.1 SP1, if you did not choose to configure I/O fencing during the product configuration, then the installer does not start I/O fencing in disabled mode in VCS and SFHA clusters.

However, if you upgrade VCS or SFHA from 5.1 to 5.1SP1, the installer retains the I/O fencing configuration from the previous version.

Installer supports configuration of non-SCSI3 based fencing

You can now configure non-SCSI3 based fencing for VCS cluster using the installer. See the *Veritas Cluster Server Installation Guide*.

Web-based installer supports configuring VCS cluster in secure mode

You can now configure the VCS cluster in secure mode using the Web-based installer.

See the *Veritas Cluster Server Installation Guide*.

The installer can copy CPI scripts to any given location using `-copyinstallscripts` option

The installer can copy CPI scripts to given location using `-copyinstallscripts` option. This option is used when customers install SFHA products manually and

require CPI scripts stored on the system to perform product configuration, uninstallation, and licensing tasks without the product media.

See the *Veritas Cluster Server Installation Guide*.

Web-based installer supports configuring disk-based fencing for VCS

You can now configure disk-based fencing for the VCS cluster using the Web-based installer.

See the *Veritas Cluster Server Installation Guide*.

The Web-based installer supports adding nodes

The Web-based installer has increased parity with the script-based installer. It now supports the ability to add nodes to a cluster. It also supports configuring secure clusters and fencing configuration.

The installer provides automated, password-less SSH configuration

When you use the installer, it enables SSH or RSH communication among nodes. It creates SSH keys and adds them to the authorization files. After a successful completion, the installer removes the keys and system names from the appropriate files.

When you use the installer for SSH communications, meet the following prerequisites:

- The SSH (or RSH) daemon must be running for auto-detection.
- You need the superuser passwords for the systems where you plan to install VCS.

The installer can check product versions

You can use the installer to identify the version (to the MP/RP/SP level depending on the product) on all platforms. Activate the version checker with `./installer -version system_name`.

Depending on the product, the version checker can identify versions from 4.0 onward.

Upgrade changes

The following lists the upgrade changes in this release.

Supported paths for VCS upgrades that do not require a node reboot

When using the installer program to perform any of the typical upgrade listed in the following upgrade matrix, a node reboot is not required.

Upgrade matrix:

- 5.0MP3 to 5.1SP1
- 5.1 to 5.1 SP1
- 5.1RP1 to 5.1SP1
- 5.1RP2 to 5.1SP1

For supported upgrade matrix, refer to the *Veritas Cluster Server Installation Guide*.

Upgrades that follow any other upgrade paths require a reboot.

Packaging updates

The following lists package changes in this release.

VRTScutil package is no longer supported

The VRTScutil package is obsolete. VCS 5.1SP1 does not support VRTScutil package. If VRTScutil package is already installed, the VCS installer removes this package during product upgrades.

New VRTSamf package

VRTSamf is a new package introduced in this release. The Asynchronous Monitoring Framework (AMF) module, along with the VCS Agent Framework (AGFW) and resource agents provides a way to avoid polling for resource state changes. The AMF module allows the agent to register which resources to monitor and when to wait. The module provides the agent with immediate notification so that action can be taken at the time of the event. AMF enables the VCS agents to monitor a large number of resources with a minimal effect on performance.

VRTSacclib package is no longer shipped with VCS 5.1SP1

The VRTSacclib package was available with VCS 5.1. The package is not shipped with VCS 5.1SP1. The latest VRTSacclib package can be accessed from the Agent Pack release.

Changes to the VCS engine

The HAD can exchange messages up to 64KB size

The size of the messages that HAD supports is increased from 16KB to 64KB. The messages can be exchanged between different HAD processes (running on different systems) or between CLI and HAD processes.

Refer to the following list for the message, object, attribute, and attribute values:

1. Maximum message size = 64KB
2. Maximum object name size = 1KB
3. Maximum attribute name size = 1KB
4. Maximum scalar attribute value size = 4KB
5. Maximum single key (of key-value pair) size = 4KB
6. Maximum single value (of key-value pair) size = 4KB
7. Maximum size of single element of vector or keylist pair = 4KB
8. Maximum user Name size = 1KB
9. Maximum password size = 255b
10. Maximum password encrypted size = 512b

Note: Points 2 through 10 were already supported in 5.1 release.

CPUThresholdLevel attribute is editable

You can configure the Critical, Warning, Note and Info levels. The values must be in descending order.

For Example: {Critical = 100, Warning = 90, Note = 90, Info = 80} is correct value; whereas {Critical = 100, Warning = 90, Note = 100, Info = 80} is not correct value.

Support for intelligent monitoring of VCS resources using IMF

VCS now supports intelligent resource monitoring in addition to poll-based monitoring. Intelligent Monitoring Framework (IMF) is an extension to the VCS agent framework. You can enable or disable the intelligent monitoring functionality of VCS agents as needed.

The benefits of intelligent monitoring over poll-based monitoring are as follows:

- Faster notification of resource state changes.

- Reduction in VCS system utilization which enables VCS to effectively monitor a large number of resources.

See the *Veritas Cluster Server Administrator's Guide* for more information.

The following agents are IMF-aware in VCS 5.1 SP1:

- Mount
- Process
- Application
- Oracle
- Netlsnr
- CFSMount
- CVMVxconfigd
- CFSfsckd

New attributes

The following sections describes the attributes introduced in VCS 5.1SP1, VCS 5.1, and VCS 5.0MP3.

Attributes introduced in VCS 5.1SP1

Application Agent attributes

- **EnvFile:** This attribute specifies the environment file that must be sourced before running `StartProgram`, `StopProgram`, `MonitorProgram` or `CleanProgram`.
- **UseSUDash:** This attribute specifies that the agent must run `su - user -c <program>` or `su user -c <program>` while running `StartProgram`, `StopProgram`, `MonitorProgram` or `CleanProgram`.

RemoteGroup agent attribute

- **ReturnIntOffline:** This attribute can take one of the following three values. These values are not mutually exclusive and can be used in combination with one another. You must set `IntentionalOffline` attribute to 1 for the `ReturnIntOffline` attribute to work.
 - **RemotePartial:** Makes `RemoteGroup` resource to return `IntentionalOffline` when the remote service group is in `ONLINE|PARTIAL` state.
 - **RemoteOffline:** Makes `RemoteGroup` resource to return `IntentionalOffline` when the remote service group is in `OFFLINE` state.

- **RemoteFaulted:** Makes RemoteGroup resource to return IntentionalOffline when the remote service group is in OFFLINE|FAULTED state.

DiskGroup agent attribute

- **Reservation:** Determines if you want to enable SCSI-3 reservation. For more information, please refer to *Bundled Agents Reference Guide*.
In order to support SCSI-3 disk reservation, you must be sure that the disks are SCSI-3 compliant. Since all the disks are not SCSI-3 compliant, reservation commands fail on such disk groups. The Reservation attribute helps in resolving this issue. The Reservation attribute can have one of the following three values:
 - **ClusterDefault:** The disk group is imported with or without SCSI-3 reservation, based on the cluster-level UseFence attribute.
 - **SCSI3:** The disk group is imported with SCSI-3 reservation.
 - **NONE:** The disk group is imported without SCSI-3 reservation. The agent does not care about the cluster-level UseFence attribute.

Note: This attribute must be set to NONE for all resources of type DiskGroup in case of non-SCSI-3 fencing.

IPMultiNICB agent attribute

- **Options:** Value of this attribute is used as the option for the `ifconfig` command. For example, if value of this attribute is set to “metric 2” then “metric 2” option is set on the interface while bringing IPMultiNICB resource online.

LVMVG agent attribute

- **ModePermSyncFlag:** This attribute is added to get the mode and permissions without activating the volume group. The default value of ModePermSyncFlag is 1. To skip the activation of the volume group before preserving mode and permissions, set the value of ModePermSyncFlag attribute to 0 (zero).

NFSRestart agent attribute

- **Lower:** Defines the position of the NFSRestart resource in the service group. The NFSRestart resource below the Share resource needs a value of 1. The NFSRestart resource on the top of the resource dependency tree has a Lower attribute value of 0.

RVGPrimary agent attribute

- **BunkerSyncTimeOut:** The timeout value in seconds that signifies the amount of time that a Secondary RVG can wait for the synchronization from the bunker host to complete before taking over the Primary role.

NotifierSourceIP agent attribute

- **NotifierSourceIP:** Lets you specify the interface that the notifier must use to send packets. This attribute is string/scalar. You must specify an IP address that is either DNS resolvable or appears in the `/etc/hosts` file.

SambaServer agent attributes

- **PidFile:** The absolute path to the Samba daemon (smbd) Pid file. This attribute is mandatory if you are using Samba configuration file with non-default name or path.
- **SocketAddress:** The IPv4 address where the Samba daemon (smbd) listens for connections. This attribute is mandatory if you are configuring multiple SambaServer resources on a node.

ASMinst agent attributes

- **MonitorOption:** Enables or disables health check monitoring.

NetBios agent attribute

- **PidFile:** The absolute path to the Samba daemon (nmbd) PidFile. This attribute is mandatory if you are using Samba configuration file with non-default name or path.

Sybase agent attribute

- **Run_ServerFile:** The attribute specifies the location of the `RUN_SERVER` file for a Sybase instance. If this attribute is not specified, the default location of this file is accessed while starting Sybase server instances.

Cluster-level attributes

- **AutoAddSystemToCSG:** Indicates whether the newly joined or added systems in the cluster become a part of the `SystemList` of the `ClusterService` service group if the service group is confirmed. The value 1 (default) indicates that the new systems are added to `SystemList` of `ClusterService`. The value 0 indicates that the new systems are not added to `SystemList` of `ClusterService`.
- **CounterMissTolerance:** If `GlobalCounter` does not update in `CounterMissTolerance` intervals of `CounterInterval`, then VCS reports about this issue depending on the `CounterMissAction` (that is, `CounterMissTolerance * CounterInterval`) time has elapsed since last update of `GlobalCounter` then `CounterMissAction` is performed. The default value of `CounterMissTolerance` is 20.
- **CounterMissAction:** The action mentioned in `CounterMissAction` is performed whenever the `GlobalCounter` is not updated for `CounterMissTolerance` intervals of `CounterInterval`.
The two possible values of `CounterMissAction` are `LogOnly` and `Trigger`.

LogOnly logs the message in Engine Log and SysLog. Trigger invokes a trigger which has a default action of collecting the comms tar file. The Default value of Trigger is LogOnly.

- PreferredFencingPolicy: The I/O fencing race policy to determine the surviving subcluster in the event of a network partition. Valid values are Disabled, System, or Group.

Disabled: Preferred fencing is disabled. The fencing driver favors the subcluster with maximum number of nodes during the race for coordination points.

System: The fencing driver gives preference to the system that is more powerful than others in terms of architecture, number of CPUs, or memory during the race for coordination points. VCS uses the system-level attribute FencingWeight to calculate the node weight.

Group: The fencing driver gives preference to the node with higher priority service groups during the race for coordination points. VCS uses the group-level attribute Priority to determine the node weight.

Resource type attributes

- IMF: Determines whether the IMF-aware agent must perform intelligent resource monitoring.

It is an association attribute with three keys Mode, MonitorFreq, and RegisterRetryLimit.

- Mode: Defines whether to perform IMF monitoring based on the state of the resource. Mode can take values 0, 1, 2, or 3. Default is 0.
 - MonitorFreq: Specifies the frequency at which the agent invokes the monitor agent function. Default is 1.
 - RegisterRetryLimit: Defines the maximum number of times the agent attempts to register a resource. Default is 3.
- IMFRegList: Contains a list of attributes. The values of these attributes are registered with the IMF module for notification. If an attribute defined in IMFRegList attribute is changed then the resource, if already registered, is unregistered from IMF. If IMFRegList is not defined and if any attribute defined in ArgList is changed the resource is unregistered from IMF.
- AlertOnMonitorTimeouts: Indicates the number of consecutive monitor failures after which VCS sends an SNMP notification to the user.

WPAR agent attribute

- ResourceSet: A resource set is used to define a subset of processors in the system. If a resource set is specified for a workload partition, it can use the processors within the specified resource set only. The value of the ResourceSet attribute is the name of the resource set created using the `mkrset` command.

If set, the agent configures the WPAR to use only the resource set specified by this attribute.

- **WorkLoad:** Allows modification of resource control attributes of WPAR - `shares_CPU` and `shares_memory`. This attribute has two keys, CPU and MEM. The key CPU is used to specify the number of processor shares that are available to the workload partition. The key MEM is used to specify the number of memory shares that are available to the workload partition.

Attributes introduced in VCS 5.1

VCS 5.1 introduced the following new attributes. See the *Veritas Cluster Server Administrator's Guide* for more information.

Resource type attributes:

- **ContainerOpts:** Specifies the behavior of the agent in a container environment.
- **CleanRetryLimit:** Number of times to retry the clean function before moving a resource to ADMIN_WAIT state.
- **EPClass:** Enables you to control the scheduling class for the agent functions (entry points) except the online entry point.
- **EPPriority:** Enables you to control the scheduling priority for the agent functions (entry points) except the online entry point.
- **FaultPropogation:** Specifies if VCS should propagate the fault up to parent resources and take the entire service group offline when a resource faults.
- **OnlineClass:** Enables you to control the scheduling class for the online agent function (entry point).
- **OnlinePriority:** Enables you to control the scheduling priority for the online agent function (entry point).

Service group level attribute:

- **ContainerInfo:** Specifies information about the container that the service group manages.

Cluster level attributes:

- **CID:** The CID provides universally unique identification for a cluster.
- **DeleteOnlineResource:** Defines whether you can delete online resources.
- **HostMonLogLevel:** Controls the behavior of the HostMonitor feature.

Attributes introduced in VCS 5.0 MP3

VCS 5.0MP3 introduced the following attributes.

Resource type attributes:

- **FaultPropagation:** Specifies if VCS should propagate the fault up to parent resources and take the entire service group offline when a resource faults.
- **AgentFile:** Complete name and path of the binary for an agent. Use when the agent binaries are not installed at their default locations.
- **AgentDirectory:** Complete path of the directory in which the agent binary and scripts are located. Use when the agent binaries are not installed at their default locations.

Cluster level attributes:

- **DeleteOnlineResource:** Defines whether you can delete online resources.
- **HostMonLogLvl:** Controls the behavior of the HostMonitor daemon. Configure this attribute when you start the cluster. You cannot modify this attribute in a running cluster.
- **EngineShutdown:** Provides finer control over the hastop command.
- **BackupInterval:** Time period in minutes after which VCS backs up configuration files.
- **OperatorGroups:** List of operating system user account groups that have Operator privileges on the cluster.
- **AdministratorGroups:** List of operating system user account groups that have administrative privileges on the cluster.
- **Guests:** List of users that have Guest privileges on the cluster.

System level attributes:

- **EngineVersion:** Specifies the major, minor, maintenance-patch, and point-patch version of VCS.

Service group level attributes:

- **TriggerResFault:** Defines whether VCS invokes the resfault trigger when a resource faults.
- **AdministratorGroups:** List of operating system user account groups that have administrative privileges on the service group.
- **OperatorGroups:** List of operating system user account groups that have Operator privileges on the service group.
- **Guests:** List of users that have Guest privileges on the service group.

Changes to bundled agents

This section describes changes to the bundled agents for VCS.

New bundled agent

- VolumeSet agent: The VolumeSet agent brings online, takes offline, and monitors a Veritas Volume Manager (VxVM) volume set. Use this agent to make a volume set highly available.

Support for Veritas dynamic multi-pathing

The following agent supports Veritas Dynamic Multi-Pathing (DMP):

- LVMVG agent

About the ReturnIntOffline attribute of RemoteGroup agent

The ReturnIntOffline attribute can take one of three values: RemotePartial, RemoteOffline, and RemoteFaulted.

These values are not mutually exclusive and can be used in combination with one another. You must set the IntentionalOffline attribute of RemoteGroup resource to 1 for the ReturnIntOffline attribute to work.

About the RemotePartial option

Select the RemotePartial value of this attribute when you want the RemoteGroup resource to return an IntentionalOffline when the remote service group is in an ONLINE | PARTIAL state.

About the RemoteOffline option

Select the RemoteOffline value of this attribute when you want the RemoteGroup resource to return an IntentionalOffline when the remote service group is in an OFFLINE state.

About the RemoteFaulted option

Select the RemoteFaulted value of this attribute when you want the RemoteGroup resource to return an IntentionalOffline when the remote service group is in an OFFLINE | FAULTED state.

Configuring RemoteGroup resources in parallel service groups

When a RemoteGroup resource is configured inside parallel service groups, it can come online on all the cluster nodes, including the offline nodes. Multiple instances of the RemoteGroup resource on cluster nodes can probe the state of a remote service group.

Note: The RemoteGroup resource automatically detects whether it is configured for a parallel service group or for a failover service group. No additional configuration is required to enable the RemoteGroup resource for parallel service groups.

A RemoteGroup resource in parallel service groups has the following characteristics:

- The RemoteGroup resource continues to monitor the remote service group even when the resource is offline.
- The RemoteGroup resource does not take the remote service group offline if the resource is online anywhere in the cluster.
- After an agent restarts, the RemoteGroup resource does not return offline if the resource is online on another cluster node.
- The RemoteGroup resource takes the remote service group offline if it is the only instance of RemoteGroup resource online in the cluster.
- An attempt to bring a RemoteGroup resource online has no effect if the same resource instance is online on another node in the cluster.

Changes to SambaServer and NetBios agents

The SambaServer and NetBios agents contain the following changes:

- VCS SambaServer and NetBios agents now support multiple resource instances on a node.
- These agents now support non default Samba configuration file and pid file names.

For more information about bundled agents, refer to the *Veritas Cluster Server Bundled Agents Reference Guide*.

Changes to Disk Group agents

The clean entry point in AIX can produce the system dump.

The clean entry point in AIX can now forcefully produce a system dump when a system fails over to another node. To investigate the system failure, the system dump is produced using the following command: `# sysdumpstart -p`

Changes to database agents

Changes to the Oracle agent

- Oracle agent now supports IMF monitoring.

Changes to the Sybase agent

- The Sybase agent supports a new optional attribute `Run_ServerFile`. The attribute specifies the location of the `RUN_SERVER` file for a Sybase instance. If this attribute is not specified, the default location of the `RUN_SERVER` file is accessed while starting Sybase server instances.
- The VCS agent binaries for Sybase are now a part of `VRTSvcs` package. This package also includes the VCS agent binaries for DB2 and Oracle.
- The agent supports a new attribute `WaitForRecovery`. If this attribute is enabled, during the online function, the agent waits until recovery is completed and all databases that can be made online are brought online.

Changes to LLT

This release includes the following new features and changes to LLT:

- LLT startup time through the LLT init script is now optimized to use a constant time. LLT takes less than 16 seconds to start irrespective of the number of links specified in `/etc/llttab` file.
In the previous releases, LLT took around $(5 * \text{number_of_links_specified_in_the_}/etc/llttab_file)$ seconds to start.
 - The `lltstat` command includes the following new options:
 - `lltstat -nv active`
This command filters the output of `lltstat -nv` to display the status of only the active nodes in the cluster.
 - `lltstat -nv configured`
This command filters the output of `lltstat -nv` to display the status of only the configured nodes in the cluster. Configured nodes include active nodes and any additional nodes which are listed in the `/etc/llthosts` file.
- See the `lltstat` manual page for more information.
- Support for different link speeds for LLT links
LLT now removes the restriction to use private NICs with same media speed. You can now use different media speed for the private NICs and configure the NICs with lesser speed as low-priority links to enhance LLT performance.

- Support for destination-based load balancing
LLT now also provides destination-based load balancing where the LLT link is chosen based on the destination node id and the port. With destination-based load balancing, LLT sends all the packets of a particular destination on a link.

See the *Veritas Cluster Server Installation Guide* and the *Veritas Cluster Server Administrator's Guide* for more details.

Changes to GAB

This section lists the new features and changes related to GAB in this release.

- GAB logging daemon
GAB implements a distributed network protocol. For situations when GAB decides to take the drastic action of killing its userland client process or panicking a node to resolve an issue, data from the affected node alone may not suffice for a meaningful support analysis. The new gablogd daemon attempts to address this issue. GAB starts this daemon by default at GAB configuration time.

See the *Veritas Cluster Server Administrator's Guide* for more information.

Changes to I/O fencing

This section covers the new features and changes related to I/O fencing in this release.

Support for preferred fencing

Traditional fencing prevents a split-brain condition by allowing only one of multiple sub-clusters to continue its operation in case a network partition disrupts regular communication between nodes. The preferred fencing feature gives preference to one sub-cluster over other sub-clusters in determining the surviving sub-cluster. This preference is based on factors such as which of the sub-clusters is running higher priority applications or the total importance of nodes which form that sub-cluster or both.

See the *Veritas Cluster Server Installation Guide* and the *Veritas Cluster Server Administrator's Guide* for more details.

Support for Non-SCSI3 fencing

In environments that do not support SCSI-3, non-SCSI-3 fencing provides reasonable data protection by causing the winning side to delay by a configurable amount (`loser_exit_delay`, default 55). Additionally, Symantec has enhanced the fencing component to help panic the losing side quickly. Together, these

enhancements help narrow down the window of potential data corruption drastically.

See the *Veritas Cluster Server Installation Guide* and the *Veritas Cluster Server Administrator's Guide* for more details.

Enhancements to server-based fencing

This release includes the following enhancements and new features related to server-based fencing:

- Single CP-server based fencing
Support to use a single highly available CP server that is configured on an SFHA cluster to provide server-based fencing support for multiple application clusters
- Support for CP server on AIX and HP-UX
CP server now supports AIX and HP-UX in addition to Linux and Solaris operating systems.

Support to migrate between fencing modes when the cluster is running

The `vxfsnwap` utility now supports migrating between disk-based and server-based fencing configurations in a cluster that is running.

See the *Veritas Cluster Server Administrator's Guide* for more details.

Changes to global clustering

VCS global clustering monitors and manages the replication jobs and clusters at each site. In the event of a site outage, global clustering controls the shift of replication roles to the Secondary site, bring up the critical applications and redirects client traffic from one cluster to the other.

Before Release 5.1SP1, if there was a disaster at the Primary site or a network disruption, the applications were taken offline on the original Primary and failed over to the Secondary. When the original Primary returned or the network disruption was corrected, you had the following options:

- Manually resynchronize the original Primary with the data from the new Primary, once the original Primary comes back up. The applications are only active on the new Primary site.
- Automatically resynchronize the original Primary with the data from the new Primary, once the original Primary comes back up. The applications are only active on the new Primary site.

Beginning in Release 5.1SP1, you have a third option. Applications can be active on both the original Primary and Secondary sites. After the original Primary returns or the network disruption is corrected, you have the option of specifying which site is the Primary going forward. This option is called the primary-elect feature, and it is enabled through the VCS global clustering.

The key difference between the primary-elect feature and the other options is that if a network disruption occurs, applications continue to run on the Primary site and they are also failed over to the Secondary. This feature lets you maintain application availability on both sites while the network is down.

VCS system requirements

This section describes system requirements for VCS.

The following information applies to VCS clusters. The information does not apply to SF Oracle RAC installations.

VCS requires that all nodes in the cluster use the same processor architecture and run the same operating system.

All nodes in the cluster must run the same VCS version. Each node in the cluster may run a different version of the operating system, as long as the operating system is supported by the VCS version in the cluster.

See “[Hardware compatibility list](#)” on page 26.

See “[Supported AIX operating systems](#)” on page 26.

Hardware compatibility list

The compatibility list contains information about supported hardware and is updated regularly. For the latest information on supported hardware go to the following URL:

<http://www.symantec.com/docs/TECH74012>

Before installing or upgrading Veritas Cluster Server, review the current compatibility list to confirm the compatibility of your hardware and software.

Supported AIX operating systems

This section lists the supported operating systems for this release of Veritas products.

Product installation scripts verify the required update levels. The installation process terminates if the target systems do not meet the maintenance level requirements.

The minimum system requirements for this release are as follows:

For Power 6 or earlier processors at one of the following levels:

- AIX 6.1 TL2
- AIX 5.3 at one of the following levels:
 - TL7 with SP6 or later
 - TL8 with SP4 or later

For Power 7 processors at one of the following levels:

- AIX 6.1 TL5 with Service Pack 1 or later
- AIX Version 5.3 executing in POWER6 or POWER6+ compatibility at the following levels:
 - TL11 with Service Pack 2 or later
 - TL10 with Service Pack 4 or later

For important updates regarding this release, review the Late-Breaking News TechNote on the Symantec Technical Support website:

<http://entsupport.symantec.com/docs/334998>

Supported software for VCS

VCS supports the following volume managers and file systems:

- Logical Volume Manager (LVM)
- Journaled File System (JFS) and Enhanced Journaled File System (JFS2) on LVM
- Veritas Storage Foundation (SF): Veritas Volume Manager (VxVM) with Veritas File System (VxFS)

VCS 5.1 SP1 supports the following versions of SF:

- SF 5.1 SP1
 - VxVM 5.1 SP1 with VxFS 5.1 SP1
- SF 5.1
 - VxVM 5.1 with VxFS 5.1

Note: VCS supports the previous version of SF and the next version of SF to facilitate product upgrades.

Supported VCS agents

Table 1-1 lists the agents for enterprise applications and the software that the agents support.

Table 1-1 Supported software for the VCS agents for enterprise applications

Agent	Application	Application version	AIX version
DB2	DB2 Enterprise Server Edition	8.1, 8.2, 9.1, 9.5, 9.7	AIX 5.3, AIX 6.1
Oracle	Oracle	11gR1, 10gR2, 11gR2	AIX 5.3, AIX 6.1
Sybase	Sybase Adaptive Server Enterprise	12.5.x, 15.x	AIX 5.3, AIX 6.1

See the *Veritas Cluster Server Installation Guide* for the agent for more details.

For a list of the VCS application agents and the software that the agents support, see the [Veritas Cluster Server Agents Support Matrix](#) at Symantec website.

Features no longer supported

No longer supported agents and components

VCS no longer supports the following:

- Configuration wizards
- Disk agent
- ServiceGroupHB agent.
 This release does not support disk heartbeats. Symantec recommends using I/O fencing.
- VRTSWebApp
- Oracle 8.0.x, Oracle 8.1.x, and Oracle 9i - not supported by the updated Oracle agent.
- VCS documentation package (VRTSvcsdc)
 The VCS documentation package (VRTSvcsdc) is deprecated. The software disc contains the documentation for VCS in Portable Document Format (PDF) in the *cluster_server/docs* directory.

Symantec recommends copying pertinent documents from the disc to your system directory /opt/VRTS/docs for reference.

- hahbsetup tool. This tool is removed as no supported feature requires this tool.
- VRTScutil package. This package is no longer supported.

Fixed issues

This section covers the incidents that are fixed in this release.

This release includes fixed issues from the 5.1 Service Pack (SP) 1 Rolling Patch (RP) 2 release. For the list of fixed issues in the 5.1 SP1 RP2 release, see the Veritas Storage Foundation and High Availability Solutions 5.1 SP1 RP2 Release Notes.

See the corresponding Release Notes for a complete list of fixed incidents related to that product.

LLT, GAB, and I/O fencing fixed issues

[Table 1-2](#) lists the fixed issues for LLT, GAB, and I/O fencing.

Table 1-2 LLT, GAB, and I/O fencing fixed issues

Incident	Description
1908938	[GAB] In a large cluster, cascaded lowest node failures result in GAB panic during sequence space recovery.
1840826	[GAB] Prevent 'gabconfig -c' while port 'a' is in the middle of iofence processing.
2096584	[LLT] LLT unload may fail but should not cause hang/panic on AIX when clients are registered.
1861439 1849527	[LLT] Removing the LLT links from a single node in a four-node cluster causes other nodes to panic.
2066020	[LLT] The <code>dlpiping</code> utility exits with an error similar to "dlpiping: send ECHO_REQ failed."
2005045	[LLT] The <code>hastart</code> command fails to start HAD on one of the nodes with message "GabHandle::open failed errno = 16" in syslog after HAD is stopped on all the nodes in the cluster simultaneously.
1859023	[LLT] The <code>lltconfig -T query</code> command displays a partially incorrect output

Table 1-2 LLT, GAB, and I/O fencing fixed issues (*continued*)

Incident	Description
1846387 2084121	[Fencing] The <code>vx fenceswap</code> and the <code>vx fencesthaw</code> utilities fail when rsh or ssh communication is not set to the same node.
1922413	[Fencing] The <code>vx fencesthaw</code> utility should detect storage arrays which interpret NULL keys as valid for registrations/reservations.
1847517	[Fencing] The <code>vx fenceswap</code> utility has an incorrect usage message for <code>-n</code> option
1992560	[Fencing] The <code>vx fencesthaw</code> utility uses <code>scp</code> to communicate with the local host.
1512956	[Fencing] The <code>vx fenceclearpre</code> utility displays error messages
2143933	[VxCPS] For a four-node cluster, the installer fails to configure server-based fencing which uses three CP servers as its coordination points. The process fails while registering the CP clients on the third CP server.
2151166	[VxCPS] Need strict host name matching in coordination point installer.

Bundled agents fixed issues

[Table 1-3](#) lists the fixed issues for bundled agents.

Table 1-3 Bundled agents fixed issues

Incident	Description
251704	The index number of the virtual interfaces changes after a failover. As a result applications using the interfaces may face communication failure.
252354	Application agent does not pass the value of <code>CleanReason</code> to the script that the Agent executes as per the value of the <code>CleanProgram</code> attribute.
2001039	In a frozen local service group, if a resource goes offline outside VCS control, a <code>RemoteGroup</code> resource also goes offline.

Table 1-3 Bundled agents fixed issues (*continued*)

Incident	Description
2019904	The OS determines the interface that the notifier uses to send packets. The user must be optionally able to specify the interface. This is an enhancement.
2045972	If you upgrade to VCS 5.1, Application resources may go to the FAULTED state.
2111972	A resource fails to come online if the number of disks that you add to the volume group are more than the number of disks that the volume group already has.

VCS engine fixed issues

[Table 1-4](#) lists the fixed issues for VCS engine.

Table 1-4 VCS engine fixed issues

Incident	Description
254693	If the OnlineRetryLimit and PreOnline attributes are set for a group, then the group does not fail over in case of a fault.
970971	At unfreeze of a failover group, VCS does not evaluate the group for Concurrency violation.
1074707	A global group goes online on a remote site despite a concurrency violation. This behavior is observed if a related group resource goes intentionally online on the remote site.
1472734	VCS must log an alert message to increase the value of the ShutdownTimeout attribute on a multi-CPU computer.
1634494	If the GlobalCounter attribute does not increase at the configured interval, VCS must report the failure.
1859387	When a parent group completely faults in a system zone, an online-local-hard (OLH) child group fails over to another system. This behavior is observed only if the child group is marked for manual failover in campus cluster. That is, the value of the AutoFailover attribute for the group is equal to 2.

Table 1-4 VCS engine fixed issues (*continued*)

Incident	Description
1861740	The Subject line of the SMTP notification email must contain the Entity name. This is an enhancement.
1866434	When hashadow attempts to restart the High Availability Daemon (HAD) module, if the <code>/var/VRTSvcs/lock/.hadargs</code> file does not exist, hashadow gets the SIGSEGV signal.
1874261	VCS sets the MonitorOnly attribute of the resources in a frozen service group to 0. This behavior occurs even if the ExternalStateChange attribute is not set to OfflineGroup for a resource that goes intentionally offline.
1874533	If a resource, with the ExternalStateChange attribute set to OfflineGroup, goes intentionally offline, VCS sets the MonitorOnly attribute of all resources in a frozen service group to 0. VCS must set the MonitorOnly attribute only when required.
1915908	The <code>hares</code> command lets you have the "." special character in a resource name.
1958245	Notifier Agent is unable to get the local IP address in the linked-based IPMP.
1971256	If a service group faults during failover, then VCS may not honor the Prerequisites/Limits attributes on the target system.
2022123	The <code>notifier</code> command must let you specify the originating source IP address. This is an enhancement.
2061932	If you override a static attribute for a resource with an empty type definition, then VCS dumps duplicate entries for the attribute in the configuration file.
2081725	After a child group autostarts, VCS does not bring a partially-online parent to ONLINE state.
2083232	If you configure an online-local dependency between two parallel groups, then the parent service group does not AutoStart on all nodes.
2084961	If the VCS configuration includes a file with an absolute pathname, then you cannot load templates from the cluster manager GUI.

Table 1-4 VCS engine fixed issues (*continued*)

Incident	Description
2111296	In rare cases, VCS tries to bring online a failover service group that is already online on another node.
2128658	If you add a script-based WAN heartbeat, the heartbeat agent generates a core file and fails to report status.

Enterprise agents fixed issues

[Table 1-5](#) lists the fixed issues for enterprise agents.

Table 1-5 Enterprise agents fixed issues

Incident	Description
776230	The Sybase agent offline script must support the databases that require a longer time to shut down. This is an enhancement.
2117378	When the monitor entry function encounters an invalid process ID (PID) in a PID file, the function fails to detect the exit status of the process. This behavior occurs if the PID has an empty line below it. The function also accordingly fails to detect the correct state of a failed DB2 Connect instance.

VCS 5.1 RP1 fixed issues

Table 1-6 Veritas Cluster Server 5.1 RP1 fixed issues

Fixed issues	Description
1967207	vxfsconfig -l reports multiple (duplicate) paths after phased upgrade on the first sub-cluster.
1946367	Change in LLT delivery thread's priority limits.
1941647	The <code>haalert</code> command hangs if the engine is not in running state.
1922411	vxfsentsthdw must detect storage arrays which interpret NULL keys as valid for registrations/reservations.
1916004	ASMagent connects as sysdba instead of sysasm for 11gR2.

Table 1-6 Veritas Cluster Server 5.1 RP1 fixed issues (*continued*)

Fixed issues	Description
1915909	The <code>hares</code> command lets you create resources which has the "." special character
1915016	Port h halting system due to internal protocol error on <code>gab_sf_dlv_gaps()</code> .
1900450	Race script is killed if it exceeds the script time-out.
1874267	If <code>ExternalStateChange</code> is not set to <code>OfflineGroup</code> , do not set <code>MonitorOnly</code> to 0 .
1870424	LLT must display an error message if an attempt is made to configure more than 8 links (<code>LLT_MAX_LINK</code>) under LLT.
1855196	System panics due to depleted memory during GAB broadcast stress and reboot node 0.
1839091	Resource coordpoint becomes FAULTED from time to time.

VCS 5.1 RP2 fixed issues

Table 1-7 Veritas Cluster Server 5.1 RP2 fixed issues

Fixed issues	Description
1986311	Issue occurs while accessing a freed pointer in <code>vxfsend</code> .
2011416	Memory leaks occur in <code>llt_dlpi_setup</code> and <code>llt_closenode</code> paths.
2019899	Notifier faces issues in binding to a specific source IP address.
2031931	Issue occurs while executing the <code>lltconfig -a set 1 link1 <ip-address></code> command .
2059631	LLT links go off/on repeatedly after configuring LLT over <code>udp</code> in IPv6.
2069689	HAD dumps a core file while deleting a resource.
2070743	HAD gets stuck in a tight loop when HACL1 forks and membership changes.
2077396	VCS dumps core under heavy load system which results in node panic.
2086251	GAB driver must be enhanced to prevent <code>gabconfig -c</code> while port 'a' is in the middle of <code>iofence</code> processing. Else, system may panic.

Table 1-7 Veritas Cluster Server 5.1 RP2 fixed issues (*continued*)

Fixed issues	Description
2086280	Node panics after running the GTX tc.
2102777	RemoteGroup resource must support remote groups that are a parallel SG.
2083268	RFC check with DNS agent must be disabled..
2083181	Issue occurs in llt_opennode(), check p_registered and p_unregistering under port lock.
2100421	Cluster goes in jeopardy after upgrade from 5.1 to 5.1RP2.
2108816	MemCPUAllocator agent breaks if CPURequired attribute is not declared in the AIX 6.1 Virtualised environment.
2087190	nfs_lock_\$RESNAME file is not removed after system crash and monitor complains.
2110465	vxfcntlpre cannot clear keys from coordinator disks and data disks when there's a preexisting split brain.
2111294	Some VCS nodes in a group are online and some are not.
2116161	LVMVG goes not come online.
2119570	Issue occurs in Oracle detailed monitoring when sending SNMP notification on WARN signal.
2120020	DB2 resource generated excessive logging in engine_A.log.
2125442	HAD must bring online the failover service group only if it is offline on all nodes after the service group is unfrozen.
2126871	Memory leak occurs in MultiNICB agent.
1937834	Partial parent group must auto-start after child comes online, and service group must fail over after node panic.
2066967	Heartbeating logic between engine and agfw must improve during snapshotting and during steady cluster operations.
2071549	Under heavy load, HAD may wait indefinitely in waitpid() when user requests to run some command through "hacli". This may cause GAB to kill HAD.
2077363	Overriding static attribute for any resource with empty type definition creates duplicate entries in main.cf
2077375	Parallel group in PARTIAL state autostarts in case of engine restart.

Table 1-7 Veritas Cluster Server 5.1 RP2 fixed issues (*continued*)

Fixed issues	Description
2079617	NFSRestart agent must remain online if HAD is forcefully stopped and restarted.
2079622	nfs splitbrain test: Delay forced import of disk group agent to avoid errors to client nodes.
2079664	ClusterService Group autopopulates system list
2080703	Memory leak occurs when running the <code>hareg -group</code> command.
2084977	A stack overflow occurs when a file name is very long.
2089182	The <code>vxcperv</code> process memory keeps growing when you run <code>cpsadm</code> commands.
2102764	RemoteGroup resource appears OFFLINE even after applying patch for issue 1834858.
2110465	<code>vxfcntlpre</code> cannot clear keys from coordinator disks and data disks when there is a preexisting split brain.

Known issues

This section covers the known issues in this release.

See the corresponding Release Notes for a complete list of known issues related to that product.

See [“Documentation”](#) on page 64.

Hang or crash issue in `frmalloc` recursive lock acquisition

Recursive calls to `xmalloc` causes hang or crash in `frmalloc` recursive lock acquisition. This issue is reported on AIX 6.1.

Workaround: To resolve the issue, install the following APARs before installing VCS:

AIX 6.1 TL4 APAR IZ65498

AIX 6.1 TL4 APAR IZ64768

For versions earlier than AIX 6.1 TL4, contact IBM for a suitable APAR.

NFS cluster I/O fails when storage is disabled

The I/O from the NFS clusters are saved on a shared disk or a shared storage. When the shared disks or shared storage connected to the NFS clusters are disabled, the I/O from the NFS Client fails and an I/O error occurs.

Workaround: If the application exits (fails/stops), restart the application.

Issues related to installation

This section describes the known issues during installation and upgrade.

Installation precheck can cause the installer to throw a license package warning (2320279)

If the installation precheck is attempted after another task completes (for example checking the description or requirements) the installer throws the license package warning. The warning reads:

```
VRTSvlic not installed on system_name
```

Workaround:

The warning is due to a software error and can be safely ignored.

While configuring authentication passwords through the Veritas product installer, the double quote character is not accepted (1245237)

The Veritas product installer prompts you to configure authentication passwords when you configure Veritas Cluster Server (VCS) as a secure cluster, or when you configure Symantec Product Authentication Service (AT) in authentication broker (AB) mode. If you use the Veritas product installer to configure authentication passwords, the double quote character (") is not accepted. Even though this special character is accepted by authentication, the installer does not correctly pass the characters through to the nodes.

Workaround: There is no workaround for this issue. When entering authentication passwords, do not use the double quote character (").

Errors observed during partial upgrade of SFHA

While upgrading the VCS packages during an SFHA upgrade from 5.0 MP3 RP2 to 5.1SP1, CPI failed to uninstall the I/O fencing packages (VRTSvxfen, VRTSllt, and VRTSgab). [1779129]

Workaround

Before upgrading SFHA from 5.0 MP3 RP2 to 5.1SP1, you must apply the I/O fencing hotfix 5.0MP3RP2HF2.

Manual upgrade of VRTSvlic package loses keyless product levels (2115662)

If you upgrade the `VRTSvlic` package manually, the product levels that were set using `vxkeyless` may be lost. The output of the `vxkeyless display` command will not display correctly.

To prevent this, perform the following steps while manually upgrading the VRTSvlic package.

To manually upgrade the VRTSvlic package

1. Note down the list of products configured on the node for keyless licensing.

```
# vxkeyless display
```

2. Set the product level to NONE.

```
# vxkeyless set NONE
```

3. Upgrade the VRTSvlic package.

```
# installp -u VRTSvlic
```

This step may report a dependency, which can be safely overridden.

```
# installp -acgX -d pathname VRTSvlic
```

4. Restore the list of products that you noted in step 1.

```
# vxkeyless set product[,product]
```

Issues with keyless licensing reminders after upgrading VRTSvlic (2141446)

After upgrading from 5.1 to 5.1SP1, some keyless licenses may be left in the system. As a result, you may see periodic reminders being logged if the VOM server is not configured.

This happens if you were using keyless keys before upgrading to 5.1SP1. After the upgrade, you install real keys and run `vxkeyless set NONE`. In this case, the keyless licenses may not be completely removed and you see warning messages being logged after two months (if VOM server is not configured). This does not result in any functionality impact.

To resolve this issue, perform the following steps:

1. Note down the list of products configured on the node for keyless licensing. Run `vxkeyless display` to display the list.

2. Set the product level to *NONE* with the command:

```
# vxkeyless set NONE
```

3. Find and delete the keyless licenses left over in the system. To do this, perform the following steps for every key stored in `/etc/vx/licenses/lic:`

- Verify if the key has `VXKEYLESS` feature Enabled using the following command:

```
# vxlicrep -k <license_key> | grep VXKEYLESS
```

- Delete the key if and only if `VXKEYLESS` feature is Enabled.

Note: When performing the search, do not include the `.vxlic` extension as part of the search string.

4. Restore the previous list of products with the command:

```
# vxkeyless set product1[,product]
```

Installer is unable to split a cluster that is registered with one or more CP servers

Splitting a cluster that uses server-based fencing is currently not supported. [2110148]

You can split a cluster into two and reconfigure VCS on the two clusters using the installer. For example, you can split a cluster `clus1` into `clus1A` and `clus1B`.

However, if you use the installer to reconfigure the VCS, the installer retains the same cluster UUID of `clus1` in both `clus1A` and `clus1B`. If both `clus1A` and `clus1B` use the same CP servers for I/O fencing, then the CP server allows registration only from the cluster that attempts to register first. It rejects the registration from the cluster that attempts next. Thus, the installer reports failure during the reconfiguration of the cluster that uses server-based fencing.

Workaround: None.

The installer enters an infinite loop because the cluster is already running in secure mode while configuring server-based fencing (2166599)

During server-based fencing configuration with a secure cluster, if `vxfen` fails to start and you retry server-based fencing configuration, the installer keeps asking to enter another system to enable security after you manually start VCS.

Workaround: When `vxfen` fails to start in customized mode for server-based fencing with a secure cluster, do not choose to retry configuring fencing, choose the default option, then `vxfen` starts in disabled mode. You can also retry fencing configuration using `-fencing` option.

System moves to low system resources while bringing large number process resources online (2061338)

When large number of resource like Process resources (1500 in number) is configured on a Linux system (kernel version 2.6.18-92.el5) than agent gets killed. The reason for is fork failure and fork return with an error number 513. A bug against Red Hat "Issue #822253" exists. Red Hat has confirmed that this is their issue. This issue does't appear on kernel version 2.6.18-194.el5 which they claim to have the fix for this issue.

Operational issues for VCS

Connecting to the database outside VCS control using sqlplus takes too long to respond

Connecting to start the database outside VCS control, using `sqlplus` takes more than 10 minutes to respond after pulling the public network cable. [704069]

Issues with configuration of resource values

If you configure a resource that has more than 425 values in its **ArgListValues**, the agent managing that resource logs a message such as:

```
VCS WARNING V-16-2-13806 Thread(1437547408) ArgListValues overflow;  
Cannot append values more than upper limit of (425).
```

Normally, the number of values in **ArgListValues** for a resource must not exceed 425. However, in case of a keylist, association or vector type of attribute appears in the `ArgList` for a resource-type. Since these attributes can take multiple values, there is a chance for the resource values in **ArgListValues** to exceed 425.

The CmdServer process may not start in IPv6 environments in secure clusters

In an IPv6 environment on secure clusters, the CmdServer process may not start. In addition, security may not function correctly. If it does not start on a particular node, modify that node's `/etc/hosts` file so that the localhost resolves to `::1`.

Workaround: In the `/etc/hosts` file, add the following:

```
::1          localhost
```

Issues related to the VCS engine

Systems with multiple CPUs and copious memory shut-down time may exceed the ShutdownTimeout attribute

The time taken by the system to go down may exceed the default value of the ShutdownTimeout attribute for systems that have a large numbers of CPUs and memory. [1472734]

Workaround: Increase the value of the ShutdownTimeout attribute based on your configuration.

The hacf -cmdtoctf command generates a broken main.cf file

The `hacf -cmdtoctf` command used with the `-dest` option removes the include statements from the types files. [1728738]

Workaround: Add include statements in the main.cf files that are generated using the `hacf -cmdtoctf` command.

VCS Engine logs messages when it eventually connects to a remote cluster

Description: In a global cluster, if a local cluster fails to connect with a remote cluster in the first attempt but succeeds eventually, then you may see the following warning messages in the engine logs. [2110108]

```
VCS WARNING V-16-1-10510 IpmHandle: pen Bind Failed.  
unable to bind to source address 10.209.125.125. errno = 67
```

Workaround: There is currently no workaround for this issue. This issue has no impact on any functionality.

Agent framework can reject `hares -action` command

When a probed resource is disabled and later enabled then, the agent framework can reject `hares -action` command till the agent successfully monitors the resource.

New nodes get added to `SystemList` and `AutoStartList` attributes of `ClusterService` even if `AutoAddSystemToCSG` is disabled

The `AutoAddSystemToCSG` attribute determines whether the newly joined or added systems in a cluster become part of the `SystemList` of the `ClusterService` service group if the service group is configured. The value 1 (default) indicates that the new systems are added to `SystemList` of `ClusterService`.

`AutoAddSystemToCSG` has an impact only when you execute the `hasys -add` command or when a new node joins the cluster. [2159139]

However, when you use the installer to add a new node to the cluster, the installer modifies the `SystemList` and `AutoStartList` attributes irrespective of whether `AutoAddSystemToCSG` is enabled or disabled. The installer adds the new system to the `SystemList` and `AutoStartList`. To add nodes, the installer uses the following commands that are not affected by the value of `AutoAddSystemToCSG`:

```
# hagr -modify ClusterService SystemList -add newnode n
# hagr -modify ClusterService AutoStartList -add newnode
```

Workaround

The installer will be modified in future to prevent automatic addition of nodes to `SystemList` and `AutoStartList`.

As a workaround, use the following commands to remove the nodes from the `SystemList` and `AutoStartList`:

```
# hagr -modify ClusterService SystemList -delete newnode
# hagr -modify ClusterService AutoStartList -delete newnode
```

Issues related to the bundled agents

VCS resources may time out if NFS server is down

The VCS resources may time out if the server NFS mounted file system and the NFS server is down or inaccessible. This behavior is exclusive to AIX platform.

Workaround: You must unmount the NFS mounted file system to restore the cluster to sane condition.

Issues related to the VCS database agents

OracleTypes.cf needs updates for WPAR support (2163956)

To support the Oracle and the Netlsnr agents in WPAR environment, you must modify the OracleTypes.cf file to include the following attributes in both Netlsnr and Oracle type:

```
static int ContainerOpts{}  
= { RunInContainer=1, PassCInfo=0 }
```

Workaround: To modify the OracleTypes.cf for WPAR support

- 1 Stop VCS on all nodes.

```
# hstop -all -force
```

- 2 Edit the OracleTypes.cf file on one of the nodes. Add the following line to Netlsnr and Oracle type:

```
static int ContainerOpts{}  
= { RunInContainer=1, PassCInfo=0 }
```

- 3 Start VCS on the node with modified configuration:

```
# hstart
```

- 4 After VCS has started on the node, start VCS on other cluster nodes:

```
# hstart
```

VCS agent for Oracle: Health check monitoring is not supported for Oracle database 11g R1 and 11g R2 (1985055)

Health check monitoring is not supported for Oracle database 11g R1 and 11g R2.

Workaround: Set MonitorOption attribute for Oracle resource to 0.

VCS agent for Oracle: Health check monitoring does not work with Oracle 10.2.0.4

The health check monitoring in Oracle agent does not work with Oracle 10.2.0.4 due to incompatibility of the health check APIs provided by Oracle. [2101570]

Resolution: Disable health check monitoring by setting the MonitorOption attribute to 0 (zero).

VCS agent for Oracle: Make sure that the ohasd has an entry in the init scripts

Make sure that the ohasd process has an entry in the init scripts so that when the process is killed or the machine is rebooted, this automatically restarts the process.[1985093]

Workaround: Respawn of ohasd process. Add the ohasd process in the `/etc/inittab` file to ensure that this process is automatically restarted when killed or the machine is rebooted.

VCS agent for Oracle: Intentional Offline does not work

Due to issues with health check monitoring, Intentional Offline does not work for VCS agent for Oracle.

The ASMInstAgent does not support having pfile/spfile for the ASM Instance on the ASM diskgroups

The ASMInstAgent does not support having pfile/spfile for the ASM Instance on the ASM diskgroups.

Workaround:

Have a copy of the pfile/spfile in the default `$GRID_HOME/dbs` directory to make sure that this would be picked up during the ASM Instance startup.

VCS agent for ASM: Health check monitoring is not supported for ASMInst agent

The ASMInst agent does not support health check monitoring.

Workaround: Set the MonitorOption attribute to 0.

Concurrency violation due to process startup on failover node is not detected when detail monitoring is set for Oracle resources [2917558]

Inside a failover service group, when the administrator starts an Oracle resource on a node and if the Oracle instance is online on any other node within the cluster, the instance would come up. However, the database does not get mounted. In such circumstances, this startup attempt is detected by basic monitoring. If detail monitoring is enabled, this startup attempt does not get detected.

Workaround: No workaround.

Issues related to the agent framework

Agent framework cannot handle leading and trailing spaces for the dependent attribute

Agent framework does not allow spaces in the target resource attribute name of the dependent resource.

Workaround

Do not provide leading and trailing spaces in the target resource attribute name of the dependent resource.

The agent framework does not detect if service threads hang inside an entry point

In rare cases, the agent framework does not detect if all service threads hang inside a C entry point. In this case it may not cancel them successfully. [1511211]

Workaround: If the service threads of the agent are hung, send a kill signal to restart the agent. Use the following command: `kill -9 hung_agent's_pid`. The `haagent -stop` command does not work in this situation.

The ArgListValues attribute values for dependent resources may not populate correctly when a target resource is deleted and re-added

For resource attributes, deleting a resource prevents a dependent attribute's value from refreshing in the dependent resource's value.

For example, you have resource (*rD*), which depends on a resource's attribute value (*rT:Attr_rt*). When you delete the target resource (*rT*), and re-add it (*rT*), the dependent resource (*rD*) does not get the correct value for the attribute (*Attr_rt*). [1539927]

Workaround: Set the value of the reference attribute (*target_res_name*) to an empty string.

```
# hares -modify rD target_res_name ""
```

Where *rD* is the name of the dependent resource, and *target_res_name* is the name of the reference attribute that contains the name of the target resource.

Set the value of the reference attribute (*target_res_name*) to the name of the target resource (*rT*).

```
# hares -modify rD target_res_name rT
```

Agent performance and heartbeat issues

Depending on the system capacity and the number of resources configured under VCS, the agent may not get enough CPU cycles to function properly. This can prevent the agent from producing a heartbeat synchronously with the engine. If you notice poor agent performance and an agent's inability to heartbeat to the engine, check for the following symptoms.

Navigate to `/var/VRTSvcs/diag/agents/` and look for files that resemble:

```
FFDC_AGFWMMain_729_agent_type.log  FFDC_AGFWTimer_729_agent_type.log core
FFDC_AGFWSvc_729_agent_type.log   agent_typeAgent_stack_729.txt
```

Where *agent_type* is the type of agent, for example Application or FileOnOff. If you find these files, perform the next step.

Navigate to `/var/VRTSvcs/log/` and check the `engine_*.log` file for messages that resemble:

```
2009/10/06 15:31:58 VCS WARNING V-16-1-10023 Agent agent_type
not sending alive messages since Tue Oct 06 15:29:27 2009
2009/10/06 15:31:58 VCS NOTICE V-16-1-53026 Agent agent_type
ipm connection still valid
2009/10/06 15:31:58 VCS NOTICE V-16-1-53030 Termination request sent to
agent_type agent process with pid 729
```

Workaround: If you see that both of the above criteria are true, increase the value of the `AgentReplyTimeout` attribute value. (Up to 300 seconds or as necessary.)
[1853285]

Issues related to global clusters

Clusters are stuck in INIT and LOST_CONN states after enabling AT after cluster migration to IPv6

Clusters are stuck in INIT and LOST_CONN states after enabling Symantec Product Authentication Service (AT) for the first time without secure WAC.
[1836428/1847556]

Workaround: Reboot the clusters or restart VCS on both the clusters. The command `hastop -all` may not stop WAC. In this case, you have to manually kill WAC.

The engine log file receives too many log messages on the secure site in global cluster environments

When the WAC process runs in secure mode on one site, and the other site does not use secure mode, the engine log file on the secure site gets logs every five seconds. [1539646]

Workaround: The two WAC processes in global clusters must always be started in either secure or non-secure mode. The secure and non-secure WAC connections will flood the engine log file with the above messages.

Application group attempts to come online on primary site before fire drill service group goes offline on the secondary site

The application service group comes online on the primary site while the fire drill service group attempts to go offline at the same time, causing the application group to fault. (2107386)

Workaround: Ensure that the fire drill service group is completely offline on the secondary site before the application service group comes online on the primary site.

Issues related to LLT

This section covers the known issues related to LLT in this release.

LLT port stats sometimes shows recvcnt larger than recvbytes

With each received packet, LLT increments the following variables:

- recvcnt (increment by one for every packet)
- recvbytes (increment by size of packet for every packet)

Both these variables are integers. With constant traffic, recvbytes hits and rolls over `MAX_INT` quickly. This can cause the value of recvbytes to be less than the value of recvcnt. [1788315]

This does not impact the LLT functionality.

LLT may incorrectly declare port-level connection for nodes in large cluster configurations

When ports get registered and unregistered frequently on the nodes of the cluster, LLT may declare that a port-level connection exists with another peer node. This

occurs in some corner cases even though a port is not even registered on the peer node. [1809827]

Issues related to I/O fencing

This section covers the known issues related to I/O fencing in this release.

All nodes in a sub-cluster panic if the node that races for I/O fencing panics

At the time of a network partition the lowest node in each sub-cluster races for the coordination points on behalf of that sub-cluster. If the lowest node is unable to contact a majority of the coordination points or the lowest node itself unexpectedly panics during the race, then all the nodes in that sub-cluster will panic. [1965954]

Coordination Point agent does not provide detailed log message for inaccessible CP servers

The Coordination Point agent does not log detailed information of the CP servers that are inaccessible. When CP server is not accessible, the agent does not mention the UUID or the virtual IP of the CP server in the engine log. [1907648]

Preferred fencing does not work as expected for large clusters in certain cases

If you have configured system-based or group-based preferred fencing policy, preferred fencing does not work if all the following cases are true:

- The fencing setup uses customized mode with one or more CP servers.
- The application cluster has more than eight nodes.
- The node weight for a single node (say galaxy with node id 0) is more than the sum total of node weights for the rest of the nodes.
- A network fault occurs and the cluster partitions into two with the single node (galaxy) on one part and the rest of the nodes on the other part.

Under such circumstances, for group-based preferred fencing, the single node panics even though more high priority services are online on that node. For system-based preferred fencing, the single node panics even though more weight is assigned to the node. [2161816]

See the *Veritas Cluster Server Administrator's Guide* for more information on preferred fencing.

Server-based I/O fencing fails to start after configuration on nodes with different locale settings

On each (application cluster) node, the vxfen module retrieves and stores the list of the UUIDs of coordination points. When different nodes have different locale settings, the list of UUIDs on one (application) node does not match with that of the other (application) nodes. Hence, I/O fencing does not start after configuration. [2112742]

Workaround: Start I/O fencing after fixing the locale settings to use the same values on all the (application) cluster nodes.

Reconfiguring VCS with I/O fencing fails if you use the same CP servers

When you reconfigure an application cluster that uses server-based I/O fencing (customized fencing mode), the installer does not remove the application cluster information from the CP servers before the reconfiguration. As a result, if you reconfigure the application cluster and choose to configure I/O fencing in customized mode using the same CP servers, then reconfiguration of server-based fencing for the application cluster fails. [2076240]

Workaround: Manually remove the application cluster information from the CP servers after you reconfigure VCS but before you reconfigure server-based I/O fencing for the application cluster.

See the *Veritas Cluster Server Administrator's Guide* for instructions to remove the application cluster information from the CP servers.

CP server cannot bind to multiple IPs (2085941)

Coordination point server (CP server) binds only to a single virtual IP and listens on the same. Application clusters cannot access the CP server if it fails to establish connection to this virtual IP. Therefore, if the connection fails because of the subnet in which the virtual IP of the CP server exists, you cannot access the CP server even if there is another subnet through which the client can connect to the CP server over a different IP.

Resolution: No known resolution for this issue.

I/O fencing driver fails to configure after reboot in a non-SCSI3 fencing environment

With non-SCSI3 fencing configured, if you reboot cluster nodes using the `reboot -n` command successively without any delay, then the VXFEN driver fails to configure after reboot. [2074279]

Workaround: After rebooting on one system, delay the reboot on the next system by 180 seconds.

Issues related to Symantec Product Authentication Service with VCS

This section covers the known issues related to Symantec Product Authentication Service (AT) in this release.

The `vcsat` and `cpsat` commands may appear to be hung

The following commands may appear to be hung when you invoke them from the command shell:

- `/opt/VRTScps/bin/cpsat`
- `/opt/VRTSvc/bin/vcsat`

This issue occurs when the command requires some user interaction. [1841185]

Workaround:

- To fix the issue for `vcsat`, run the commands as follows:

```
# export EAT_HOME_DIR=/opt/VRTSvc
# /opt/VRTSvc/bin/vssatvcs command_line_argument
# unset EAT_HOME_DIR
```

- To fix the issue for `cpsat`, run the commands as follows:

```
# export EAT_HOME_DIR=/opt/VRTScps
# /opt/VRTScps/bin/vssatcps command_line_argument
# unset EAT_HOME_DIR
```

Issues related to Veritas Cluster Server agents for Veritas Volume Replicator

The following are new additional Veritas Cluster Server agents for Veritas Volume Replicator known issues in 5.1 SP1 release.

Issues with bunker replay

When `ClusterFailoverPolicy` is set to `Auto` and the `AppGroup` is configured only on some nodes of the primary cluster, global cluster immediately detects any system fault at the primary site and quickly fails over the `AppGroup` to the remote site. VVR might take longer to detect the fault at the primary site and to complete its configuration changes to reflect the fault.

This causes the RVGPrimary online at the failover site to fail and the following message is displayed:

```
RVGPrimary:RVGPrimary:online:Diskgroup bunkerdgname
could not be imported on bunker host hostname. Operation
failed with error 256 and message VxVM
VVR vradmin ERROR V-5-52-901 NETWORK ERROR: Remote server
unreachable...
```

```
Timestamp VCS ERROR V-16-2-13066 (hostname) Agent is calling
clean for resource(RVGPrimary) because the resource
is not up even after online completed.
```

Resolution: To ensure that global clustering successfully initiates a bunker replay, Symantec recommends that you set the value of the OnlineRetryLimit attribute to a non-zero value for RVGPrimary resource when the primary site has a bunker configured.

Issues related to AMF driver

AMF driver fails to unload with the Mount Agent running

If Mount Agent uses IMF to monitor mounts of type VxFS, then you cannot unload AMF driver as long as Mount Agent is running. [2262747]

Workaround: Stop the mount agent before you unload the AMF driver.

Software limitations

This section covers the software limitations of this release.

See "[Documentation](#)" on page 64.

Limitations related to installing and upgrading VCS

Upgrades on alternate disk supported only from version 5.1

VCS supports upgrade on an alternate disk only from version 5.1 to version 5.1 SP1. If you are running earlier versions of VCS, perform a full or phased upgrade to version 5.1 and then upgrade to version 5.1 SP1 using an alternate disk.

Limitations related to the VCS engine

VCS deletes user-defined VCS objects that use the HostMonitor object names

If you had defined the following objects in the `main.cf` file using the reserved words for the HostMonitor daemon, then VCS deletes these objects when the VCS engine starts. [1293092]

- Any group that you defined as `VCSHmg` along with all its resources.
- Any resource type that you defined as `HostMonitor` along with all the resources of such resource type.
- Any resource that you defined as `VCSHm`.

Limitations related to the bundled agents

Programs using networked services may stop responding if the host is disconnected

Programs using networked services (for example, NIS, NFS, RPC, or a TCP socket connection to a remote host) can stop responding if the host is disconnected from the network. If such a program is used as an agent entry point, a network disconnect can cause the entry point to stop responding and possibly time out.

For example, if the host is configured to use NIS maps as a client, basic commands such as `ps -ef` can hang if there is network disconnect.

Symantec recommends creating users locally. To reflect local users, configure: `/etc/netsvc.conf`

Limitations of the DiskGroup agent

Volumes in disk group are started automatically if the Veritas Volume Manager default value of `AutoStartVolumes` at system level will be set to `ON` irrespective of the value of the `StartVolumes` attribute defined inside the VCS. Set `AutoStartVolumes` to `OFF` at system level if you do not want to start the volumes as part of import disk group.

Volume agent clean may forcibly stop volume resources

When the attribute `FaultOnMonitorTimeouts` calls the Volume agent clean entry point after a monitor time-out, the `vxvol -f stop` command is also issued. This command forcibly stops all volumes, even if they are still mounted.

False concurrency violation when using PidFiles to monitor application resources

The PID files created by an application contain the PIDs for the processes that are monitored by Application agent. These files may continue to exist even after a node running the application crashes. On restarting the node, the operating system may assign the PIDs listed in the PID files to other processes running on the node.

Thus, if the Application agent monitors the resource using the PidFiles attribute only, the agent may discover the processes running and report a false concurrency violation. This could result in some processes being stopped that are not under VCS control.

Volumes in a disk group start automatically irrespective of the value of the StartVolumes attribute in VCS

Volumes in a disk group are started automatically if the value of the system level attribute autostartvolumes in Veritas Volume Manager is set to On, irrespective of the value of the StartVolumes attribute in VCS.

Workaround

If you do not want the volumes in a disk group to start automatically after the import of a disk group, set the autostartvolumes attribute to Off at the system level.

Limitations related to IMF

- IMF registration on Linux for “bind” file system type is not supported.
- In case of SLES11 SP1:
 - IMF should not be enabled for the resources where the BlockDevice can get mounted on multiple MountPoints.
 - If FSType attribute value is nfs, then IMF registration for “nfs” file system type is not supported.

Limitations related to the VCS database agents

DB2 RestartLimit value

When multiple DB2 resources all start at the same time with no dependencies, they tend to interfere or race with each other. This is a known DB2 issue.

The default value for the DB2 agent RestartLimit is 3. This higher value spreads out the re-start of the DB2 resources (after a resource online failure), which lowers the chances of DB2 resources all starting simultaneously. [1231311]

Limitation with intentional offline functionality of VCS agent for Oracle

The Oracle resource never faults after an intentional offline.

Intentional offline functionality of VCS agent for Oracle requires you to enable health check monitoring. The agent uses Oracle's Health Check API to find the state of the database. If the API returns a graceful shutdown for the database, then the agent marks the resource state as INTENTIONAL OFFLINE. Later if the Oracle agent's online function does not succeed, the agent does not mark the resource as FAULTED. The state remains as INTENTIONAL OFFLINE because the agent receives the database state from the API as graceful shutdown during each monitor cycle. [1805719]

Limitations related to global clusters

- Cluster address for global cluster requires resolved virtual IP.
The virtual IP address must have a DNS entry if virtual IP is used for heartbeat agents.
- Total number of clusters in a global cluster configuration can not exceed four.
- Cluster may not be declared as faulted when Symm heartbeat agent is configured even when all hosts are down.
The Symm agent is used to monitor the link between two Symmetrix arrays. When all the hosts are down in a cluster but the Symm agent is able to see the replication link between the local and remote storage, it would report the heartbeat as ALIVE. Due to this, DR site does not declare the primary site as faulted.

Systems in a cluster must have same system locale setting

VCS does not support clustering of systems with different system locales. All systems in a cluster must be set to the same locale.

VxVM site for the disk group remains detached after node reboot in campus clusters with fire drill

When you bring the DiskGroupSnap resource online, the DiskGroupSnap agent detaches the site from the target disk group defined. The DiskGroupSnap agent

invokes VCS action entry points to run VxVM commands to detach the site. These commands must be run on the node where the disk group is imported, which is at the primary site.

If you attempt to shut down the node where the fire drill service group or the disk group is online, the node goes to a LEAVING state. The VCS engine attempts to take all the service groups offline on that node and rejects all action entry point requests. Therefore, the DiskGroupSnap agent cannot invoke the action to reattach the fire drill site to the target disk group. The agent logs a message that the node is in a leaving state and then removes the lock file. The agent's monitor function declares that the resource is offline. After the node restarts, the disk group site still remains detached. [1272012]

Workaround:

You must take the fire drill service group offline using the `hagrp -offline` command before you shut down the node or before you stop VCS locally.

If the node has restarted, you must manually reattach the fire drill site to the disk group that is imported at the primary site.

If the secondary node has crashed or restarted, you must manually reattach the fire drill site to the target disk group that is imported at the primary site using the following command: `/opt/VRTSvcs/bin/hares -action $targetres joindg -actionargs $fdsitename $is_fenced -sys $targetsys.`

Limitations with DiskGroupSnap agent

The DiskGroupSnap agent has the following limitations:

- If you use the Bronze configuration for the DiskGroupSnap resource, you could end up with inconsistent data at the secondary site in the following cases: [1391445]
 - After the fire drill service group is brought online, a disaster occurs at the primary site during the fire drill.
 - After the fire drill service group is taken offline, a disaster occurs at the primary while the disks at the secondary are resynchronizing.

Symantec recommends that you use the Gold configuration for the DiskGroupSnap resource.

Virtualizing shared storage using VIO servers and client partitions

AIX 5.3, with proper patches to the operating system and client partitions, is capable of running multiple virtualized partitions within a single frame. You can

split the CPU, memory, and certain adapters (networking and storage), into smaller virtual units that the partitions can then use.

In an Advanced POWER™ Virtualization (APV) environment, AIX uses the VIO Server to monitor and manage the I/O paths for the virtualized client partitions. At a very high level, the VIO server provides a partition's access to storage that is external to the physical computer. The VIO server encapsulates the physical hardware into virtual adapters called virtual SCSI adapters (server adapter). On the client side, you can create virtual adapters (client adapters) that map to the server adapter and enable a partition to connect to external storage.

The VIO server provides similar mechanisms to share limited networking resources across partitions. Refer to the manual that came with your system to help set up partitions, and to configure and use the various components such as VIO server and HMC, which are integral parts of IBM's APV environment.

The minimum patch level for using VIO servers with VCS is: Fix Pack 7.1.2.0.0.

Supported storage

Refer to the IBM data sheet:

<http://www14.software.ibm.com/webapp/set2/sas/f/vios/home.html>

Disk Restrictions

When using VCS in combination with VIO servers and their client partitions, you need to ensure that no reservations are placed on the shared storage. This enables client partitions on different systems to access and use the same shared storage.

- If the shared storage is under MPIIO control, set the `reserve_policy` attribute of the disk to `no_reserve`.
- If the shared storage is not under MPIIO control, look up the array documentation to locate a similar attribute to set on the disk.

Internal testing on EMC disks shows that this field maps as the `reserve_lock` attribute for EMC disks. In this case, setting it to `no` achieves the same result.

Accessing the same LUNs from Client Partitions on different Central Electronics Complex (CEC) modules

This section briefly outlines how to set shared storage so that it is visible from client partitions on different CEC modules.

With the VIO server and client partitions set up and ready, make sure that you have installed the right level of operating system on the client partitions, and

that you have mapped the physical adapters to the client partitions to provide access to the external shared storage.

To create a shareable diskgroup, you need to ensure that the different partitions use the same set of disks. A good way to make sure that the disks (that are seen from multiple partitions) are the same is to use the disks serial numbers, which are unique.

Run the following commands on the VIO server (in non-root mode), unless otherwise noted.

Get the serial number of the disk of interest:

```
$ lsdev -dev hdisk20 -vpd
hdisk20
U787A.001.DNZ06TT-P1-C6-T1-W500507630308037C-
L401 0401A00000000 IBM FC 2107

Manufacturer.....IBM
Machine Type and Model.....2107900
Serial Number.....7548111101A
EC Level.....131
Device Specific. (Z0).....10
Device Specific. (Z1).....0100
...
```

Make sure the other VIO server returns the same serial number. This ensures that you are viewing the same actual physical disk.

List the virtual SCSI adapters.

```
$ lsdev -virtual | grep vhost
vhost0 Available Virtual SCSI Server Adapter
vhost1 Available Virtual SCSI Server Adapter
```

Note: Usually vhost0 is the adapter for the internal disks. vhost1 in the example above maps the SCSI adapter to the external shared storage.

Prior to mapping hdisk20 (in the example) to a SCSI adapter, change the reservation policy on the disk.

```
$ chdev -dev hdisk20 -attr reserve_policy=no_reserve
hdisk20 changed
```

For hdisk20 (in the example) to be available to client partitions, map it to a suitable virtual SCSI adapter.

If you now print the reserve policy on `hdisk20` the output resembles:

```
$ lsdev -dev hdisk20 attr reserve_policy
value
no_reserve
```

Next create a virtual device to map `hdisk20` to `vhost1`.

```
$ mkvdev -vdev hdisk20 -vadapter vhost1 -dev mp1_hdisk5
mp1_hdisk5 Available
```

Finally on the client partition run the `cfgmgr` command to make this disk visible via the client SCSI adapter.

You can use this disk (`hdisk20` physical, and known as `mp1_hdisk5` on the client partitions) to create a diskgroup, a shared volume, and eventually a shared file system.

Perform regular VCS operations on the clients vis-a-vis service groups, resources, resource attributes, etc.

Cluster Manager (Java console) limitations

This section covers the software limitations for Cluster Manager (Java Console).

Use the VCS 5.1 Java Console to manage clusters

Cluster Manager (Java Console) from versions lower than VCS 5.1 cannot be used to manage VCS 5.1SP1 clusters. Symantec recommends using the latest version of Cluster Manager.

See the *Veritas Cluster Server Installation Guide* for instructions on upgrading Cluster Manager.

Run Java Console on a non-cluster system

Symantec recommends not running Cluster Manager (Java Console) for an extended period on a node in the cluster. The Solaris version of the Java Virtual Machine has a memory leak that can gradually consume the host system's swap space. This leak does not occur on Windows systems.

Cluster Manager does not work if the hosts file contains IPv6 entries

VCS Cluster Manager fails to connect to the VCS engine if the `/etc/hosts` file contains IPv6 entries.

Workaround: Remove IPv6 entries from the `/etc/hosts` file.

VCS Simulator does not support I/O fencing

When running the Simulator, be sure the `UseFence` attribute is set to the default, “None”.

The operating system does not distinguish between IPv4 and IPv6 packet counts

In a dual-stack configuration, when you use packet counts and the IPv6 network is disabled, the NIC agent might not detect a faulted NIC. It might not detect a fault because while the IPv6 network is down its packet count still increases. The packet count increases because the operating system does not distinguish between the packet counts for IPv4 and IPv6 networks. The agent then concludes that the NIC is up. If you are using the same NIC device for IPv4 as well as IPv6 resources, set `PingOptimize` to 0 and specify a value for the `NetworkHosts` attribute for either the IPv6 or the IPv4 NIC resource. [1061253]

A service group that runs inside of a WPAR may not fail over when its network connection is lost

For a WPAR configuration when the WPAR root is on NFS, the WPAR service group may not fail over if the NFS connection is lost. This issue is due to an AIX operating system limitation. [1637430]

Limitations related to LLT

This section covers LLT-related software limitations.

LLT over IPv6 UDP cannot detect other nodes while VCS tries to form a cluster

LLT over IPv6 requires link-local scope multicast to discover other nodes when VCS tries to form a cluster. If multicast networking is undesirable, or unavailable in your environment, use the address of the peer nodes to eliminate the need for the multicast traffic. [1533308]

Workaround: Add the `set-addr` entry for each local link into the `/etc/llttab` file. You add the entry to specify the address of the peer nodes that are available on the corresponding peer links. For example, you add the following lines into the `llttab` file to specify the `set-addr` entry for a node. In this example, the node's IPv6 address is `fe80::21a:64ff:fe92:1d70`.

```
set-addr 1 link1 fe80::21a:64ff:fe92:1d70  
set-arp 0
```

LLT does not start automatically after system reboot

After you reboot the systems, if you had not completed the terminal setting procedure, LLT does not start automatically and does not log any error messages. You can manually start LLT using the `/etc/init.d/llt.rc` command. [2058752]

If you reinstall a system, when the system reboots a message appears on the system console to set the terminal setting if you have not already done so. LLT does not start until you complete the terminal setting procedure.

Workaround: To resolve the LLT startup issue

- 1 After you reboot the systems, open the system console using any available method, for example, from HMC.
- 2 On the console, go to the terminal setting menu, and set the terminal of your choice.
- 3 Select the **Task Completed** menu option.

Limitations related to I/O fencing

This section covers I/O fencing-related software limitations.

Limitation with RDAC driver and FASTT array for coordinator disks that use raw disks

For multipathing to connected storage, AIX uses the RDAC driver for FASTT arrays. Since it is an active/passive array, only the current active path is exposed to clients. The I/O fencing driver, vxfen, can use only a single active path and has no foreknowledge of the passive paths to the coordinator disks on an array. If the single active path fails, all nodes in the cluster lose access to the coordinator disks.

The loss of the path to the coordinator disks can potentially go unnoticed until a reboot, split brain, or any other reason that leads to a cluster membership change occurs. In any of these conditions, the cluster cannot form, and all nodes panic to prevent data corruption. No data loss occurs.

Workaround: Use DMP and specify paths to coordinator disks as DMP paths rather than raw disks to avoid this limitation.

Stopping systems in clusters with I/O fencing configured

The I/O fencing feature protects against data corruption resulting from a failed cluster interconnect, or “split brain.” See the *Veritas Cluster Server Administrator's*

Guide for a description of the problems a failed interconnect can create and the protection I/O fencing provides.

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

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

Workaround: Use the shutdown -r command on one node at a time and wait for each node to complete shutdown.

Cannot modify VxFEN tunable parameters

You cannot change the VxFEN tunable parameters due to a software limitation. [1863916]

Documentation errata

The following sections, if present, cover additions or corrections for Document version: 5.1SP1.3 of the product documentation. These additions or corrections may be included in later versions of the product documentation that can be downloaded from the Symantec Support website and the Symantec Operations Readiness Tools (SORT).

See the corresponding Release Notes for documentation errata related to that component or product.

See [“Documentation”](#) on page 64.

See [“About Symantec Operations Readiness Tools”](#) on page 9.

Veritas Cluster Server Installation Guide

Updates for the procedure to set up non-SCSI3 fencing in virtual environments manually

Topic: Setting up non-SCSI3 fencing in virtual environments manually

Some information is missing in the procedure that is documented in the Installation Guide. Refer to the following procedure.

Setting up non-SCSI3 fencing in virtual environments manually

To manually set up I/O fencing in a non-SCSI-3 PR compliant setup

- 1 Configure I/O fencing in customized mode with only CP servers as coordination points.
- 2 Make sure that the VCS cluster is online and check that the fencing mode is customized.

```
# vxfenadm -d
```

- 3 Make sure that the cluster attribute UseFence is set to SCSI3.

```
# haclus -value UseFence
```

- 4 On each node, edit the /etc/vxenvIRON file as follows:

```
data_disk_fencing=off
```

- 5 Enter the following command to change the vxfen_min_delay parameter value:

```
# chdev -l vxfen -P -a vxfen_vxfnd_tmt=25
```

- 6 On each node, edit the /etc/vxfenmode file as follows:

```
loser_exit_delay=55  
vxfen_script_timeout=25
```

Refer to the sample /etc/vxfenmode file.

- 7 On each node, set the value of the LLT sendhbcap timer parameter value as follows:

- Run the following command:

```
lltconfig -T sendhbcap:3000
```

- Add the following line to the /etc/llttab file so that the changes remain persistent after any reboot:

```
set-timer senhbcap:3000
```

- 8 On any one node, edit the VCS configuration file as follows:

- Make the VCS configuration file writable:

```
# haconf -makerw
```

- For each resource of the type DiskGroup, set the value of the MonitorReservation attribute to 0 and the value of the Reservation attribute to NONE.

```
# hares -modify <dg_resource> MonitorReservation 0
```

```
# hares -modify <dg_resource> Reservation "NONE"
```

- Run the following command to verify the value:

```
# hares -list Type=DiskGroup MonitorReservation!=0
```

```
# hares -list Type=DiskGroup Reservation!="NONE"
```

The command should not list any resources.

- Modify the default value of the Reservation attribute at type-level.

```
# haattr -default DiskGroup Reservation "NONE"
```

- Make the VCS configuration file read-only

```
# haconf -dump -makero
```

- 9 Make sure that the UseFence attribute in the VCS configuration file main.cf is set to SCSI3.

- 10 To make these VxFEN changes take effect, stop and restart VxFEN and the dependent modules

- On each node, run the following command to stop VCS:

```
# /etc/init.d/vcs.rc stop
```

- After VCS takes all services offline, run the following command to stop VxFEN:

```
# /etc/init.d/vxfen.rc stop
```

- On each node, run the following commands to restart VxFEN and VCS:

```
# /etc/init.d/vxfen.rc start
```

```
# /etc/init.d/vcs.rc start
```

Veritas Cluster Server Administrator's Guide

This section covers the documentation errata in the *Veritas Cluster Server Administrator's Guide*.

Correction for setting up a disaster recovery fire drill

Topic: Setting up a disaster recovery fire drill

Issue: The content below is incorrect:

After the fire drill service group is taken offline, reset the value of the ReuseMntPt attribute to 1 for all Mount resources.

Use the following corrected information:

After the fire drill service group is taken offline, reset the value of the ReuseMntPt attribute to 0 for all Mount resources.

Documentation

Product guides are available on the documentation disc in PDF formats. Symantec recommends copying pertinent information, such as installation guides and release notes, from the disc to your system's `/opt/VRTS/docs` directory for reference.

Documentation set

[Table 1-8](#) lists the documents for Veritas Cluster Server.

Table 1-8 Veritas Cluster Server documentation

Title	File name
<i>Veritas Cluster Server Installation Guide</i>	vcs_install_51SP1_aix.pdf
<i>Veritas Cluster Server Release Notes</i>	vcs_notes_51SP1_aix.pdf
<i>Veritas Cluster Server Administrator's Guide</i>	vcs_admin_51SP1_aix.pdf
<i>Veritas Cluster Server Bundled Agents Reference Guide</i>	vcs_bundled_agents_51SP1_aix.pdf
<i>Veritas Cluster Server Agent Developer's Guide</i>	vcs_agent_dev_51sp1pr4.pdf
<i>Veritas Cluster Server Agents for Veritas Volume Replicator Configuration Guide</i>	vcs_vvr_agent_51SP1_aix.pdf
<i>Veritas Storage Foundation and High Availability Solutions Virtualization Guide</i>	sfha_virtualization_51SP1_aix.pdf

Table 1-8 Veritas Cluster Server documentation (*continued*)

Title	File name
<i>Veritas Cluster Server Agent for DB2 Installation and Configuration Guide</i>	vxcs_db2_agent_51SP1_aix.pdf
<i>Veritas Cluster Server Agent for Oracle Installation and Configuration Guide</i>	vxcs_oracle_agent_51SP1_aix.pdf
<i>Veritas Cluster Server Agent for Sybase Installation and Configuration Guide</i>	vxcs_sybase_agent_51SP1_aix.pdf

Table 1-9 lists the documentation for Veritas Volume Replicator.

Table 1-9 Veritas Volume Replicator documentation

Document title	File name
<i>Veritas Volume Replicator Administrator's Guide</i>	vvr_admin_51SP1_aix.pdf
<i>Veritas Volume Replicator Planning and Tuning Guide</i>	vvr_planning_51SP1_aix.pdf
<i>Veritas Volume Replicator Advisor User's Guide</i>	vvr_advisor_users_51SP1_aix.pdf

Table 1-10 lists the documentation for Symantec Product Authentication Service (AT).

Table 1-10 Symantec Product Authentication Service documentation

Title	File name
<i>Symantec Product Authentication Service Release Notes</i>	vxat_notes.pdf
<i>Symantec Product Authentication Service Administrator's Guide</i>	vxat_admin.pdf

Manual pages

The manual pages for Veritas Storage Foundation and High Availability Solutions products are installed in the `/opt/VRTS/man` directory.

Set the `MANPATH` environment variable so the `man(1)` command can point to the Veritas Storage Foundation manual pages:

- For the Bourne or Korn shell (`sh` or `ksh`), enter the following commands:

```
MANPATH=$MANPATH:/opt/VRTS/man  
export MANPATH
```

- For C shell (`csh` or `tcsh`), enter the following command:

```
setenv MANPATH ${MANPATH}:/opt/VRTS/man
```

See the `man(1)` manual page.