

Veritas™ Cluster Server Release Notes

Windows Server 2003, Windows Server
2008

5.1 SP2



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Product version: 5.1 Service Pack 2

Document version: 5.1.SP2.2

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customercare_apac@symantec.com

Europe, Middle-East, and Africa

semea@symantec.com

North America and Latin America

supportsolutions@symantec.com

Veritas Cluster Server for Windows Release Notes

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Introduction

This document provides important information regarding Veritas Cluster Server (VCS) for Windows, VCS enterprise agents for Network Appliance SnapMirror, VCS application agent for Microsoft Exchange, and VCS database agent for Microsoft SQL. Please review this entire document before using this product.

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

You can download the latest version of this document from

<http://www.symantec.com/docs/TECH59755>

For general information about VCS for Windows and Veritas Storage Foundation and High Availability Solutions for Windows, see the following Web site:

<http://www.symantec.com>

For the latest information on updates, patches, and software issues regarding this release, see the following TechNote:

<http://www.symantec.com/docs/TECH59755>

For any install/upgrade failures refer to following technote for information on how to recover from failures.

<http://www.symantec.com/docs/TECH76129>

New features and changes in release 5.1 SP2

This section describes the changes introduced in VCS for Windows release 5.1 Service Pack 2.

New application version support

VCS 5.1 SP2 introduces support for the following new application versions:

- Exchange Server 2010
- Exchange Server 2010 SP1
- Exchange Server 2007 SP3
- Oracle 11gR1 and 11gR2
- Microsoft SharePoint Server 2010
- SQL Server 2008 R2
- Network Appliance Data ONTAP 7.3.3

- Data ONTAP DSM for Windows MPIO 3.3, 3.3.1
- Network Appliance SnapDrive 6.1, 6.2
- Network Appliance SnapManager for SQL 2.1, 5.0 (2.0 or later versions)
- Network Appliance SnapManager for Exchange 3.2 and later versions

New Operating System support

VCS 5.1 SP2 introduces support for the following operating systems:

- Windows Server 2008
- Windows Server 2008 R2

Support for Microsoft SharePoint Server 2010

This release includes support for HA and DR configurations of Microsoft SharePoint Server 2010. High availability support involves monitoring and recovery support for SharePoint 2010 applications and high availability support for SQL Server databases used by SharePoint Server 2010. VCS provides a new agent for SharePoint Server 2010 that monitors the Web Applications, Service Applications, and services configured in the SharePoint Server farm. VCS also provides a new configuration wizard for configuring SharePoint Server 2010 service groups.

Refer to the *Veritas Storage Foundation and High Availability Solutions HA and Disaster Recovery Solutions Guide for SharePoint Server 2010* for information on configuring HA and DR for SharePoint Server 2010.

Refer to the SQL Server Agent Implementation Guides for information on configuring HA and DR for SQL Server.

Support for Microsoft Exchange Server 2010

This release provides High Availability (HA) and Disaster Recovery (DR) support for Exchange Server 2010 mailbox database. VCS provides a new database agent for Exchange 2010 that monitors the mailbox databases configured on shared storage. VCS also provides a new configuration wizard for configuring the Exchange 2010 database service group.

For more details refer to, *Veritas Cluster Server Implementation Guide for Microsoft Exchange 2010*

Support for NetApp vFiler

VCS 5.1 SP2 introduces support for NetApp vFilers.

Support for Microsoft SQL Server 2008 R2

This release includes support for HA and DR configurations for Microsoft SQL Server 2008 R2. Use the existing VCS SQL Server 2008 agents to configure both SQL Server 2008 and SQL Server 2008 R2. The VCS SQL Server 2008 Configuration Wizard is enhanced to support selection of the SQL Server version during configuration. Use the wizard to configure service groups for both SQL Server 2008 and SQL Server 2008 R2.

Refer to the *Veritas Cluster Server Implementation Guide for Microsoft SQL Server 2008 and 2008 R2* for instructions on how to configure HA and DR for SQL Server 2008 R2 in a VCS environment.

Changes to SQL Server 2008 agent

The SQL Server 2008 Database Engine agent is enhanced to address an issue where SQL databases are not accessible after service group failovers if the user account specified for the SQL services (SQL Server service, SQL Server Agent service) does not have local administrator privileges on all the cluster nodes that are part of the SQL service group.

A new optional attribute called SQLClusterAccount is added to the SQL Server 2008 Database Engine agent. Use this attribute if the SQL Server services account is not a member of the local Administrators group on the cluster nodes in the service group. You can specify either a domain group or the SQL Server service name for this attribute. The agent assigns this account with Full Control privileges to the SQL Server databases and log files. You can specify this attribute while configuring the SQL Server service group using the VCS SQL Server 2008 Configuration Wizard.

Support for configuring up to eight private network links for LLT

The VCS Cluster Configuration Wizard (VCW) now supports configuring up to eight private network links for LLT over Ethernet or LLT over the User Datagram Protocol (UDP) layer.

To configure the network links for LLT over UDP, use the Edit Ports button on the Private Network Configuration panel of the wizard to specify the UDP ports for the links.

Support for removing the faulted node from a cluster

While removing a node from a cluster, if the validation checks failed for the node you wanted to remove, you were required to rectify the cause of failure and then proceed to remove the node. However, VCS Cluster Configuration Wizard now enables you to remove the failed node, without rectifying the cause of failure.

Note: You must proceed to remove the failed node only if the node is permanently unavailable, due to any hardware or Operating System related issues, that can be resolved only by reinstalling the Operating System.

New features and changes in release 5.1SP1

This section describes the changes introduced in VCS for Windows version 5.1 Service Pack 1.

This release also includes the changes introduced in the release VCS 5.1 Application Pack 1 (AP1).

See [“New features and changes in release 5.1 AP1”](#) on page 15.

New application version support

VCS 5.1 SP1 introduces support for new application versions, including:

- Exchange 2007 SP2
- SQL Server 2008 SP1
- SQL Server 2005 SP3
- Enterprise Vault 8.0 SP1 and SP2

Client support

VCS introduces support for client components on the following operating systems:

- Windows XP SP3
- Windows 7

New Enterprise Vault option

There is a new Enterprise Vault (EV) Cluster Setup Wizard installation option available from the product installer.

Support for qtree in NetAppSnapDrive

The VCS NetAppSnapDrive agent now support qtree. The configuration wizards supports discovery of qtree volumes.

Note that the VCS NetAppSnapMirror agent does not support qtree volumes.

Enhancements to NetAppSnapMirror agent

The NetAppSnapMirror agent is modified to include the following changes:

- A new attribute, SyncMode, is added to the agent. You can use this attribute to configure the replication mode. In addition to earlier supported asynchronous mode of replication, the NetAppSnapMirror agent now supports semi-synchronous and synchronous modes of replication.
- A new attribute, VisibilityFrequency, is added to the agent. You can use this attribute to control how often the source snapshot is visible on the destination mirror.

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

Access Based Enumeration support for FileShare and CompositeFileShare

Access based enumeration support has been added for FileShare and CompositeFileShare agents. FileShare configuration wizard supports options to enable/disable Access based enumeration as well as Client Cache Type.

Synchronous and Semi-synchronous replication support in NetAppSnapMirror agent

In addition to earlier supported Asynchronous mode of replication, the NetAppSnapMirror agent now supports Semi-synchronous and Synchronous modes of replication.

VCS Application Manager (VAM) utility

VCS provides a new utility, VCS Application Manager (VAM), that lets you manage applications in the virtual server context. Use VAM to launch application management tools and system management tools in the virtual server context.

You can launch the VAM utility from the Windows Start menu. (click **Start > Programs > Symantec > Veritas Cluster Server > Configuration Tools > Application Manager**)

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

Wizard for configuring MSMQ service group

VCS now provides a wizard that you can use to configure Microsoft Message Queuing (MSMQ) service groups. You can launch the wizard from the Solutions Configuration Center (SCC).

VCS HAD Helper Service user account privileges modified

The privileges required by the VCS HAD Helper service user account have been modified. The hadhelper utility now does not assign the following privilege to the VCS helper service user account:

- Increase scheduling priority

VCS SQL Server 2008 management pack for SCOM 2007

VCS provides a management pack for SQL Server 2008. You can use the management pack to monitor SQL 2008 instances configured under VCS in a Systems Center Operations Manager (SCOM) 2007 monitoring environment.

This management pack is supported on SCOM 2007 SP1 and R2 versions.

Contact Symantec Technical Support for more information about the management packs.

Process agent changes

A new attribute, LanmanResname, is added to the Process agent. You can use this attribute to configure the agent to monitor processes in the context of the virtual name specified in the Lanman resource.

Enhancements in FileShare and CompositeFileShare agents

The FileShare and CompositeFileShare agents are modified to include the following changes:

- Support for the Windows access-based enumeration option is added to the agents. The File Share Configuration Wizard provides options to enable or disable access-based enumeration.
- The File Share Configuration Wizard now includes option to define the value of the attribute Client Cache Type.

- A new function, ForceControl, is added to the agents. You can use ForceControl to restore the properties of file shares as per what is defined in the VCS configuration. The agent overwrites all changes made to the file share properties, irrespective of whether they were made externally or from within VCS, and resets them to what is defined in the VCS configuration. .
- The AutoControl attribute is modified. You can now use this attribute to define the agent behavior when share properties are modified when the FileShare or CompositeFileShare resource is online.
- The IgnorePermissions attribute is deprecated. You can use the AutoControl attribute instead..
- A new attribute, ShareComment, is added to the agents. You can use this attribute to add comments to the file share resource

See the *Veritas Cluster Server Bundled Agents Guide* for more information about the FileShare and CompositeFileShare agents.

See the *Veritas Cluster Server Administrator's Guide* for more information about the File Share Configuration Wizard.

PrintShare agent changes

The PrintShare agent is modified to retain the comments that were added to the printers. When the printers are added to the print share service group, VCS retains the comments and adds a VCS tag to it.

VCS Exchange Server Setup Wizard changes

While installing Exchange 2003 in a VCS environment, the VCS Exchange Server Setup Wizard performs certain operations on the Exchange Domain Servers object in Active Directory (AD). The wizard uses the logged-on user account context to perform these AD operations; therefore the logged-on user account is required to have the privileges to update AD objects.

AD update privileges are generally assigned to Domain Administrators and this may create a problem in environments where there are security restrictions on the privileges available to users in the domain.

The VCS Exchange Server Setup Wizard is now modified to use either the logged-on user account context or the VCS Helper Service user account context to perform the required AD updates. The wizard uses the VCS Helper Service account if the logged-on user account does not have the required privileges.

Note that for the wizard to perform the AD operations using the VCS Helper Service user account, the Exchange Domain Servers object in the AD must be

managed by the VCS Helper Service user account (**Managed By** tab on the **Object Properties** window).

Support for provisioned Exchange Server 2007 installations

Provisioning a server allows Exchange to be installed later by using delegated setup. This procedure allows a delegated account to install Exchange Server in the domain without being a member of the Exchange Organization Administrators group.

This release supports Exchange Server 2007 installations performed by delegated account.

Microsoft VHD support

This release is qualified on operating systems running on physical (hosts) and virtual (guests) machines based on Microsoft's Virtual Hard Disk (VHD) virtualization file format.

New features and changes in release 5.1 AP1

This section describes the changes introduced in Veritas Cluster Server for Windows 5.1 Application Pack 1.

Support for Microsoft SQL Server 2008

VCS 5.1 Application Pack 1 for Windows supports HA and DR configurations for Microsoft SQL Server 2008. Refer to the Veritas Cluster Server Implementation Guide for Microsoft SQL Server 2008 for instructions on how to configure a new HA and DR environment for SQL 2008.

Folder level mount point support in SnapDrive

VCS 5.1 Application Pack 1 for Windows provides folder level mount point support with NetApp SnapDrive. NetApp SnapDrive agent supports drive and volume mount points by configuring the attribute MountPath. You can create cascading volume mount points by mounting one mount point on another mount point. In such a case, you must specify the complete path in the MountPath attribute. For example,

```
MountPath = "T:\Volume1\Volume2"
```

The VCS application and service group configuration wizards allow selection of folder mount points.

MPIO support using iSCSI

VCS 5.1 Application Pack 1 for Windows now supports multipath I/O connections using iSCSI. You can configure multipathing in your storage environment using the supported iSCSI initiator. When MPIO is configured using iSCSI, only one initiator entry is added to the Initiator attribute of the NetAppSnapDrive agent.

VCS MOM 2005 management pack for SQL 2008

VCS 5.1 Application Pack 1 for Windows includes a VCS Management Pack for Microsoft SQL Server 2008. This management pack is for Microsoft Operations Manager 2005. The management pack file (.akm) is integrated with the Application Pack 1 package but you will need to import it separately. There is no change in the procedures for using this VCS management pack. Refer to the Veritas Storage Foundation and High Availability Solutions Management Pack Guide for Microsoft Operations Manager 2005 for instructions on how to use this management pack to monitor SQL 2008 using Microsoft Operations Manager (MOM) 2005 in a VCS environment.

Changes to the VCS NetAppSnapDrive agent

In VCS 5.1 Application Pack 1 for Windows, the VCS NetAppSnapDrive agent has been modified to include support for NetApp SnapDrive version 6.0 release. In SnapDrive 6.0 support for Common Internet File System (CIFS) protocol has been deprecated. As a result, the VCS NetAppSnapDrive agent attribute ShareName need not be configured if you are using SnapDrive 6.0. The VCS NetAppSnapDrive agent ignores this attribute if SnapDrive 6.0 is used. In addition, the NetAppSnapDrive agent has been modified to address performance issues in cases where multiple NetApp LUNs are configured simultaneously in a service group.

Changes to the VCS wizards

The VCS application and service group configuration wizards provide an option (Advanced button on the Network Configuration panel or the virtual server configuration panel) to add the virtual server name to the Active Directory. The wizards discover all the Organization Units (OU) in the domain and populate them in a drop-down list. You specify an OU by selecting the OU name from the drop-down list.

This functionality is enhanced in the application pack. The wizards now allow you to type the Organization Unit name or search the OU name in the domain using the Windows "Find Organizational Units" dialog box. This makes searching and specifying an OU significantly easier in cases where there are a large number of Organizational Units in the domain and where the OU structure is deeply nested.

You can type the OU details in the format "CN=Computers,DC=domainname,DC=com". If you wish to search for an OU, you can click the ellipsis button and specify the search criteria in the Windows "Find Organizational Units" dialog box.

New features and changes in release 5.1

The features and updates described below are introduced in Veritas Cluster Server for Windows version 5.1.

Veritas Cluster Server Management Console 5.1 available

The Veritas Cluster Server Management Console 5.1 software disc is included with this release of VCS.

Refer to the VCS Management Console Implementation Guide for installation, upgrade, and configuration instructions.

See the Symantec Support website for information on platform updates and future releases of VCS Management Console.

Client support on Windows Vista

VCS introduces support for client components on Windows Vista, including Vista SP2.

Configuration Checker enhancements

The following are Configuration Checker enhancements:

- Better differentiation between pre-installation and post-installation checks
- Improved check descriptions and reports

BlackBerry Enterprise Server support

You can use the VCS GenericService agent to configure BlackBerry Enterprise Server (BES) in a VCS environment. In this release, support for BES is limited to the following:

- BES can be set up in an active-passive configuration only. In an active-passive configuration, the active node hosts the configured BlackBerry server. The second node is a dedicated redundant server able to take over the configured server if the active node fails.

- BES can be configured only with a SQL database. There is no support for BES with a Microsoft Database Engine (MSDE) database.

See the *Veritas Cluster Server Administrator's Guide* for configuration instructions.

VCW support for configuring VCS LLT over UDP

You can configure LLT over the User Datagram Protocol (UDP) layer while configuring the cluster using the VCS Cluster Configuration Wizard (VCW). VCW provides the necessary configuration options required for using LLT over UDP.

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

Support for Oracle on 64-bit Windows servers

This release supports Oracle on 64-bit Windows Server operating systems.

License policy

Each copy of Veritas Cluster Server including all options and agents, whether used on a physical Server or within a virtual machine, must be licensed according to the conditions set forth in the sections below. Each Licensed Software license specifies the number of instances of the Licensed Software you may run on a particular Server at one time.

[Table 1-1](#) lists VCS editions and the additional licensing terms that apply.

Table 1-1 VCS licensing terms

Microsoft Operating System Edition	VCS licensing terms
<ul style="list-style-type: none"> ■ Server Edition ■ Standard Edition ■ Web Edition 	A separate license for the licensed software is required for each virtual or physical server, where the software is installed.
<ul style="list-style-type: none"> ■ Advanced Edition ■ Enterprise Edition 	For each license, you may run one instance of the licensed software on one physical server and up to four simultaneous instances of the licensed software on virtual servers located on the physical server.
Datacenter Edition	For each license, you may run one instance of the licensed software on one physical server and an unlimited number of virtual servers located on the physical server

No longer supported

This section provides the list of non-supported items for Veritas Cluster Server for Windows 5.1 SP1.

Symantec Live Update client is no longer installed and supported

Symantec Live Update client is no longer installed and supported as a part of Veritas Cluster Server for Windows.

Discontinued support for VCS Cluster Management Console (Single Cluster Mode)

Support for the VCS Cluster Management Console (Single Cluster Mode) is discontinued in 5.1 SP2. The VCS VRTSWebApp agent has been deprecated and is uninstalled during the upgrade. Also, the VCS Cluster Configuration Wizard (VCW) no longer provides the option to configure the Cluster Manager service components.

If VRTSWebApp resource is configured in ClusterService group, after upgrading to 5.1SP2 the resource fails to get probed and thus the ClusterService group would fail to come online in the cluster. You must manually delete the VRTSWebApp resource from the ClusterService group. Use the Cluster Manager (Java Console), the command line (hares -delete), or the Veritas Operations Manager (VOM) to remove the resource.

Veritas Cluster Server 5.1 SP1 does not support Windows Server 2000

Veritas Cluster Server 5.1 SP1 no longer supports Windows Server 2000. Therefore Exchange Server 2000 and Microsoft Operations Manager (MOM) 2000 are also no longer supported.

VCS no longer includes agents and configuration wizards for NetBackup

VCS does not include agents and configuration wizards for NetBackup. Refer to the NetBackup documentation for information on clustering support for NetBackup.

Symantec License Inventory Management (SLIM)

The Symantec License Inventory Management (SLIM) agent is no longer shipped with VCS. The SLIM agent is removed automatically during upgrades from 5.0.

Installation requirements

VCS is supported on Windows-certified network servers containing one or more processors. VCS 5.1 SP1 supports clusters of up to 32 nodes.

Supported hardware

Refer to the Hardware Compatibility List on the Symantec Support Web site to determine the approved hardware.

<http://www.symantec.com/docs/TECH138719>

The compatibility list contains information about supported hardware and is updated regularly. Before installing or upgrading VCS, review the current compatibility list to confirm the compatibility of your hardware and software.

Supported software

Veritas Cluster Server (VCS) 5.1 SP2 for Windows including the VCS Application Agent for Microsoft Exchange or the VCS Database Agent for Microsoft SQL, supports the following applications and operating systems.

The requirements for operating system and application support shown below supersede those requirements listed in the product documentation.

Also, for updates on software supported, see

<http://www.symantec.com/docs/TECH138722>

Note: All VCS nodes must run the same Windows operating system and service pack level as well as the same VCS version and service pack level. Also you must install the operating system in the same path on all systems and make sure that the same drive letter is available on all nodes and the system drive has adequate space for the installation.

Supported operating systems

VCS supports the following Windows operating systems.

Your server must run one of the following operating systems to install the VCS server components:

- Windows Server 2003 (32-bit): Standard Edition, Enterprise Edition, or Datacenter Edition (SP2 required for all editions)
- Windows Server 2003 R2 (32-bit): Standard Edition, Enterprise Edition, or Datacenter Edition (SP2 required for all editions)

- Windows Server 2003 (32-bit): Web Edition: fully supports SFW and supports only file share for SFW HA (SP2 required for all editions)
- Windows Server 2003 for 64-bit Itanium (IA64): Enterprise Edition or Datacenter Edition (SP2 required for all editions)
- Windows Server 2003 x64 Editions (for AMD64 or Intel EM64T): Standard x64 Edition, Enterprise x64 Edition, or Datacenter x64 Edition (SP2 required for all editions)
- Windows Server 2003 x64 R2 Editions (for AMD64 or Intel EM64T): Standard x64 R2 Edition, Enterprise x64 R2 Edition, or Datacenter x64 R2 Edition (SP2 required for all editions)
- Windows Server 2008 x86, x64: Standard Edition, Enterprise Edition, Datacenter Edition, Web Edition, Small Business Server (SP1 or SP2 required for all editions)

Note: This release of VCS supports Windows Server 2008 without Hyper -V x86, x64: Standard Edition, Enterprise Edition, Datacenter Edition (SP1 or SP2 required for all editions).

- Windows Server 2008 for IA Systems (IA64) (SP1 or SP2)
- Windows Server 2008 R2 x64: Standard Edition, Enterprise Edition, Datacenter Edition, Web Edition.

Note: This release of VCS supports Windows Server 2008 R2 without Hyper-V x64: Standard Edition, Enterprise Edition, Datacenter Edition.

- Windows Server 2008 R2 for IA Systems (IA64)

Your system must run one of the following operating systems to install the VCS client software:

- Any one of the operating system versions, editions, and architectures that the Server Components are supported on.
- Windows XP x86, x64 (SP3 required)
- Windows Vista x86, x64: Ultimate edition, Business Edition, Premium edition (SP1 or SP2 required)
- Windows 7

Microsoft Exchange servers and their operating systems

Table 1-2 lists the supported Microsoft Exchange servers and the corresponding operating systems

Table 1-2 Microsoft Exchange servers and operating systems

Microsoft Exchange Servers	Operating systems
<p>Microsoft Exchange Server 2010 and Exchange Server 2010 SP1, Standard Edition or Enterprise Edition (Mailbox server role required)</p>	<ul style="list-style-type: none"> ■ Windows Server 2008 with Service Pack 2: Standard x64 Edition, Enterprise x64 Edition ■ Windows Server 2008 R2 on Standard x64 Edition, Enterprise x64 Edition
<p>Microsoft Exchange Server 2007 Standard Edition or Enterprise Edition on Windows Server 2003 (including SP1 and SP2)</p>	<ul style="list-style-type: none"> ■ Windows Server 2003 x64 (Standard Edition, Enterprise Edition, Datacenter Edition) including SP1 and SP2 for all the editions. ■ Windows Server 2003 R2 x64 (Standard Edition, Enterprise Edition, Datacenter Edition) including SP1 and SP2 for all editions. ■ Windows Server 2008 x64 Editions (for AMD64 or Intel EM64T): Standard x64 Edition, Enterprise x64 Edition, or Datacenter x64 Edition ■ Windows Server 2008 x64 R2 without Hyper-V on Standard, Enterprise, Datacenter Editions ■ Windows Server 2008 R2 for IA Systems - IA64 ■ Windows Server 2008 x64 R2 Web Edition
<p>Microsoft Exchange Server 2003 Standard Edition or Enterprise Edition on Windows Server 2003 (including SP1 and SP2)</p>	<ul style="list-style-type: none"> ■ Windows Server 2003 (32-bit) (Standard Edition, Enterprise Edition, or Datacenter Edition) including SP1 and SP2 for all editions. ■ Windows Server 2003 R2 (32-bit) (Standard Edition, Enterprise Edition, or Datacenter Edition) including SP1 and SP2 for all editions.

Microsoft SQL servers and their operating systems

[Table 1-3](#) lists the supported Microsoft SQL servers and the corresponding operating systems.

Table 1-3 Microsoft SQL Servers and operating systems

Microsoft SQL Servers	Operating systems
Microsoft SQL Server 2000 Standard Edition or Enterprise Edition (SP4 required)	Windows Server 2003 (32-bit) Standard Edition, Enterprise Edition, or Datacenter Edition (SP1 required for all editions, SP2 supported) Windows Server 2003 R2 (32-bit) Standard Edition, Enterprise Edition, or Datacenter Edition
Microsoft SQL Server 2000 (64-bit) Enterprise Edition	Windows Server 2003 for Itanium-based systems: Enterprise Edition or Datacenter Edition (SP1 required for all editions, SP2 supported)
Microsoft SQL Server 2000 Standard Edition or Enterprise Edition (SP4 required for all editions)	Windows Server 2003 x64 Editions: Standard x64 Edition, Enterprise x64 Edition, or Datacenter x64 Edition (SP1 required for all editions, SP2 supported) Windows Server 2003 x64 R2 Editions: Standard x64 R2 Edition, Enterprise x64 R2 Edition, or Datacenter x64 R2 Edition (SP1 required for all editions, SP2 supported)

Table 1-3 Microsoft SQL Servers and operating systems (*continued*)

Microsoft SQL Servers	Operating systems
Microsoft SQL Server 2005, (32-bit) Standard Edition or Enterprise Edition (SP1, SP2 and SP3 for all editions)	<p>Windows Server 2003 (32-bit) Enterprise Edition or Datacenter Edition (SP1 required for all editions, SP2 supported)</p> <p>Windows Server 2003 R2 (32-bit) Standard Edition, Enterprise Edition, or Datacenter Edition (SP2 supported for all editions)</p> <p>Windows Server 2003 Standard x64 Edition, Enterprise x64 Edition, or Datacenter x64 Edition (SP2 supported for all editions)</p> <p>Windows Server 2003 x64 R2 Editions: Standard x64 R2 Edition, Enterprise x64 R2 Edition, or Datacenter x64 R2 Edition (SP2 supported for all editions)</p> <p>Windows Server 2008 including SP1 and SP2 (32-bit) Standard Edition, Enterprise Edition, or Datacenter Edition</p> <p>Windows Server 2008 x64 R2 without Hyper-V on Standard, Enterprise, Datacenter Editions</p> <p>Windows Server 2008 R2 for IA Systems - IA64</p> <p>Windows Server 2008 x64 R2 Web Edition</p>

Table 1-3 Microsoft SQL Servers and operating systems (*continued*)

Microsoft SQL Servers	Operating systems
<p>Microsoft SQL Server 2005, (64-bit) Standard Edition or Enterprise Edition (SP1, SP2 and SP3 for all editions)</p>	<p>Windows Server 2003 for Itanium-based systems: Enterprise Edition or Datacenter Edition (SP1 required for all editions, SP2 supported)</p> <p>Windows Server 2003 Standard x64 Edition, Enterprise x64 Edition, or Datacenter x64 Edition (SP2 supported for all editions)</p> <p>Windows Server 2003 x64 R2 Editions: Standard x64 R2 Edition, Enterprise x64 R2 Edition, or Datacenter x64 R2 Edition (SP2 supported for all editions)</p> <p>Windows Server 2008 for 64-bit Itanium (IA64)</p> <p>Windows Server 2008 x64 Editions (for AMD64 or Intel EM64T): Standard x64 Edition, Enterprise x64 Edition, or Datacenter x64 Edition</p> <p>Windows Server 2008 x64 R2 without Hyper-V on Standard, Enterprise, Datacenter Editions</p> <p>Windows Server 2008 R2 for IA Systems - IA64</p> <p>Windows Server 2008 x64 R2 Web Edition</p>

Table 1-3 Microsoft SQL Servers and operating systems (*continued*)

Microsoft SQL Servers	Operating systems
Microsoft SQL Server 2008, 32-bit Standard Edition or Enterprise Edition or Web Edition (including SP1)	<p>Windows Server 2003 (32-bit) Standard Edition, Enterprise Edition or Datacenter Edition (SP2 required)</p> <p>Windows Server 2003 R2 (32-bit) Standard Edition, Enterprise Edition, or Datacenter Edition (SP2 required)</p> <p>Windows Server 2003 for Itanium-based Systems Enterprise Edition or Datacenter Edition (SP2 required for both)</p> <p>Windows Server 2003 Standard x64 Edition, Enterprise x64 Edition, or Datacenter x64 Edition (SP2 required)</p> <p>Windows Server 2003 x64 Editions (for AMD64 or Intel EM64T): Standard x64 R2 Edition, Enterprise x64 R2 Edition, or Datacenter x64 R2 Edition (SP2 required)</p> <p>Windows Server 2008 (32-bit) Standard Edition, Enterprise Edition, Datacenter Edition, or Web Edition (SP2 required)</p> <p>Windows Server 2008 x64 R2 without Hyper-V on Standard, Enterprise, Datacenter Editions</p> <p>Windows Server 2008 R2 for IA Systems - IA64</p> <p>Windows Server 2008 x64 R2 Web Edition</p>

Table 1-3 Microsoft SQL Servers and operating systems (*continued*)

Microsoft SQL Servers	Operating systems
<p>Microsoft SQL Server 2008 (64-bit Standard Edition or Enterprise Edition or Enterprise IA64 Edition or Web Edition (including SP1)</p>	<p>Windows Server 2003 for Itanium-based Systems Enterprise Edition or Datacenter Edition (SP2 required for both)</p> <p>Windows Server 2003 Standard x64 Edition, Enterprise x64 Edition, or Datacenter x64 Edition (SP2 required) Windows Server 2003 x64 Editions (for AMD64 or Intel EM64T): Standard x64 R2 Edition, Enterprise x64 R2 Edition, or Datacenter x64 R2 Edition (SP2 required)</p> <p>Windows Server 2003 x64 Editions (for AMD64 or Intel EM64T): Standard x64 R2 Edition, Enterprise x64 R2 Edition, or Datacenter x64 R2 Edition (SP2 required)</p> <p>Windows Server 2008 (32-bit) Standard Edition, Enterprise Edition, Datacenter Edition, or Web Edition (SP2 required)</p> <p>Windows Server 2008 x64 R2 without Hyper-V on Standard, Enterprise, Datacenter Editions</p> <p>Windows Server 2008 R2 for IA Systems - IA64</p> <p>Windows Server 2008 x64 R2 Web Edition</p>

Table 1-3 Microsoft SQL Servers and operating systems (*continued*)

Microsoft SQL Servers	Operating systems
Microsoft SQL Server 2008 R2	<p>Windows Server 2003 for Itanium-based Systems Enterprise Edition or Datacenter Edition (SP2 required for both)</p> <p>Windows Server 2003 Standard x64 Edition, Enterprise x64 Edition, or Datacenter x64 Edition (SP2 required)</p> <p>Windows Server 2003 x64 Editions (for AMD64 or Intel EM64T): Standard x64 R2 Edition, Enterprise x64 R2 Edition, or Datacenter x64 R2 Edition (SP2 required)</p> <p>Windows Server 2008 (32-bit) Standard Edition, Enterprise Edition, Datacenter Edition, or Web Edition (SP2 required)</p> <p>Windows Server 2008 x64 R2 without Hyper-V on Standard, Enterprise, Datacenter Editions</p> <p>Windows Server 2008 R2 for IA Systems - IA64</p> <p>Windows Server 2008 x64 R2 Web Edition</p>

Note that, Microsoft SQL Server 2000 and Microsoft SQL Server 2005 can exist in the same cluster but cannot operate on or fail over to the same system. If you use both applications in a cluster, select a distinct set of systems for the SystemList attribute of each application’s service group. Similarly, Microsoft SQL Server 2005 and Microsoft SQL Server 2008 can exist in the same cluster and operate on or fail over to the same systems. However, only one default instance can exist on a system at one time. Additional instances that operate on or fail over to that system must be named instances. The number of named instances is limited only by the normal limit of instances for that version of SQL Server.

Oracle versions and their operating systems

[Table 1-4](#) lists the supported Oracle versions and the corresponding operating systems.

Table 1-4 Oracle versions and operating systems

Oracle versions	Operating systems
<p>Oracle 9i, Release 2 (9.2.0.2) Standard Edition, Enterprise Edition</p> <p>Oracle 10g, Release 1 (10.1.0.2) Standard Edition, Enterprise Edition</p>	<ul style="list-style-type: none"> ■ Windows Server 2003 (32-bit) Standard Edition, Enterprise Edition, or Datacenter Edition (SP2 required for all editions) ■ Windows Server 2003 (32-bit) R2 Standard Edition, Enterprise Edition, or Datacenter Edition (SP2 required for all editions) ■ Windows Server 2003 for Itanium-based Systems Enterprise Edition or Datacenter Edition (SP2 required for both)
<p>Oracle 10g, Release 2 (10.2.0.1.0) Standard Edition, Enterprise Edition</p>	<ul style="list-style-type: none"> ■ Windows Server 2003 (32-bit) Standard Edition, Enterprise Edition, or Datacenter Edition (SP2 required for all editions) ■ Windows Server 2003 (32-bit) R2 Standard Edition, Enterprise Edition, or Datacenter Edition (SP2 required for all editions) ■ Windows Server 2003 for Itanium-based Systems Enterprise Edition or Datacenter Edition (SP2 required for both) ■ Windows Server 2003 (64-bit) Standard Edition, Enterprise Edition, or Datacenter Edition (SP2 required for all editions) ■ Windows Server 2003 (64-bit) R2 Standard Edition, Enterprise Edition, or Datacenter Edition (SP2 required for all editions)
<p>Oracle 11g, Release 1 (11.1.0.6.0)</p>	<ul style="list-style-type: none"> ■ Windows Server 2003 (32-bit, 64-bit) Standard Edition, Enterprise Edition, or Datacenter Edition (SP2 required for all editions) ■ Windows Server 2003 (32-bit, 64-bit) R2 Standard Edition, Enterprise Edition, or Datacenter Edition (SP2 required for all editions)
<p>Oracle 11g, Release 1 (11.1.0.7.0)</p>	<ul style="list-style-type: none"> ■ Windows Server 2008 (32-bit, 64-bit) Standard Edition, Enterprise Edition, or Datacenter Edition (SP2 required for all editions)

Table 1-4 Oracle versions and operating systems (*continued*)

Oracle versions	Operating systems
Oracle 11g R2	<ul style="list-style-type: none"> <li data-bbox="767 314 1198 440">■ Windows Server 2008 (32-bit, 64-bit) Standard Edition, Enterprise Edition, or Datacenter Edition (SP2 required for all editions) <li data-bbox="767 440 1198 545">■ Windows Server 2008 R2 (32-bit, 64-bit) Standard Edition, Enterprise Edition, or Datacenter Edition

Supported Enterprise Vault versions

The supported version of Enterprise Vault is 8.0 SP1 and SP2.

Supported Sharepoint versions

- Microsoft SharePoint Server 2003 Standard or Enterprise edition.
- Microsoft SharePoint Server 2007 Standard or Enterprise edition.

Supported Blackberry Enterprise Server

The supported version of Blackberry Enterprise (BES) is 4.1.5

Supported Network Appliance applications

The supported versions of Network Appliance applications are as follows:

- Network Appliance Data ONTAP 7.3, 7.3.2, 7.3.3
- Network Appliance SnapDrive 4.1, 4.2.1, 5.0, 6.0, 6.0.2, 6.1, and 6.2
- Network Appliance SnapManager for SQL 2.0, 2.1 and 5.0
- Network Appliance SnapManager for Exchange version 3.2 with exchange Server 2003
- Network Appliance SnapManager for Exchange 4.0, 5.0, 6.0 with Exchange Server 2007
- Microsoft iSCSI software initiator version 2.03 and later versions
- Data ONTAP DSM for Windows MPIO 3.1, 3.2, 3.3, 3.3.1

Hardware requirements

[Table 1-5](#) lists the hardware requirements

Table 1-5 Hardware requirements

Particulars	Requirement
Memory	<ul style="list-style-type: none">■ Minimum required: 512 MB■ Recommended: 1GB
System processor	<ul style="list-style-type: none">■ Minimum required: 300 MHz Pentium II■ Recommended: 550 MHz Pentium III or higher
Display resolution	<ul style="list-style-type: none">■ Minimum resolution: 1024 x 768 pixels or higher■ VCS Cluster Manager (Java Console and Web Console) requires an 8-bit (256 color) display and a graphics card able to render 2D images.

Supported client operating systems

The following client operating systems are supported:

- Windows XP Professional (SP2 or higher required)
- Windows Vista (32-bit) (SP2 supported): Business, Enterprise, and Ultimate editions
- Windows Vista (64-bit) (SP2 supported): Business, Enterprise, and Ultimate editions
- Windows 7

VMware ESX server support

VMware ESX 3.0 or higher is required for installing and configuring VCS on VMware virtual machines.

Firewall and anti-spyware considerations

Disable spyware monitoring and removal software before installing this product. You must disable firewalls to enable discovery of the local client. On systems running Windows Server 2003 SP1, you must disable the Windows Firewall or configure it to allow exceptions to the Remote Administration and File and Printer Sharing services.

Software limitations

This section covers Veritas Cluster Server limitations.

For a complete list of known issues as well as other late-breaking news,
<http://www.symantec.com/docs/TECH59755>

Unable to restore user database using SnapManager for SQL

While restoring the user database using SnapManager, user needs to select the checkbox which specifies that the snapshot was taken on other machine. The user is also required to select the system name. When this option is selected, it is possible to restore the database.

UUID files are always installed to the default installation path

During product installation, you can specify a different installation path than the default.

However, the installation process installs the UUID files in the following default path regardless of where the other binaries are installed.

```
C:\Program Files\Veritas\UUID\bin
```

SnapDrive service fails to start after uninstalling VCS

When VCS is uninstalled and the system is rebooted, the SnapDrive service fails to start with a logon failure.

Workaround: Reset the password for the SnapDrive service account and then start the SnapDrive service.

Limitation on SnapManager for Exchange

The Exchange Setup Wizard for VCS supports Network Appliance SnapManager for Microsoft Exchange (SME) with the restriction that MTA data, transaction logs, and registry replication information must be on the same LUN.

Undocumented commands and command options

VCS contains undocumented commands and command options intended for development use only. Undocumented commands are not supported for external use.

Cannot connect to the other LUNs on the NetApp Filer from the node on which the Exchange service group is online

If an Exchange 2003 service group (along with the NetAppFiler and NetAppSnapDrive resources) is online on a node, you will not be able to connect to the other LUNs on the filer using the SnapDrive plugin from the Windows Computer Management console.

You will be able to connect to the other LUNs only if MExchangeSA and all resources above it are taken offline.

SnapDrive resources fail to offline for a standalone Exchange Server in a VCS environment (797915)

In a standalone Exchange 2003 SP1 cluster configuration, if you take the Exchange service group offline, the NetAppSnapDrive resources fail to go offline.

Workaround: Rename the Microsoft iSCSI Initiator such that the initiator name does not contain any reference to the system name.

Windows Safe Mode boot options not supported (1234512)

The Windows Safe Mode boot options are not supported. VCS services and wizards fail to run if Windows is running in Safe Mode.

Service group offline alerts remain unresolved on a MOM 2005 server (1217601)

In a VCS cluster with a MOM 2005 monitoring environment, the VCS state monitoring script logs service group offline alerts. These alerts are logged only if the service group is offline on the cluster node that has highest priority in the SystemList attribute of that service group. However, if the service group is brought online on the node again, the offline alerts logged earlier do not get resolved.

You must manually resolve the service group offline alerts on the MOM 2005 server.

File shares on Windows Server 2008 are not accessible using the virtual IP address (1214494)

File shares configured in VCS can be accessed using the virtual server name (ShareName attribute) or the virtual IP address on Windows Server 2003 systems. However, on Windows Server 2008, you are unable to access file shares using the virtual IP address. This is a restriction in the operating system.

You can access file shares using the virtual server name.

Security issue when using Java-GUI and default cluster admin credentials (1188218)

While configuring the cluster using the VCS Cluster Configuration Wizard (VCW) if you do not choose the secure mode (Use Single Sign-on option) on the **Configure Security Service Option** panel, VCW creates a user with user name as admin and password as password. The user credentials are auto-populated in the respective fields, by default. This user has administrative privileges to the cluster.

Symantec recommends that you create a different user instead of accepting the default values.

VCW does not support configuring broadcasting for UDP

VCW does not provide options to configure broadcasting information for UDP. You can configure broadcasting for UDP by manually editing the `llttab` file. Refer to the *Veritas Cluster Server Administrator's Guide* for more information.

All servers in a cluster must run the same operating system

All servers in a cluster must run the same operating system. You cannot mix 32-bit (x86), x64, or IA64 Windows operating systems within a cluster.

Cluster Manager (Java Console)

The following are Cluster Manager (Java Console) software limitations.

Latest version of Java Console for VCS is required

Cluster Manager (Java Console) from previous VCS versions cannot be used to manage VCS 5.1 SP2 clusters. Symantec recommends always using the latest version of Cluster Manager.

Running Java Console on a non-cluster system is recommended

Symantec recommends not running Cluster Manager (Java Console) for an extended period on a system in the cluster.

Service group dependency limitations

The following are Service group dependency software limitations.

No failover for some instances of parent group

In service groups in which the group dependency is configured as parallel parent/failover child, online global, remote soft or firm, the parent group may not online on all nodes after a child group faults.

System names must not include periods

The name of a system specified in the VCS configuration file, `main.cf`, must not be in the fully qualified form; that is, the name must not include periods. The name in `main.cf` must be consistent with the name used in the `llthosts.txt` file.

Incorrect updates to path and name of `types.cf` with spaces

The path of the `types.cf` file, as referenced in the `main.cf`, updates incorrectly if the path contains spaces. For example, `C:\Program Files\`, would update incorrectly. Running a combination of the `hacf` commands `hacf -cmdtoconf` and `hacf -cftocmd` truncates the path of the `types.cf` file and updates the `main.cf` file with the truncated path.

Lock by third-party monitoring tools on shared volumes

Some third-party monitoring tools (such as Compaq Insight Manager) hold an exclusive lock or have an open file handle on the shared volumes they monitor. This lock may prevent VCS from offlining a service group that includes the volume as a resource. VCS requires a lock on resource in a service group when taking the group offline.

Workaround: Symantec recommends adding a custom resource as the topmost parent for an affected service group. Use the custom resource to manage onlineing, monitoring, and offlining of the third-party monitoring tool.

Schedule backups on online nodes

If you are scheduling backups in a VCS cluster, schedule them on the node on which the service group is online. If the Exchange virtual server fails over to another node, you must set up the backup schedule again on the new node.

Undefined behavior when using VCS wizards for modifying incorrectly configured service groups (253007)

If you use the VCS wizards to modify service groups that are incorrectly configured through the VCS Cluster Manager (Java Console), the wizards fail to modify the service groups. This may also result in undefined behaviors in the wizards.

MirrorView agent resource faults when agent is killed (508066)

If all of the parent resources of the MirrorView Agent are offline when the MirrorView Agent is killed, or has crashed, then the resource will fault once the MirrorView Agent has automatically restarted. This behavior only occurs if all of the parent resources of the MirrorView agent are offline before the MirrorView Agent being killed, or crashing.

Exchange virtual servers are shown as non-reachable in the Exchange Service Manager (333108)

In a clustered Exchange 2003 configuration, the following issue is observed: Exchange virtual servers were displayed as non-reachable in the Exchange Service Manager (ESM) under tools, monitoring, and status, if the Routing Group Master is configured on the Exchange cluster nodes.

Workaround: Symantec recommends that you configure the Routing Group Master on a standalone Exchange Server.

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.

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.

Virtual fire drill not supported in Windows environments

The virtual fire drill feature available from the VCS command line and the Cluster Manager (Java console) is not supported in Windows environments.

Cluster Manager consoles do not update GlobalCounter

To avoid updating Cluster Manager views with unnecessary frequency, the Java and Web Console do not increment the GlobalCounter attribute of the cluster.

Symantec Product Authentication Service does not support node renaming

Symantec Product Authentication Service (earlier known as Veritas Security Services) does not support renaming nodes.

WAN cards are not supported

The VCS Configuration Wizard (VCW) does not proceed with network card discovery if it detects a WAN card.

VCS DiskReservation (DiskRes) and Mount (Mount) agents supported only on Windows Server 2003

The VCS DiskReservation (DiskRes) and Mount (Mount) agents that can be used to manage the shared disks and volumes that are managed using Windows Logical Disk Manager (LDM) are supported only on Windows Server 2003.

Known issues

This section describes the known issues in VCS release 5.1 SP2.

For a complete list of known issues as well as other late-breaking news, see

<http://www.symantec.com/docs/TECH59755>

Installer may fail during uninstallation

This issue occurs when you try to remove 5.1 SP2 from the cluster nodes. The Veritas Product Installer (VPI) may fail with an msi error. (2137388)

The installer post-uninstall summary panel may display the following error:

Error 1704.An installation for Microsoft Windows SDK for Windows Server 2008 Samples (6001.18000.367) is currently suspended. You must undo the changes made by that installation to continue. Do you want to undo those changes? Product: <product msi module name>

The VPI logs may additionally contain the following message:

Error 1712.One or more of the files required to restore your computer to its previous state could not be found. Restoration will not be possible. Product: <product msi module name>

Workaround

Close VPI and then reboot the system where the uninstallation has failed. After the system reboots, run the uninstallation again.

Installation may intermittently fail on one or more systems (1673123, 2144673)

VCS installation may intermittently fail on one or more systems.

You may see the following error in the logs:

```
Action start 17:13:13: InstallFinalize.  
DEBUG: Error 2356: Couldn't locate cabinet in stream:  
Data1.cab.  
Internal Error 2356. Data1.cab
```

Workaround: If this problem occurs, exit the installer and then launch the installer again and continue reinstalling.

Upgrading to a permanent license, using the License Management option requires you to remove all the demo license keys (2143557)

Using the License Management option, if you choose to upgrade the VCS license key to a permanent license, you must remove all the VCS demo licenses.

Additionally,

While upgrading the license key to a permanent license using the License Management option, the wizard may display "invalid license key" error, in spite of entering the valid key.

Workaround:

Close the error and relaunch the wizard.

Error while switching global service groups using Veritas Operations Manager (VOM) 3.0

The following issue may occur if you are using Veritas Operations Manager (VOM) 3.0 for administering VCS global service groups configured in secure clusters. (2084898)

If you try to switch global service groups between clusters, the operation fails with the following error:

```
VCS WARNING V-16-1-50824 Command (hagrp -switch <servicegroupname>  
<targetsystemname> <targetclustername>) failed. At least Group Operator  
privilege required on remote cluster <targetclustername>.
```

Workaround

VOM uses the Veritas Storage Foundation Messaging Service to run VCS commands. This service runs in the Local System account context. Configure this service to run in the Domain Administrator account context and then perform the switch operation.

Change the service account on each of the managed hosts in the clusters.

Perform the following steps on each of the cluster nodes (managed hosts):

- 1 Open the Windows Services MMC snap-in.
- 2 Right-click **Veritas Storage Foundation Messaging Service** and then click **Properties**.
- 3 Click the **Log On** tab and do the following:
 - Click **This account**, click **Browse**, and in the Select User dialog box specify a user account that has Domain Administrator privileges.
 - Click **OK**.
- 4 Type the account password in the Password and Confirm password fields and then click **OK**.
- 5 Proceed with the service group operations.

On a Windows Server 2008 or 2008 R2 node, installer may fail to restart the services after the installation is complete (2140506)

The product installer may fail to restart the services, if the logged on user account does not have the required administrative privileges on the cluster node.

This issue occurs even if you choose to log on using the User Access Control (run as administrator) option.

hastop.exe command prompt may remain open when the installer fails to stop HAD (2141297)

While upgrading to or repairing the 5.1SP2 installation, the product installer stops the required services. While stopping HAD, a command prompt "hastop.exe" may launch. If HAD fails to stop in defined time out, the installer stops and does not proceed with the installation. However, the command prompt "hastop.exe" remain open.

Leaving the command prompt open may lead to handle leak.

Workaround:

You must manually close the command prompt.

SharePoint 2010 resource faults with an initialization error

After configuring the SharePoint service group, the VCS SharePoint 2010 agent resource (SharePointServer) may fault.(2102270)

The SharePoint 2010 agent log may contain the following messages:

VCS ERROR V-16-10051-13583

SharePointServer:<SharePointcomponentname>:monitor:Provider Initialization failed [4, 0x800705AF]

VCS ERROR V-16-20083-105

SharePointServer:<SharePointcomponentname>:monitor:Provider Initialization failed [4, 0x800700A4].

Workaround

From the Windows Services MMC snap-in, restart the Windows Management Instrumentation (WMI) service and then probe the SharePoint 2010 resource.

This is a known Microsoft issue and a hotfix was not available at the time of this release.

MSMQ resource fails to come online if the MSMQ directory path contains double byte characters

The VCS MSMQ resource may fail to come online and may eventually fault if the MSMQ directory path contains Double Byte Character Set (DBCS) characters. (584162, 2121635)

The MSMQ agent log may contain the following message:

V-16-2-13066 Agent is calling clean for resource (MSMQresourcename) because the resource is not up even after online completed.

The Windows Event Viewer may display the following message:

The logger files cannot be initialized (Error: 0x800700003) The file <filename> in the <MSMQdirectory> folder is corrupted or absent. To start the Message Queuing service without losing consistency, you must correct or recover this file...

Workaround

This is a limitation from Microsoft. Do not use DBCS characters in the MSMQ directory paths.

Cannot create or map LUNs on a node where an Exchange 2003 service group is brought online (1444066)

If an Exchange 2003 service group is brought online on a node, the NetApp SnapDrive 6.0 instance takes a lot of time to connect to the NetApp filer. After the connection is established, you may not be able to create or map LUNs on the node. This happens because the computer host name is changed to the Exchange virtual computer name when the Exchange service group comes online. The SnapDrive instance still uses the physical host name to connect to the filer.

Workaround:

Restart the NetApp SnapDrive service from the services console after the Exchange 2003 service group comes online.

VCS uninstallation halts and displays an error message; uninstall continues after clearing the message

During VCS for Windows uninstallation, the installer halts while uninstalling the Symantec Service Management Framework component and displays the following error message:

```
Shell error: not found
```

Uninstallation continues after clearing the error message.

Mount resource fails to bring file share service group online (1266158)

If you are using Windows Logical Disk Manager (LDM) for shared storage, you may encounter problems while bringing service groups online or switching service groups. Create file share service group and try to bring it online. Mount resource fails to bring the file share service group online or switch the service group.

Workaround:

Set the attribute AutoFSClean of Mount resource agent to 1. The default value is 0. The agent cleans the file system by running Chkdsk/X on the volume being brought online.

Caution: Cleaning a file system may result in loss of data.

Mount agent may go in unknown state on virtual machines (1262346)

On virtual machines having VCS for Windows installed while configuring the Mount agent, node may go in an unknown state. This happens because the attribute PartitionNo is Global and is seen differently on the shared disks.

Workaround:

Perform the following steps

- 1 Take the service group offline.
- 2 Rescan the disks from all the nodes.
- 3 To retrieve information about the PartitionNo, type the following at the command prompt:

```
C:\>havol -getdrive -details
```

The information about the disk is retrieved and stored in a text file in the same path from where you executed the command.

- 4 Edit the attribute PartitionNo from Global to Per System. Assign the value for PartitionNo from the disk details retrieved in the above step.

Resource fails to online after failover on secondary

During a migrate or failover on the secondary, the NetAppSnapDrive resources fail to come online.

Workaround:

Mount the LUNs manually using the SnapDrive GUI or CLI and then probe the resources.

Exchange Setup Wizard messages

During preinstallation steps, the Exchange Setup wizard for VCS renames a node to the Exchange virtual server name. Installing Microsoft Exchange on the node then adds the virtual server name to the Exchange Domain Servers group.

During post-installation steps, the setup wizard restores the original name to the node and removes the Exchange virtual server name from the Exchange Domain Servers group.

VCS Configuration Wizard may fail to add nodes or reconfigure a cluster with an online Exchange service group (263698)

If an Exchange 2003 service group is online in a cluster, the VCS Configuration Wizard may fail to add a node to the cluster or reconfigure the cluster.

Workaround:

Take the Exchange service group offline and run the VCS configuration Wizard to add the node.

Error when reconfiguring cluster or creating the ClusterService group if an Exchange 2003 service group is online (1171088)

If an Exchange 2003 service group is online and you run the VCS Cluster Configuration Wizard (VCW) to reconfigure the cluster or create the ClusterService group, VCW may fail to discover the network adapters on the cluster nodes.

Workaround:

Perform the following steps:

- 1 Take all the ExchService resources in the Exchange 2003 service group offline.
- 2 From the Services MMC snap-in, restart the WMI service.
- 3 Run VCW to perform the required tasks.
- 4 Bring the ExchService resources online.

Global group fails to come online on the DR site with a message that it is in the middle of a group operation (1795151)

When the node that runs a global group faults, VCS internally sets the MigrateQ attribute for the group and attempts to fail over the global group to another node within the local cluster. The MigrateQ attribute stores the node name on which the group was online. If the failover within the cluster does not succeed, then VCS clears the MigrateQ attribute for the groups. However, if the groups have dependencies which are more than one-level deep, then VCS does not clear the MigrateQ attribute for all the groups.

This defect causes VCS to misinterpret that the group is in the middle of a failover operation within the local cluster and prevents the group to come online on the DR site. The following message is displayed:

```
VCS Warning V-16-1-51042 Cannot online group global_group.  
Group is in the middle of a group operation in cluster  
local_cluster.
```

Workaround: Perform the following steps on a node in the local cluster which is in the running state.

To bring the global group online on the DR site

- 1 Check whether the MigrateQ attribute is set for the global group that you want to bring online on the remote cluster. Type the following on the command prompt:

```
hagrp -display -all -attribute MigrateQ
```

This command displays the name of the faulted node on which the group was online.

- 2 Flush the global group that you want to bring online on the remote cluster. Type the following on the command prompt:

```
hagrp -flush global_group -sys faulted_node -clus local_cluster
```

where:

- *global_group* is the group that you want to bring online on the remote cluster.
- *faulted_node* is the node in the local cluster that hosted the global group and has faulted.
- *local_cluster* is the cluster at the local site.

The flush operation clears the node name from the MigrateQ attribute.

- 3 Bring the service group online on the remote cluster.

Type the following on the command prompt:

```
hagrp -online global_group -any -clus remote_cluster
```

Unable to access SQL Server 2008 databases upon failover (1876562)

When you create a SQL 2008 database from a cluster node, only the Local Administrators group and the SQL Users group created on that node have permissions to that database. As a result, when the SQL service group is switched over to another cluster node, you cannot access that database from that node.

Also, the SQL service may fail to start after switching over the service group on alternate nodes. This occurs if the SQL service user account specified during SQL installation does not have local administrative privileges on all the cluster nodes.

Workaround: Ensure that the user account for the SQL service is a domain user and a member of the Local Administrators group on all the cluster nodes.

Cannot log on to the Cluster Manager (Java Console) after upgrading to Service Pack 2 (1871939)

You may not be able to log on to the VCS Cluster Manager (Java Console) after upgrading to Service Pack 2. This issue occurs if you have configured a secure cluster and are upgrading your systems from VCS 5.1 AP1 to VCS 5.1 SP2.

Workaround: Start the Symantec Product Authentication Service and then log on to the Cluster Manager (Java Console). Type the following at the command prompt:

```
net start vrtsat
```

VCW is unable to configure the VCS HAD Helper service user account in a domain having a Windows 2000 domain controller

While configuring the cluster on Windows Server 2008 R2 systems, the VCS Cluster Configuration Wizard (VCW) fails to configure the VCS HAD Helper Service user account because it is unable to add the user account to the local Administrator's group on the cluster nodes. The VCW logs display the following error:

```
Error=000006FD.  
00000968-00000666: Failed to add the user to administrators group.
```

This issue occurs on Windows Server 2008 R2 systems that are part of a domain that has a Windows 2000 domain controller.

SQL instance running on 64-bit machine is not discovered by MOM 2005 server (1449804)

A SQL Server instance running on a 64-bit cluster node is not discovered by MOM 2005 Server. This problem occurs because the MOM 2005 agent is 32-bit while the SQL instance is 64-bit.

Workaround: Depending on your SQL server version, create the following registry key on the 64-bit cluster nodes that host the SQL instance: For SQL Server 2008:

```
HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\Microsoft\Windows\  
CurrentVersion\Uninstall\Microsoft SQL Server 10
```

For SQL Server 2005:

```
HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\Microsoft\  
Microsoft SQL Server\Instance Names\SQL
```

You need not create any registry value under this key. After adding the registry key, the MOM server detects the SQL instances.

Version conflict error while importing the VCS 5.1 SQL management pack for MOM 2005 (1471181)

A management pack version conflict error occurs when you try to import the VCS 5.1 management pack for SQL server in a Microsoft Operations Manager 2005 monitoring environment. This occurs if you have already imported the Microsoft SQL Server 2008 management pack before you import the VCS management pack.

The following error is displayed:

```
Version of Rule Group 'State Monitoring and Service  
Discovery' - '09.0.3043.0000' should be newer than  
'10.1.0001.0000'.
```

Workaround: You can ignore the error and click **Continue** to proceed with the VCS management pack import process. There is no change in the SQL 2005 monitoring scripts included in the Microsoft SQL management pack version 10.1.0001.0000. The VCS management pack file (VCS_SQL2005_MOM2005.akm) version 09.0.3043.0000 works as it is with Microsoft SQL management pack version 10.1.0001.0000.

VCS cluster configuration fails if Symantec Endpoint Protection 11.0 MR3 version is installed (1455690)

The VCS Cluster Configuration Wizard (VCW) fails to configure the cluster on systems where Symantec Endpoint Protection (SEP) 11.0 MR3 version is installed.

The following error is displayed:

```
Failed to start the cluster. Error=FFFFFFFF. Failed to start  
services on all the nodes.
```

The wizard may also fail to ping systems that are selected to be a part of the cluster. VCW uses Internet Control Message Protocol (ICMP) to ping systems and ICMP traffic is blocked in SEP, by default.

Perform the following workaround to resolve this error.

To resolve error message

- 1 Create a custom rule in SEP to allow ICMP traffic in both directions.
- 2 Create a custom rule in the SEP firewall rules table. Specify the following details for the rule:

- Rule type: Application
 - Application name: llt.sys
 - Action: allow
- 3 Move this rule to the top of the firewall rules table and then apply the firewall policy again.
 - 4 Ensure that the SEP clients on the systems receive this policy and then proceed with the cluster configuration task.

Refer to the SEP documentation for detailed instructions on creating custom firewall rules.

Memory leak occurs in the VCS agent for SQL 2008 (1466183)

A memory leak occurs in the VCS agent for SQL Server 2008. This issue is observed when DBList based SQL database detail monitoring is configured. In this mode of detail monitoring, the VCS agent for SQL 2008 uses Microsoft ActiveX Data Objects (ADO) to access the SQL databases. The memory leak occurs due to the ADO connections made by the agent to each database configured in the DBList agent attribute. The amount of memory leak is negligible and should not cause any adverse effects on the SQL Server operations in the cluster.

Currently there is no fix available for this issue.

Contact Symantec technical support for more information.

SQL Server 2008 Analysis and Agent service resources may go in to an unknown state (1466012)

The SQL Server 2008 Analysis service and SQL Server 2008 Agent service resources may go in to an UNKNOWN state when you bring the SQL Server 2008 service group online. The following error is logged on the GenericService agent log:

```
VCS ERROR V-16-10051-6012
GenericService:MSOlap-NEW:online:Failed to wait for the
service 'MSOLAP$NEW' to start. Error = 258
VCS ERROR V-16-10051-6012
GenericService:SQLServerAgent-NEW:online:Failed to wait for
the service 'SQLAgent$NEW' to start. Error = 258
```

Workaround: Probe the resources if they are in the UNKNOWN state.

Issue while configuring a secure cluster (1466003)

While configuring a secure cluster you may get the following error on the **Configure Security Service Options** panel of the **VCS Cluster Configuration Wizard** (VCW):

```
Symantec Product Authentication Service Configuration  
utility failed. Exit Code : 11
```

As a result, you may not be able to configure a secure cluster.

Workaround: Note the following requirements before configuring a secure cluster:

- Disable Windows Firewall, if it is enabled.
- While specifying the root broker details in the VCW panel, specify the physical host name (instead of the IP address) of the root broker system.

If the error persists, perform the following steps:

To fix persistent error

- 1 From the command prompt, navigate to the following directory on the cluster system:

```
C:\Program Files\Veritas\Security\Authentication\bin
```

For 64-bit systems the path is as follows:

```
C:\Program Files(x86)\Veritas\Security\Authentication\bin
```

Here, C:\Program Files (C:\Program Files(x86) for 64-bit) is presumed to be the installation directory for VCS.

- 2 Run the following command from the command prompt:

```
"vssregctl.exe -s -l -b  
"Security\Authentication\AuthenticationBroker\AtPlugins\vx" -k  
"ABAAuthSourceLocation" -v "C:\Program  
Files\Veritas\Security\Authentication\systemprofile\A  
BAAuthSource" -t string"
```

For 64-bit systems, the command is as follows:

```
"Security\Authentication\AuthenticationBroker\AtPlugins\vx" -k  
"ABAAuthSourceLocation" -v "C:\Program  
Files(x86)\Veritas\Security\Authentication\systemprofile\A  
BAAuthSource" -t string"
```

- 3 Proceed to configure a secure cluster using VCW.

Symantec Endpoint Protection security policy may block the VCS Cluster Configuration Wizard (1315813)

While configuring a cluster, the VCS Cluster Configuration Wizard (VCW) may fail to ping systems that are selected to be a part of the cluster. As a result, you cannot configure the cluster. This may happen in case Symantec Endpoint Protection (SEP) client is installed on the selected systems. VCW uses Internet Control Message Protocol (ICMP) to ping systems and ICMP traffic is blocked in SEP, by default.

Workaround: Create a custom rule in SEP to allow ICMP traffic in both directions.

Ensure that you create this rule on all the systems that are going to be part of the cluster. Refer to the SEP documentation for instructions.

Reconfiguring the root broker multiple times may cause issues in a secure cluster (1260632)

If in a secure cluster the root broker is changed multiple times, then the **Veritas Cluster Configuration Wizard (VCW)** may fail to connect to the cluster with the following error message:

```
Failed to open secure socket connection to port 14141 on host <hostname>
```

The VCS commands may also fail with the following error:

```
VCS ERROR V-16-1-53006 Unable to connect to VCS engine securely
```

As a result you may not be able to run VCS commands or modify the cluster using VCW.

Workaround: If root broker changes are required frequently, then Symantec recommends that you configure a root broker that is outside the cluster. The root broker system should not be part of the cluster. If the root broker is part of the cluster, Symantec recommends that you do not change the root broker after configuring a secure cluster the first time.

If the network adapters cannot ping each other, the cluster nodes may not get GAB membership

While configuring LLT over UDP, if the network adapters selected for the LLT communication cannot ping each other and you proceed with the cluster configuration, VCW configures the LLT service on the selected network adapters but the cluster nodes may not receive GAB membership and as a result the Veritas High Availability Engine, HAD, may fail to start.

You can confirm the GAB membership by running the following command:

```
gabconfig -a
```

If no port membership information is returned it indicates that GAB is not operating. This issue can be addressed in either of the following methods:

To address this issue using method 1

- 1 Reboot the cluster nodes that do not have GAB membership.
- 2 Verify the GAB operation in the cluster.

Type the following on the command prompt:

```
gabconfig -a
```

If GAB membership information is displayed for all cluster nodes, GAB is working correctly. However, if the appropriate GAB membership information is not returned for one or more nodes, GAB is not operating correctly. In that case, proceed to the next method.

To address this issue using method 2

- 1 Stop the LLT service in the cluster.

Type the following on the command prompt:

```
:net stop llt
```

- 2 Delete the cluster using VCW.
- 3 Ensure that the network adapters can ping each other and then re-create the cluster using VCW.

Saving large configuration results in very large file size for main.cf (616818)

If your service groups have a large number resources or resource dependencies, and if the PrintTree attribute is set to 1, saving the configuration may cause the configuration file to become excessively large in size and may affect performance.

Workaround: Disable printing of resource trees in regenerated configuration files by setting the PrintTree attribute to 0.

AutoStart may violate limits and prerequisites load policy

The load failover policy of Service Group Workload Management may be violated during AutoStart when all of the following conditions are met:

- More than one autostart group uses the same Prerequisites.

- One group, G2, is already online on a node outside of VCS control. The other group, G1, is offline when VCS is started on the node.
- The offline group is probed before the online group is probed.

In this scenario, VCS may choose the node where group G2 is online as the AutoStart node for group G1 even though the Prerequisites load policy for group G1 is not satisfied on that node.

Workaround: Persistently freeze all groups that share the same Prerequisites before using `hastop -force` to stop the cluster or node where any such group is online. This workaround is not required if the cluster or node is stopped without the force option.

Trigger not invoked in REMOTE_BUILD state

In some situations, VCS does not invoke the in jeopardy trigger if the system is a REMOTE_BUILD state. VCS fires the trigger when the system goes to the RUNNING state.

Some alert messages do not display correctly (612268)

The following alert messages do not display correctly:

51030	Unable to find a suitable remote failover target for global group %s. Administrative action is required.
51031	Unable to automatically fail over global group %s remotely because local cluster does not have Authority for the group.
50913	Unable to automatically fail over global group %s remotely because clusters are disconnected and ClusterFailOverPolicy is set to %s. Administrative action is required.
50914	Global group %s is unable to failover within cluster %s and ClusterFailOverPolicy is set to %s. Administrative action is required.
50916	Unable to automatically failover global group %s remotely due to inability to communicate with remote clusters. Please check WAN connection and state of wide area connector.
50761	Unable to automatically fail over global group %s remotely because ClusterList values for the group differ between the clusters. Administrative action is required.
50836	Remote cluster %s has faulted. Administrative action is required.

51032	Parallel global group %s faulted on system %s and is unable to failover within cluster %s. However, group is still online/partial on one or more systems in the cluster
51033	Global group %s is unable to failover within cluster %s and AutoFailOver is %s. Administrative action is required.

Issues related to the VCS engine

The following issues relate to the VCS engine.

Engine may hang in LEAVING state

When the command `hares -online` is issued for a parent resource when a child resource faults, and the `hares -online` command is followed by the command `hastop -local` on the same node, then the engine transitions to the LEAVING state and hangs.

Workaround: Issue the command `hastop -local -force`

Timing issues with AutoStart policy

Consider a case where the service group is offline and engine is not running on node 1. If you restart the engine on node 1 after HAD is killed on node 2 and before the engine is restarted on node 2, then VCS does not initiate the autostart policy of the group.

Issues related to Cluster Manager (Java Console)

The following issues relate the Cluster Manager (Java Console)

Cluster Manager (Java Console) fails to launch if CMC 5.1 is installed (1261117)

If you install the Cluster Management Console 5.1 in a VCS environment, the Cluster Manager (Java GUI) may fail to start.

Cluster connection error while converting local service group to a global service group (1295394)

This issue occurs while converting a local service group into a global service group using the Global Group Configuration Wizard from the Cluster Manager (Java Console). While specifying the remote cluster information, if you choose the **Use connected clusters credentials** option for the cluster admin user, the wizard fails

to validate the user credentials even if the logged on user is a cluster administrator. The following error is displayed:

```
VCS WARNING V-16-10-73 Following clusters had problems while  
connection: Cluster <cluster name>: Connection Refused
```

Workaround: You must select the **Enter new credentials** option and manually specify the cluster administrator credentials.

Repaint feature does not work properly when look and feel preference is set to Java (1082952)

When a user selects the **Java Look and Feel in the Preferences** dialog box and the look and feel has changed, repainting does not work in that the **Preferences** dialog box does not change as it should and the panel is not clearly visible.

Workaround: After selecting the **Java Look and Feel in the Preferences** dialog box, close the Java GUI and then reopen it. You should then be able to select other tabs in the **Preference** dialog box.

Exception when selecting preferences (585532)

On Windows systems, selecting the Java (Metal) look and feel of the Java Console may cause a Java exception.

Workaround: After customizing the look and feel, close restart the Java Console.

Java Console errors in a localized environment

When connected to cluster systems using locales other than English, the Java Console does not allow importing resource types or loading templates from localized directories.

Workaround: Copy the types files or templates to directories with English names and then perform the operation.

Common system names in a global cluster setup

If both local and remote systems have a common system name in a global cluster setup, group operations cannot be performed on those systems using the Java console.

Workaround: Use command-line interface to perform group operations.

Agent logs may not be displayed (643753)

If VCS is installed at a different location (at a location other than the default location), the VCS agent logs may not be visible from the Java Console.

Workaround: Copy the `bmc` and `bmcmap` files to the location specified in Table 1-3:

Table 1-6 bmc and bmcmap file location

Copy from this directory	Copy to this directory
(For English) D:\Program Files\Veritas\messages\en Where, D: is the drive on which VCS is installed.	%VCS_HOME%\messages\en Where, %VCS_HOME% is the default installation directory for VCS, typically C:\Program Files\Veritas\Cluster Server.

Global service groups

The following are global service groups issues.

VCW configures a resource for GCO in a cluster without a valid GCO license

The VCS Configuration Wizard (VCW) enables you to configure a resource for global clustering, even if the cluster does not have a valid license for the Global Cluster Option (GCO). You can successfully bring a GCO resource online, take it offline, or switch it between nodes in a cluster. However, the following message is logged on the engine log if you attempt to connect to a remote cluster:

```
VCS WARNING V-16-3-18000 Global Cluster Option not licensed.  
Will not attempt to connect to remote clusters
```

Workaround: Symantec recommends that you do not configure a global cluster resource in a cluster without a valid GCO license.

Group does not go online on AutoStart node

Upon cluster startup, if the last system on which the global group is probed is not part of the group's `AutoStartList`, then the group will not `AutoStart` in the cluster. This issue affects only global groups. Local groups do not experience this behavior.

Workaround: Ensure that the last system to join the cluster is a system in the group's `AutoStartList`.

Cross-cluster switch may cause concurrency violation

If the user tries to switch a global group across clusters while the group is in the process of switching within the local cluster (across systems), then the group will be online on both the local and remote clusters. This issue affects only global groups. Local groups do not experience this behavior.

Workaround: Ensure that the group is not switching locally before attempting to switch the group remotely.

Declare cluster dialog may not display highest priority cluster as failover target

When a global cluster fault occurs, the **Declare Cluster** dialog enables you to fail groups over to the local cluster. However, the local cluster may not be the cluster assigned highest priority in the cluster list.

Workaround: To bring a global group online on a remote cluster, do one of the following:

- From the Java Console, right-click the global group in the Cluster Explorer tree or **Service Group View**, and use the Remote Online operation to bring the group online on a remote cluster.
- From the Web Console, use the Operations links available on the **Service Groups** page to bring the global group online on a remote cluster.

Fibre Channel adapters may require modified settings

The following issues apply to VCS with specific Fibre Channel host bus adapters.

Emulex Fibre Channel adapters

For servers configured with Emulex Fibre Channel host bus adapters, you must modify settings of the adapter. The default settings of the adapter do not ensure proper function of SCSI reserve and release.

Workaround: Be sure that the host bus adapter has the proper drivers installed.

Modify the Topology, ResetFF, and ResetTPRLO drive settings in the Emulex adapter BIOS settings, as instructed in the following workaround.

To workaround this issue

- 1 Locate and run the `Emulex` utility for changing Miniport driver settings.
- 2 Select **Configuration Settings**.
- 3 Select **Adapter Settings**.

- 4 Set the **Topology** parameters to 1, Permanent, and Global.
- 5 Set the **ResetFF** parameters to 1, Permanent, and Global.
- 6 Set the **ResetTPRLO** parameters to 1, Permanent, and Global.
- 7 Save the configuration.
- 8 Repeat step 1 through step 7 for all Emulex adapters in each system.
- 9 Reboot the systems.

Note: When using EMC storage, you must make additional changes to Emulex host bus adapter settings. See TechNote 245039 on this topic at, <http://entsupport.symantec.com>.

QLogic Fibre Channel adapters

When configured over QLogic Fibre Channel host bus adapters, the DiskReservation agent requires the Target Reset option of the adapter to be enabled. By default, this adapter option is disabled, causing the agent to hang during failover.

To workaround this issue

- 1 During system startup, press ALT+Q to access the QLogic adapter settings menu.
- 2 Select **Configuration Settings**.
- 3 Select **Advanced Adapter Settings**.
- 4 Set the **Enable Target Reset** option to Yes.
- 5 Save the configuration.
- 6 Repeat step 1 through step 5 for all QLogic adapters in each system.
- 7 Reboot the systems.

If VCS upgrade fails on one or more nodes, HAD fails to start and cluster becomes unusable (1251272)

This issue may happen in cases where you are upgrading a multi-node VCS cluster. If the upgrade succeeds on at least one node but fails on one or more nodes in the cluster, the VCS High Availability Engine (HAD) may fail to start on the nodes on which the upgrade has failed.

The VCS installer does not let you remove VCS from those nodes with an error that those nodes are part of a cluster. The VCS Cluster Configuration Wizard

(VCW) does not let you remove those nodes from the cluster with an error that the nodes have a different version of VCS installed.

As a result, you cannot perform any operations on the cluster.

Workaround: To get the cluster running, you must manually remove the nodes on which VCS upgrade failed, from the cluster. Then, use the cleanup scripts to remove VCS from the nodes on which the upgrade failed, reinstall VCS, and add the nodes to the cluster.

Perform the following steps to remove the nodes on which the VCS upgrade failed, from the cluster:

To workaround this issue

- 1 Stop HAD and LLT on all the cluster nodes.

Type the following on the command prompt:

```
net stop had  
  
net stop llc
```

- 2 On a node on which VCS was upgraded successfully, open the file `llthosts.txt` and delete the entries of all the cluster nodes on which the upgrade failed.

For example, consider a cluster with three nodes, N1, N2, and N3.

The `llthosts.txt` file contains the following entries:

```
# This is program generated file, please do not edit.  
0 N1  
1 N2  
2 N3
```

If the upgrade failed on N3, delete the last entry from the file.

So the modified `llthosts.txt` file should look like this:

```
# This is program generated file, please do not edit.  
0 N1  
1 N2
```

The `llthosts.txt` file is typically located at `C:\Program Files\VERITAS\comms\llc`.

Here `C:\` is the drive on which VCS is installed.

- 3 On the node on which you performed step 2, open the `gabtab.txt` file and modify the entry to reflect the exact number of nodes in the cluster.

The `gabtab.txt` file contains the following entry:

```
#This is program generated file, please do not edit.  
gabconfig -c -n <number of nodes in the cluster>
```

The *<number of nodes in the cluster>* should be the number of nodes on which VCS was upgraded successfully.

Considering the example in step 2 earlier, the `gabtab.txt` file contains the following entry:

```
#This is program generated file, please do not edit.  
gabconfig -c -n 3
```

As the upgrade failed on one out of the total three nodes in the cluster, the entry should look like this:

```
#This is program generated file, please do not edit.  
gabconfig -c -n 2
```

The `gabtab.txt` file is typically located at `C:\Program Files\VERITAS\comms\gab`.

Here `C:\` is the drive on which VCS is installed.

- 4 From the Windows Services snap-in, change the startup type of the Veritas High Availability Engine (HAD) service to Manual.
- 5 Repeat step 2, step 3, and step 4 on all the nodes on which VCS was upgraded successfully.
- 6 On one of the nodes on which VCS was upgraded successfully, open the VCS configuration file `main.cf` in a text editor and remove the entries of all the cluster nodes on which the VCS upgrade failed.

The `main.cf` file is located at `%VCS_Home%\conf\config`.

The variable `%VCS_HOME%` is the default installation directory for VCS, typically `C:\Program Files\VERITAS\Cluster Server`.

- 7 Start HAD on the node on which you modified the VCS configuration file in step 6 earlier.

Type the following on the command prompt:

```
net start had
```

You can remove VCS from the affected nodes using the cleanup scripts that are provided with the software. These scripts are `.bat` files located in the `\Tools\vp`

directory on the software DVD. Refer to the `readme.txt` file located in the directory for details on how to use the cleanup scripts. After removing VCS, install VCS using the product installer and then add the nodes to the cluster.

Contact Symantec Technical Support for more information.

Options on the Domain Selection panel in the VCS Cluster Configuration Wizard are disabled (1213943)

While running the VCS Cluster Configuration Wizard (VCW), the options to retrieve a list of systems and users in the domain on the **Domain Selection** panel are available only for the first time you run the wizard. If you click **Next** and then click **Back** to go back to the panel, all or some of these options appear disabled.

Workaround: Exit and launch the wizard again.

Fixes and enhancements for 5.1 SP2

[Table 1-7](#) describes the issues that were fixed in the 5.1 SP2 release.

Table 1-7 Fixed issues for Veritas Cluster Server 5.1 SP2

Fixed incidents	Descriptions
1803383, 2007447	LLT protocol driver on windows did not handle plug-n-play messages from underlying NIC card. As a result, when underlying NIC card was removed or disabled, LLT protocol service caused machine to hang. This change allows LLT to unbind from the NIC card, when a plug-n-play message indicating NIC removed is received.
1876562	SQL service user account specified during SQL Server 2008 installation does not have local administrative privileges on all the cluster nodes.
1926484	The RegRep agent stores the registry changes at a different location than what is specified in the configuration. This happens whenever the service group system list is modified (either a node is added or removed) when the RegRep resource is online in the cluster.
1927325	When the system level attribute "CPUUsageMonitoring" is enabled, the VCS engine (HAD) logs display the following message: VCS ERROR V-16-1-50120 Error in enabling CPUUsage monitoring: -1073738810 VCS fails to enable the attribute and as a result is not able to monitor the CPU usage on the cluster nodes.

Table 1-7 Fixed issues for Veritas Cluster Server 5.1 SP2 (*continued*)

Fixed incidents	Descriptions
1937380	<p>After updating the VCS management pack (Symantec.SFW.HA.mp, ver 5.1.10000.1) and the VCS Library Management Pack (Symantec.VCS.Library.mp, ver 5.1.10000.2) the Helper Process utility (MOMHelper.exe) keeps terminating and the following error is observed:</p> <p>Forced to terminate the following process started at <time> because it ran past the configured timeout 60 seconds.</p>
1943534	<p>On Windows Server 2008, the MSMQ resource fails to come online due to a permissions issue.</p> <p>The following errors are observed in the agent log:</p> <ul style="list-style-type: none"> ■ VCS ERROR V-16-10041-17059 ■ MSMQ:<servicegroupname>-MSMQ:online:SetFileSecurity error! (rc=5) ■ VCS ERROR V-16-10041-17062 ■ MSMQ:<servicegroupname>-MSMQ:online:Failed to set permissions to the MSMQ storage. Error 5. <p>The MSMQ agent runs in the local system context. The MSMQ agent assigns the MSMQ service SID with full control privileges to the MSMQRootPath. If there is any change in the permissions such that the local system account does not have privileges on the file system, then the MSMQ agent is unable to assign the MSMQ service SID with full control privileges to the MSMQRootPath. Without the required permissions, the MSMQ resource fails to come online.</p> <p>On Windows Server 2008, the MSMQ virtual server queues failed to be seen from a remote system.</p>
1951924	<p>SQL Server 2008 user databases are not accessible after a failover if the SQL service user account specified during SQL Server 2008 installation does not have local administrative privileges on all the cluster nodes.</p>
1979764	<p>The IP agent is unable to probe IP addresses if the first three octets and the first two digits of the fourth octet match those of the IP address manually assigned to the network adapter.</p> <p>The IP agent log contains the following message:</p> <p>VCS WARNING V-16-10051-4008 IP:csg_ip:monitor:IP (<VirtualIPAddress>) is Admin IP</p>

Table 1-7 Fixed issues for Veritas Cluster Server 5.1 SP2 (*continued*)

Fixed incidents	Descriptions
2005859	<p>The VCS Cluster Manager (Java Console) is unable to load the group templates. The following error is displayed:</p> <p>VCS ERROR V-16-10-65: Could not load :- Hacf</p> <p>This issue typically occurs if in the cluster configuration file, main.cf, references to types configuration files are specified using the absolute path. For example, if the entry for ClusterConnectorConfigType.cf file in the main.cf appears as follows:</p> <pre>include "C:\Program Files\Veritas\Cluster Server\conf\config\ClusterConnectorConfigType.cf"</pre> <p>The hacf utility creates temporary files before loading the templates. Absolute paths are not handled by hacf, therefore it fails to create the required temporary files and is unable to load the templates. In some cases, the hacf utility may also crash.</p>
2017551	<p>VCW support for more than 2 network cards to create 2-8 private network links while configuring LLT over UDP.</p>
2020013	<p>This issue occurs in a multi-node (e.g. 10 nodes) cluster environment where there is a temporary disruption in the VCS private network links configured in the cluster.</p> <p>When the private network links connection is restored, the VCS GAB may cause a panic on the nodes where there is an error in the gap sequence protocol that GAB uses to establish the cluster membership.</p> <p>This may result in a BSOD (0xbad40000 crash dump) on those nodes.</p>
2033709	<p>Following errors occurred with VCS NetApp SnapMirror agent: -</p> <p>The agent crashes when the SnapMirrorSchedule attribute is configured. As a result, the SnapMirror schedules created are lost whenever the service group is failed over between the cluster nodes.</p> <p>The agent fails to perform snapmirror resync during a global cluster failover.</p> <p>The following error is logged:</p> <p>VCS ERROR V-16-20031-21 NetAppSnapMirror:<resname>:online:'snapmirror-resync' failed for destination location <filename>:<volname>, source location <filename>:<volname> at filer <filename>. Error 13102: Snapmirror resynchronization of <volumename> to <volumename> : revert to resync base snapshot failed Aborting resync.</p>

Table 1-7 Fixed issues for Veritas Cluster Server 5.1 SP2 (*continued*)

Fixed incidents	Descriptions
2040049	<p>VCWSilent does not support LLT over UDP configuration</p> <p>VCS provides a silent configuration utility, VCWSilent.exe, that can be used to configure a new cluster. However, the VCWSilent.exe does not support configuring LLT over UDP.</p>
2066365	<p>This issue is seen when a considerable number of IIS sites (typically more than 10) are configured and the IIS wizard is used to configure these sites under VCS.</p> <p>While configuring the IIS service group, the IIS site discovery leads to a memory corruption and the wizard fails to discover the IIS sites. The IIS wizard may either hang or may fail to complete.</p> <p>The following Application Error event is generated in the Windows Event Viewer:</p> <p>"Faulting application hadiscover.exe"</p>

Fixes and enhancements for 5.1 SP1

[Table 1-8](#) describes the issues that were fixed in the 5.1 SP1 release.

Table 1-8 Fixed issues for Veritas Cluster Server 5.1 SP1

Fixed incidents	Descriptions
1229217	<p>The Lanman resource faults when it tries to perform the DNS refresh and one of the DNS servers is not available.</p>
1262548, 1486465	<p>Memory leak in IIS agent.</p>

Table 1-8 Fixed issues for Veritas Cluster Server 5.1 SP1 (*continued*)

Fixed incidents	Descriptions
1296465, 1499225	<p>This issue occurs in cases where the VCS Global Cluster Option (GCO) is configured in a disaster recovery setup.</p> <p>If the ClusterService group (with the Wide Area Connector resource) and a global service group are online on the same cluster node at a multi-node primary site and that node fails or is shut down, the service group tries to fail over locally. However, if there is not a suitable failover node at the primary site, the service group does not fail over to a node on the secondary site (DR site). Thus global failover is unsuccessful.</p> <p>The VCS engine logs the following error:</p> <pre>VCS NOTICE V-16-1-52604 Global group <service group name> is no longer completely faulted in cluster. Canceling retry of cross-cluster failover.</pre>
1298649, 1486196	<p>If the volumes configured for Exchange are mounted as folder mount points, the Exchange Setup Wizard for VCS may fail to discover such volumes and crash intermittently.</p>
1369751, 1486518	<p>After configuring a print share service group with printers added in the virtual server, subsequent deletion of printers is not reflected upon failover to another nodes.</p> <p>This issue occurs due to RegRep agent's behavior of not processing the keys that are deleted. The printers are stored under a registry hive and the hive corresponding to the deleted printer is ignored by RegRep agent.</p>

Table 1-8 Fixed issues for Veritas Cluster Server 5.1 SP1 (*continued*)

Fixed incidents	Descriptions
1371162	<p>This issue occurs when Exchange is deployed in an Any-to-Any configuration with a front-end/back-end scenario, and the Exchange back-end server is clustered with VCS.</p> <p>When the Calendaring options for the Exchange protocols (POP3 and IMAP4) are configured to use the Exchange front-end server (Calendaringtab > Use front-end server option), VCS fails to bring the Exchange Protocol resources online.</p> <p>The Exchange Protocol agent log may display the following message:</p> <pre>VCS DBG_21 V-16-50-0 ExchProtocol:V03-IMAP4SVC-1: online:_UpdateMetabaseInformation() returned 100, 0x00000003 ExchProtocolRes.cpp:CExchProtocolRes::Online[207]</pre>
1372034, 1486465	<p>While upgrading to 5.0 RP1a, if the IIS agent attribute Site Type is set to APPPOOL, the IIS resource cannot be probed.</p>
1373467	<p>Issue in a disaster recovery setup where the Microsoft iSCSI connection to the NetApp Filers is configured with the setting "Automatically restore this connection when the system boots" set to "False" to avoid service group concurrency violation issue in a NetApp storage environment.</p> <p>While configuring Exchange in a VCS environment, when you reboot a node after Exchange installation, the registry replication drive is not mounted on the node (as a result of non-persistent iSCSI connection). The wizard fails to mount the Registry Replication drive on the cluster node and may fail to proceed with the Exchange post-installation tasks.</p>
1382400	<p>A node cannot be added to a cluster which has ClusterService service group configured and the node has only 1 public NIC enabled using HP NIC teaming software.</p>
1383348, 1486528	<p>After configuring a Process resource inside a service group and bringing it online, the Process agent memory usage increases with each offline, online, offline monitor operation. The memory usage pattern indicates leakage in these entry points. This leakage is observed only on Windows IA64 and Windows X64 based systems.</p>

Table 1-8 Fixed issues for Veritas Cluster Server 5.1 SP1 (*continued*)

Fixed incidents	Descriptions
1422649	The File Share Configuration Wizard does not allow an existing or a new fileshare that has a space in the name.
1423166	The SQL Server 2005 Configuration Wizard sets the Lanman attributes ADUpdateRequired and ADCriticalForOnline to True even if the ADUpdateRequired check box is unchecked while running the wizard
1426957	The IP agent creates false DNS entries when IP resources are brought online in a VCS cluster.
1436651, 1452919	In a MOM 2005 SP1 monitoring environment, when a service group is taken offline from online state or online from offline state, if the VCS MOM script is called during the service group transition period, the state monitoring script generates alerts.
1437841	The Print Share Configuration Wizard is unable to detect externally modified printshare service groups in the modify mode. This happens due to the presence of unrecognized resources inside the printshare service group.
1445497	The Veritas Cluster Configuration Wizard (VCW) fails to recognize Network Interface Cards (NIC) on IBM eServer systems if NIC teaming
1451314	The RemoteGroup resource generates large number of VCSAgDriver.exe process handles.
1455173	Memory leaks in Veritas High Availability Engine (had.exe).
1472638	Lanman attempts to update a DNS server other than the one that it is configured to update.

Table 1-8 Fixed issues for Veritas Cluster Server 5.1 SP1 (*continued*)

Fixed incidents	Descriptions
<p>1479886, 1484131, 1665485</p>	<p>A RegRep resource faults if the attribute ReplicationDirectory is modified when the RegRep resource is online in the cluster. This issue occurs if the registry replication directory on the shared disk is mounted using volume mount points. The following error messages are logged:</p> <pre>VCS NOTICE V-16-10051-5802 RegRep:RegRep:attrchanged:TRACE: Attribute changed: ReplicationDirectory VCS ERROR V-16-10051-5503 RegRep:RegRep:monitor:Directory does not exist (or) could not create (directory=<directory path>) VCS DBG_1 V-16-50-0 RegRep:RegRep:clean:Internal api failure (API=OpenFileMapping, Info=MAIN_SHARED_MEMORY) (Windows Error Code = 2) RegSharedMemory.c: RequestSharedMemory[36]</pre> <p>The RegRep agent creates corrupt registry file names.</p> <p>The RegRep agent fails to replicate registry key deletion changes made on a node on to the failover nodes in the cluster. For example, after configuring a print share service group with printers added in the virtual server, subsequent deletion of printers is not reflected upon fail over to another node. This issue occurs due to RegRep agent's behavior of not processing the keys that are deleted.</p>
<p>1480415</p>	<p>The following errors were fixed in the VCS Process Agent:</p> <ul style="list-style-type: none"> ■ Concurrency violation occurs as resource is brought online outside of VCS control on the passive cluster node. ■ Resource faults on the active Node because the resource is taken offline outside of VCS control. ■ Multiple processes running on the same server.
<p>1481743</p>	<p>The Process agent fails to probe when the configured user account password contains spaces. The following error is logged:</p> <pre>VCS ERROR V-16-10051-6531 Process:monitor:Failed to get the password</pre>

Table 1-8 Fixed issues for Veritas Cluster Server 5.1 SP1 (*continued*)

Fixed incidents	Descriptions
1483145	<p>The following errors were reported while switching service groups to the remote site in a VCS Global cluster environment:</p> <pre>VCS ERROR V-16-1-50101 Command (haclus -add remotecluster1 IP) failed. Cluster Administrator privilege required VCS ERROR V-16-1-50101 Command (hahb -modify ... -add Icmp ClusterList remotecluster1) failed. Cluster Administrator privilege required</pre> <p>This issue occurred because the user name contained "!" as the first character. VCS does not support certain characters for user accounts. In a secure cluster setup, this issue occurs even after setting up trust between the root brokers.</p>
1484011	<p>The ExchProtocol agent fails to start, stop, or monitor the Exchange Protocol servers POP3 and IMAP4 after these services were renamed and the Calendaring tab modified from the Exchange System Manager.</p>

Table 1-8 Fixed issues for Veritas Cluster Server 5.1 SP1 (*continued*)

Fixed incidents	Descriptions
1515403	<p>The VCS agent dlls were corrupted on one of the cluster nodes. As a result, service groups cannot be failed over to the affected node. The following error was displayed:</p> <pre>VCS ERROR V-16-1-1-195: Agent(s) for group <servicegroupname> failed on system <systemname>.</pre> <p>The agent logs contained the following message:</p> <pre>VCS ERROR V-16-2-13061 Thread(4252) Agent(MountV) is exiting because it could not load the agent library (C:\Program Files\Veritas\Cluster Server\bin\<agentname>\<agentname>.dll).</pre> <pre>VCS ERROR V-16-2-13120 Thread(3432) Error receiving from the engine. Agent(agentname) is exiting.</pre> <p>The service group fail over problem persisted even after the affected node was added back to the cluster after reinstalling VCS. This issue occurred because the agent's resource attribute "AgentFailedOn" retained the affected node name on which the agent dlls were initially corrupted. As this attribute was not cleared even after the affected node was rebuilt, the VCS engine considered that the agents on that node failed and hence the service groups cannot be failed over.</p>
1540399	<p>While configuring a SQL 2008 service group the SQL Server 2008 Configuration Wizard may crash when you click Next on the User Databases List panel.</p>
1544338	<p>After configuring the Print Share service group, the printer associated with the service group cannot be listed in the Active Directory Domain Services, even when the "List in the directory" option was enabled in the Printer Properties.</p>

Table 1-8 Fixed issues for Veritas Cluster Server 5.1 SP1 (*continued*)

Fixed incidents	Descriptions
1587279	<p>If there is a resource fault while taking a service group offline on a node, VCS fails to update the service group state details in the internal configuration. As a result, if that node is faulted, VCS triggers a local failover and brings the service group online on an alternate node.</p> <p>This failover is unintentional and should not have occurred as the service group was taken offline intentionally, either for modifying the resources or for some other maintenance purpose.</p> <p>This problem exaggerates in a global cluster (GCO) environment, when the global group is being taken offline on the primary site to bring it online on the secondary site. The group remains in offline state at the primary site and online at secondary site until the node at the primary site is in RUNNING state.</p> <p>As soon as the primary site node is faulted the service group comes online at the primary site. This results in a concurrency violation and possible data corruption.</p>
1596233	<p>While configuring the Enterprise Vault service group on 64-bit systems, the VCS Enterprise Vault Cluster Setup Wizard does not take into account the EV Wow6432 registry keys (HKLM\Software\Wow6432Node\Enterprise Vault) for replication.</p>
1634310	<p>Process agent resources after running for a period of time go into an unknown state and fail to come online.</p>
1635911	<p>While configuring a SQL 2008 service group, the SQL Server 2008 Configuration Wizard may fail to enumerate the SQL databases and may crash when you click Next on the Instance Selection panel. This issue occurs because the wizard uses the logged-on user account context to connect to the databases. If the logged-on user does not have adequate privileges, the wizard may crash.</p> <p>If the logged on user account does not have the required privileges, the wizard displays an appropriate error and allows the user to proceed with the service group configuration.</p>
1650451	<p>Reliability and security issue with Symantec Veritas VRTSweb.</p>
1705162	<p>The VCS print share and file share configuration wizards cannot detect externally modified print share and file share service groups when the wizards are run in the modify mode. This issue happens because of the presence of additional resources (apart from the default resources) in the service group.</p>

Table 1-8 Fixed issues for Veritas Cluster Server 5.1 SP1 (*continued*)

Fixed incidents	Descriptions
1707025	<p>The VCS NetAppSnapDrive resources failed to come online. The agent logged ONTAP DSM licensing errors even when the correct licenses were installed.</p> <p>These errors occurred because of the following:</p> <ul style="list-style-type: none"> ■ The NetApp LUNs were created using qtree. The VCS NetAppSnapDrive agent does not support volumes created using qtree. ■ The ONTAP DSM version used was version 3.3. The VCS NetAppSnapDrive agent supports ONTAP DSM version 3.2.
1737176	<p>The VCS SQL 2008 Configuration Wizard is unable to detect externally modified SQL Server 2008 service group when the wizard is run in the modify mode. This happens because of the presence of additional resources (apart from the default resources) in the service group.</p>
1737305	<p>SQL Server 2008 monitoring is not supported with System Center Operations Manager 2007, if SQL Server 2008 is clustered with VCS.</p>
1737309, 1751756	<p>On Windows Server 2008, the 64-bit MOM helper utility generates errors during initialization.</p>
1739675	<p>The VCS <code>hasys -display</code> command lists information about the various systems in a cluster. However, in the command output the cluster node names are not separated with a "#" character.</p>
1766172	<p>LLT on Windows NT padded llt packets to 64-byte size before transmission. This padding operation did not match allocated buffer size, causing incorrect buffer size reporting to NDIS, which in-turn caused the NIC card driver fail with bugcheck 0xD1.</p>

Table 1-8 Fixed issues for Veritas Cluster Server 5.1 SP1 (*continued*)

Fixed incidents	Descriptions
1803872	If there is a resource fault while taking a service group offline on a node, VCS fails to update the service group state details in the internal configuration. As a result, if that node is faulted, VCS triggers a local failover and brings the service group online on an alternate node. This failover is unintentional and should not have occurred as the service group was taken offline intentionally, either for modifying the resources or for some other maintenance purpose. This problem exaggerates in a global cluster (GCO) environment, when the global group is being taken offline on the primary site to bring it online on the secondary site. The group remains in offline state at the primary site and online at secondary site until the node at the primary site is in RUNNING state. As soon as the primary site node is faulted the service group comes online at the primary site. This results in a concurrency violation and possible data corruption.
1809463	Distributed Transactions fail when MSDTC is clustered with SQL Server 2005 on Windows Server 2008.
1843417	The Lanman resource fails to online if any of the DNS servers mentioned in the AdditionalDNSServers attribute are not reachable. Additionally, the Lanman resource faults during the DNSRefresh interval if any server in the AdditionalDNSServers attribute are not reachable when the refresh occurs.

Fixes and enhancements for 5.1 AP1

[Table 1-9](#) describes the issues that were fixed in the 5.1 AP1 release.

Table 1-9 Fixed issues for Veritas Cluster Server 5.1 AP1

Incident number	Description
1298649	The VCS Exchange wizards may crash when folder mount points are present on the regrep volume.
1303538	The NetApp Snapdrive resource concurrency violation after primary node failure with failover to remote site.
1319212	Provide the Windows Active Directory dialog box to select and search Organizational Unit in the Exchange Setup Wizard for VCS.

Table 1-9 Fixed issues for Veritas Cluster Server 5.1 AP1 (*continued*)

Incident number	Description
1373467	The VCS Exchange Setup Wizard should unmount the NetApp RegRep drive during pre-installation and post-installation tasks.
1398535	The VCS SQL Configuration Wizard always sets Lanman attributes ADUpdateRequired and ADCriticalForOnline to 'TRUE', no matter what the user specifies.

Fixes and enhancements for 5.1

[Table 1-10](#) describes the issues that were fixed in the 5.1 release.

Table 1-10 Fixed issues for Veritas Cluster Server 5.1

Incident number	Description
425035	Use a Valid Script File for Detail Monitoring
493266	Lanman resources fail to come online if multiple Lanman resources depend on the same IP resource.
506454	VCW configures the cluster with both upper and lower case of the same system name
582351	Error Bringing Mount Points Online After Power-Off
582837	On a Japanese locales, Selection panel of the VCW wizard displays distorted system selection panes
603211	DNS Scavenging Affects Virtual Servers Configured in VCS
703925	Resync action for MirrorView agent does not resynchronize mirrors in a fractured or consistent state.
765323	AddArrayUser action for the MirrorView agent fails on x64 systems.
837702	The Fire Drill Wizard does not delete the DCO log volume when deleting a fire drill configuration.
864671	A user in a user group does not receive Cluster Administrator rights.
894979	Cannot use the same NIC resource to configure Notifier and Web Console using VCW.
	Concurrency violation with online firm dependencies

Documentation

Documentation is included on the Symantec software discs in Adobe Portable Document Format (PDF) in the directory `Docs\Cluster_Server`. To view a document, explore the CD and double-click the file name.

- `VCS_AgentDev.pdf`, *VCS Agent Developer's Guide*
- `VCS_GettingStarted.pdf`, *VCS Getting Started Guide*
- `VCS_Admin.pdf`, *VCS Administrator's Guide*
- `VCS_BundledAgents.pdf`, *VCS Bundled Agents Reference Guide*
- `VCS_NetApp-Exch.pdf`, *Veritas Cluster Server Implementation Guide for Microsoft Exchange*
- `VCS_NetApp-Exch2007.pdf`, *Veritas Cluster Server Implementation Guide for Microsoft Exchange 2007*
- `VCS_NetApp-Exch2010.pdf`, *Veritas Cluster Server Implementation Guide for Microsoft Exchange 2010*
- `VCS_NetApp-SQL.pdf`, *Veritas Cluster Server Implementation Guide for Microsoft SQL*
- `VCS_NetApp-SQL2008.pdf`, *Veritas Cluster Server Implementation Guide for Microsoft SQL 2008*
- `VCS_NetApp-Oracle.pdf`, *Veritas Cluster Server Implementation Guide for Oracle*

Release notes for this product bundle are on the Symantec product disc. Copy the release notes from the disc to the directory `C:\Program Files\Veritas\Docs\ENU\VCS` if you want them available on your system for reference.

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