

Veritas Storage Foundation™ and High Availability Solutions HA and Disaster Recovery Solutions Guide for Microsoft SharePoint® Server

Windows Server 2003, Windows Server
2008

5.1 Service Pack 1



Veritas Storage Foundation and HA Solutions HA and Disaster Recovery Solutions Guide for Microsoft SharePoint Server

The software described in this book is furnished under a license agreement and may be used only in accordance with the terms of the agreement.

Product version: 5.1. Service Pack 1

Document version: 5.1.SP1.0

Legal Notice

Copyright © 2009 Symantec Corporation. All rights reserved.

Symantec, the Symantec Logo, Veritas, and Veritas Storage Foundation are trademarks or registered trademarks of Symantec Corporation or its affiliates in the U.S. and other countries. Other names may be trademarks of their respective owners.

This Symantec product may contain third party software for which Symantec is required to provide attribution to the third party ("Third Party Programs"). Some of the Third Party Programs are available under open source or free software licenses. The License Agreement accompanying the Software does not alter any rights or obligations you may have under those open source or free software licenses. Please see the Third Party Legal Notice file accompanying this Symantec product for more information on the Third Party Programs.

The product described in this document is distributed under licenses restricting its use, copying, distribution, and decompilation/reverse engineering. No part of this document may be reproduced in any form by any means without prior written authorization of Symantec Corporation and its licensors, if any.

THE DOCUMENTATION IS PROVIDED "AS IS" AND ALL EXPRESS OR IMPLIED CONDITIONS, REPRESENTATIONS AND WARRANTIES, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT, ARE DISCLAIMED, EXCEPT TO THE EXTENT THAT SUCH DISCLAIMERS ARE HELD TO BE LEGALLY INVALID. SYMANTEC CORPORATION SHALL NOT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES IN CONNECTION WITH THE FURNISHING, PERFORMANCE, OR USE OF THIS DOCUMENTATION. THE INFORMATION CONTAINED IN THIS DOCUMENTATION IS SUBJECT TO CHANGE WITHOUT NOTICE.

The Licensed Software and Documentation are deemed to be commercial computer software as defined in FAR 12.212 and subject to restricted rights as defined in FAR Section 52.227-19 "Commercial Computer Software - Restricted Rights" and DFARS 227.7202, "Rights in Commercial Computer Software or Commercial Computer Software Documentation", as applicable, and any successor regulations. Any use, modification, reproduction release, performance, display or disclosure of the Licensed Software and Documentation by the U.S. Government shall be solely in accordance with the terms of this Agreement.

Symantec Corporation
350 Ellis Street
Mountain View, CA 94043
<http://www.symantec.com>

Technical Support

Symantec Technical Support maintains support centers globally. Technical Support's primary role is to respond to specific queries about product features and functionality. The Technical Support group also creates content for our online Knowledge Base. The Technical Support group works collaboratively with the other functional areas within Symantec to answer your questions in a timely fashion. For example, the Technical Support group works with Product Engineering and Symantec Security Response to provide alerting services and virus definition updates.

Symantec's maintenance offerings include the following:

- A range of support options that give you the flexibility to select the right amount of service for any size organization
- Telephone and Web-based support that provides rapid response and up-to-the-minute information
- Upgrade assurance that delivers automatic software upgrade protection
- Global support that is available 24 hours a day, 7 days a week
- Advanced features, including Account Management Services

For information about Symantec's Maintenance Programs, you can visit our Web site at the following URL:

<http://www.symantec.com/business/support/index.jsp>

Contacting Technical Support

Customers with a current maintenance agreement may access Technical Support information at the following URL:

http://www.symantec.com/business/support/contact_techsupp_static.jsp

Before contacting Technical Support, make sure you have satisfied the system requirements that are listed in your product documentation. Also, you should be at the computer on which the problem occurred, in case it is necessary to replicate the problem.

When you contact Technical Support, please have the following information available:

- Product release level
- Hardware information
- Available memory, disk space, and NIC information
- Operating system
- Version and patch level
- Network topology
- Router, gateway, and IP address information
- Problem description:

- Error messages and log files
- Troubleshooting that was performed before contacting Symantec
- Recent software configuration changes and network changes

Licensing and registration

If your Symantec product requires registration or a license key, access our technical support Web page at the following URL:

<http://customercare.symantec.com>

Customer service

Customer service information is available at the following URL:

<http://customercare.symantec.com>

Customer Service is available to assist with the following types of issues:

- Questions regarding product licensing or serialization
- Product registration updates, such as address or name changes
- General product information (features, language availability, local dealers)
- Latest information about product updates and upgrades
- Information about upgrade assurance and maintenance contracts
- Information about the Symantec Buying Programs
- Advice about Symantec's technical support options
- Nontechnical presales questions
- Issues that are related to CD-ROMs or manuals

Maintenance agreement resources

If you want to contact Symantec regarding an existing maintenance agreement, please contact the maintenance agreement administration team for your region as follows:

Asia-Pacific and Japan customercare_apac@symantec.com

Europe, Middle-East, and Africa semea@symantec.com

North America and Latin America [supportolutions@symantec.com](mailto:supportsolutions@symantec.com)

Additional enterprise services

Symantec offers a comprehensive set of services that allow you to maximize your investment in Symantec products and to develop your knowledge, expertise, and global insight, which enable you to manage your business risks proactively.

Enterprise services that are available include the following:

Symantec Early Warning Solutions	These solutions provide early warning of cyber attacks, comprehensive threat analysis, and countermeasures to prevent attacks before they occur.
Managed Security Services	These services remove the burden of managing and monitoring security devices and events, ensuring rapid response to real threats.
Consulting Services	Symantec Consulting Services provide on-site technical expertise from Symantec and its trusted partners. Symantec Consulting Services offer a variety of prepackaged and customizable options that include assessment, design, implementation, monitoring, and management capabilities. Each is focused on establishing and maintaining the integrity and availability of your IT resources.
Educational Services	Educational Services provide a full array of technical training, security education, security certification, and awareness communication programs.

To access more information about Enterprise services, please visit our Web site at the following URL:

www.symantec.com

Select your country or language from the site index.

Contents

Chapter 1	Planning for Microsoft SharePoint with VCS	
	What this guide covers	9
	Where to go for more information	10
	Software requirements	10
	Implementation process overview	12
	Deploying new SQL Server installation	12
	Converting existing SQL Server installation	13
	Supported SharePoint configurations	15
	Primary and secondary site configuration	16
	Network configuration requirements	16
	Example configuration	18
	Replication considerations	20
	SharePoint server failover considerations	20
	DNS update considerations	20
	About updating the SQL Server IP address	20
	About updating the web server/NLB IP address	21
Chapter 2	Configuring VCS with Microsoft SharePoint	
	Tasks for a new installation of SQL Server	23
	Tasks for an existing installation of SQL Server	28
	Configuring SharePoint	33
	Configuring the VCS SQL Server service group for the SharePoint environment	33
	Updating the SQL Server IP address	34
	Updating the IP address for web requests	35
	Requirements	36
	Customizing the DNS update settings for the web servers	37
	Configuring a resource for the web servers	38
	Example VCS configuration file entries (main.cf)	40

Planning for Microsoft SharePoint with VCS

This chapter covers the following topics:

- [What this guide covers](#)
- [Where to go for more information](#)
- [Software requirements](#)
- [Implementation process overview](#)
- [Supported SharePoint configurations](#)
- [Primary and secondary site configuration](#)
- [Network configuration requirements](#)
- [Example configuration](#)
- [Replication considerations](#)
- [SharePoint server failover considerations](#)
- [DNS update considerations](#)

What this guide covers

In a disaster recovery configuration, you set up a secondary site to provide data and services in the event of a disaster at the primary site.

This guide covers guidelines and requirements for implementing SharePoint Portal Server 2003 or SharePoint Server 2007 with Veritas Cluster Server (VCS) for disaster recovery.

VCS is a component of Veritas Storage Foundation HA for Windows (SFW HA).

Use this guide as a supplement to the solutions guides that cover deploying high availability and disaster recovery for Microsoft SQL Server.

See “[Where to go for more information](#)” on page 10.

Where to go for more information

This guide is a supplement to the following solutions guides that cover deploying high availability and disaster recovery for Microsoft SQL Server:

- *Veritas Storage Foundation and High Availability Solutions HA and Disaster Recovery Solutions Guide for Microsoft SQL*, which covers SFW HA solutions for Microsoft SQL Server 2000 and 2005
- *Veritas Storage Foundation and High Availability Solutions HA and Disaster Recovery Solutions Guide for Microsoft SQL 2008*, which covers SFW HA solutions for Microsoft SQL Server 2008.

Software requirements

The following software is required for this solution:

Veritas Storage Foundation HA 5.1 Application Pack 1 Service Pack 1 for Windows, including:

- Veritas Cluster Server Database Agent for Microsoft SQL
- Veritas Volume Replicator
- Global Clustering Option

One of the following:

- Microsoft SQL Server 2000 and its supported operating systems
- Microsoft SQL Server 2005 and its supported operating systems
- Microsoft SQL Server 2008 and its supported operating systems

For information on system and software requirements for SFW HA, see:

Veritas Storage Foundation and High Availability Solutions HA and Disaster Recovery Solutions Guide for Microsoft SQL

Veritas Storage Foundation and High Availability Solutions HA and Disaster Recovery Solutions Guide for Microsoft SQL 2008

For information on software versions supported with SFW HA, see:

Veritas Storage Foundation and High Availability Solutions HA and Disaster Recovery Solutions Guide for Microsoft SQL

Veritas Storage Foundation and High Availability Solutions HA and Disaster Recovery Solutions Guide for Microsoft SQL 2008

One of the following:

- Microsoft Office SharePoint Portal Server 2003 SP2
- Microsoft Office SharePoint Server 2007 or SP1

For information on requirements, see the Microsoft SharePoint documentation.

If installing SharePoint Portal Server 2003 in a SQL Server 2005 environment, see the Microsoft Knowledge Base article “How to install SharePoint Portal Server 2003 Service Pack 2 and Windows SharePoint Services Service Pack 2 in a deployment that uses SQL Server 2005 as the database back end”:

<http://support.microsoft.com/kb/917446>

Implementation process overview

You can implement SharePoint with VCS for disaster recovery in the following ways:

- Setting up a new installation of SFW HA and SQL Server with SharePoint
- Converting an existing standalone SQL Server to an SFW HA environment with SharePoint

Deploying new SQL Server installation

[Table 1-1](#) shows the process for a new installation of SFW HA, SQL Server, and SharePoint.

Table 1-1 New installation of SQL Server and SharePoint

Task	For more information
On the primary site, install and set up SFW HA and SQL Server for high availability.	See the following as appropriate: <i>Veritas Storage Foundation and High Availability Solutions HA and Disaster Recovery Solutions Guide for Microsoft SQL</i> <i>Veritas Storage Foundation and High Availability Solutions HA and Disaster Recovery Solutions Guide for Microsoft SQL 2008</i>
On the primary site, install and configure the SharePoint servers.	See the Microsoft documentation for SharePoint. See “Configuring SharePoint” on page 33.
On the primary site, edit the SQL Server service group for disaster recovery as covered in this guide.	See “Configuring the VCS SQL Server service group for the SharePoint environment” on page 33.
On the secondary site, create a parallel SFW HA and SQL Server high availability environment.	See the following as appropriate: <i>Veritas Storage Foundation and High Availability Solutions HA and Disaster Recovery Solutions Guide for Microsoft SQL</i> <i>Veritas Storage Foundation and High Availability Solutions HA and Disaster Recovery Solutions Guide for Microsoft SQL 2008</i>

Table 1-1 New installation of SQL Server and SharePoint

Task	For more information
On the primary and secondary sites, configure SFW HA for disaster recovery.	See the following as appropriate: <i>Veritas Storage Foundation and High Availability Solutions HA and Disaster Recovery Solutions Guide for Microsoft SQL</i> <i>Veritas Storage Foundation and High Availability Solutions HA and Disaster Recovery Solutions Guide for Microsoft SQL 2008</i>
On the secondary site, install and configure the SharePoint servers.	See the Microsoft documentation for SharePoint. See “Configuring SharePoint” on page 33.

Converting existing SQL Server installation

[Table 1-2](#) shows the process for converting an existing installation of SQL Server and SharePoint.

Table 1-2 Converting existing stand-alone SQL Server

Task	For more information
On the primary site, convert the stand-alone SQL Server to a clustered server in a Storage Foundation HA environment.	See the following as appropriate: <i>Veritas Storage Foundation and High Availability Solutions HA and Disaster Recovery Solutions Guide for Microsoft SQL</i> <i>Veritas Storage Foundation and High Availability Solutions HA and Disaster Recovery Solutions Guide for Microsoft SQL 2008</i>
On the primary site, edit the SQL Server service group for disaster recovery as covered in this guide.	See “Configuring the VCS SQL Server service group for the SharePoint environment” on page 33.

Table 1-2 Converting existing stand-alone SQL Server

Task	For more information
<p>On the secondary site, create a parallel SFW HA and SQL Server high availability environment.</p>	<p>See the following as appropriate: <i>Veritas Storage Foundation and High Availability Solutions HA and Disaster Recovery Solutions Guide for Microsoft SQL</i> <i>Veritas Storage Foundation and High Availability Solutions HA and Disaster Recovery Solutions Guide for Microsoft SQL 2008</i></p>
<p>On the primary and secondary sites, configure SFW HA for disaster recovery.</p>	<p>See the following as appropriate: <i>Veritas Storage Foundation and High Availability Solutions HA and Disaster Recovery Solutions Guide for Microsoft SQL</i> <i>Veritas Storage Foundation and High Availability Solutions HA and Disaster Recovery Solutions Guide for Microsoft SQL 2008</i></p>
<p>On the secondary site, install and configure the SharePoint servers.</p>	<p>See the Microsoft documentation for SharePoint. See “Configuring SharePoint” on page 33.</p>

Supported SharePoint configurations

Table 1-3 shows the SharePoint configurations supported for setting up SharePoint with VCS for disaster recovery.

Table 1-3 SharePoint configurations supported with VCS

Configuration	Description
Large Server Farm	<ul style="list-style-type: none"> ■ One or more computers running SQL Server ■ Two or more front-end Web servers ■ Two or more search engines ■ One or more index management servers, one of which is the job server
Medium Server Farm	<ul style="list-style-type: none"> ■ One or more computers running SQL Server ■ One or two front-end web servers with the search component enabled ■ One index management and job server
Small Server Farm	<ul style="list-style-type: none"> ■ One or more computers running SQL Server ■ One computer running as the job server and running all of the following: the Web server, index component, and search component.

Note: VCS disaster recovery does not support a single server configuration in which both SQL Server and SharePoint are running on the same computer.

A shared services deployment is also supported for disaster recovery. In this configuration, index and search services provided by one server farm are used by a second server farm, in a parent and child relationship.

Primary and secondary site configuration

Table 1-4 shows how the secondary site configuration compares to the primary site configuration.

Table 1-4 Primary and secondary site configuration

Product	Configuration
SQL Server	<p>Set up the SQL Server configuration on the secondary site the same as on the primary site.</p> <p>See the following, as appropriate for your SQL version:</p> <p><i>Veritas Storage Foundation and High Availability Solutions HA and Disaster Recovery Solutions Guide for Microsoft SQL</i></p> <p><i>Veritas Storage Foundation and High Availability Solutions HA and Disaster Recovery Solutions Guide for Microsoft SQL 2008</i></p>
SharePoint	<p>The number of computers and which components are installed on each does not need to match the primary site. All the SharePoint components could be on multiple computers in the primary site, as on a large server farm configuration, and share the same computer on the secondary site, as in a small server farm configuration.</p> <p>You typically set up the SharePoint components on both primary and secondary sites as part of the same topology (server farm).</p>

Network configuration requirements

You should be familiar with requirements for setting up the network configuration to support high availability and disaster recovery.

See *Veritas Storage Foundation and High Availability Solutions HA and Disaster Recovery Solutions Guide for Microsoft SQL*.

See *Veritas Storage Foundation and High Availability Solutions HA and Disaster Recovery Solutions Guide for Microsoft SQL 2008*.

The following summarizes the network configuration requirements for the SQL Server and SharePoint components:

- One domain that includes both primary and secondary sites
- One SQL Server virtual server name

You configure a virtual server name for SQL Server as part of setting up high availability. You also assign an instance name. The SQL Server instance in both the primary and secondary sites is assigned the same virtual server name. The SharePoint web server connection to the SQL

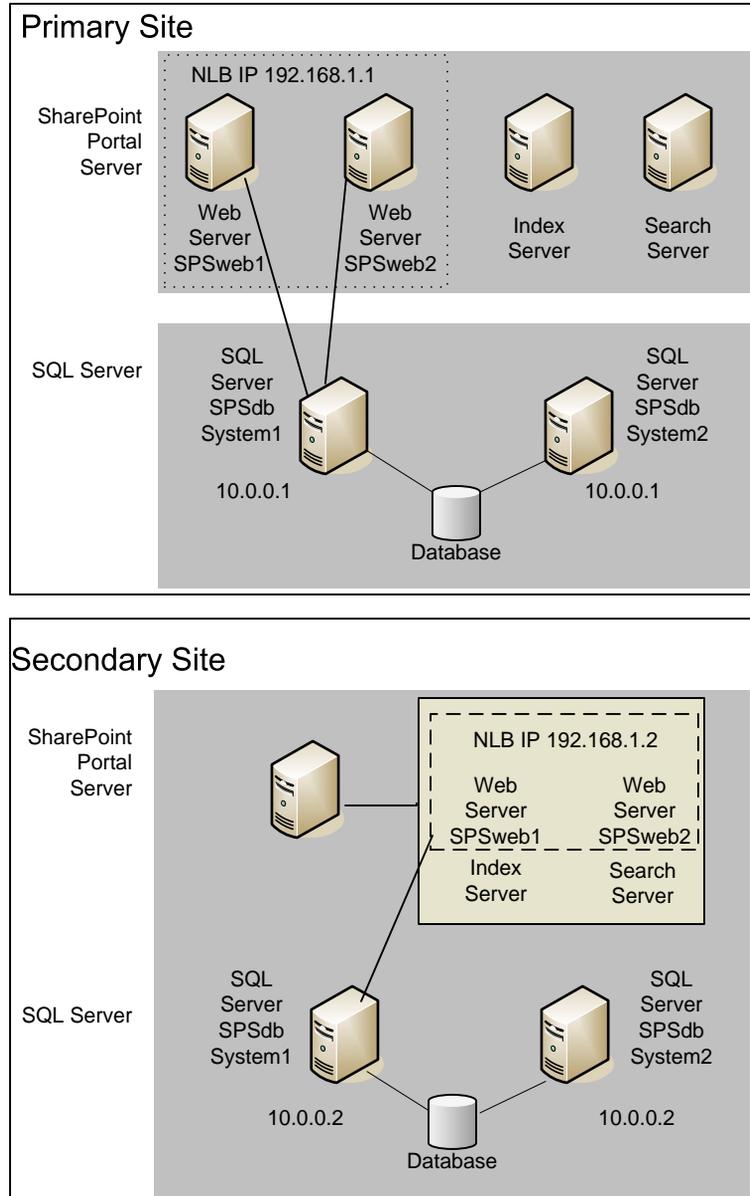
database is configured by virtual server name and instance name. Since only one instance of the SQL application is running at one time, there is no host name collision.

- Two SQL Server IP addresses, one for the primary site and one for the secondary site
 The active and passive SQL servers on the same site share the same static IP address.
- Network Load Balancer (NLB) IP address or web server address
 Multiple SharePoint web servers are typically set up on a network load balancer (NLB) cluster. You can use a hardware or software solution to implement the NLB cluster. You can implement a global NLB that includes both sites or separate local NLB clusters for each site.
 If using a local NLB, you can configure the NLB on the primary site with a different IP address than the NLB on the secondary site. This enables you to switch user requests to the IP address of the secondary site web servers if the primary site goes down.

Example configuration

Figure 1-1 shows an example disaster recovery configuration.

Figure 1-1 Example configuration



The illustrated example configuration is set up as follows:

Example primary site An active/passive configuration of two machines running SQL Server (SYSTEM1 active and SYSTEM2 passive), with a virtual IP address of 10.0.0.1, both connected to the SQL database shared storage

Four servers running SharePoint components:

- Two web servers using Microsoft Network Load Balancing (NLB) cluster service with an IP address of 192.168.1.1
 The web servers connect to the active SQL Server instance.
- An index management server
- A search server

Example secondary site An active/passive configuration of two machines running SQL Server (SYSTEM1 active and SYSTEM2 passive), with a virtual IP address of 10.0.0.2, both connected to the SQL database shared storage

One server running the SharePoint components:

- Two web servers using Microsoft Network Load Balancing (NLB) cluster service with an IP address of 192.168.1.2
 The web servers connect to the active SQL Server instance.
- An index management server and a search server on the same machine

Replication considerations

VCS enables clustering and data replication for the SQL Server only. Any data stored locally on the SharePoint web servers, index servers, and search servers rather than in the SQL database is not replicated. This non-replicated data includes the SharePoint index.

One way to provide search capabilities in the event of a disaster recovery scenario is to set up a scheduled propagation from the index server at the primary site to the search server at the secondary site. The search server at the secondary site can then handle the search requests if the primary site goes down.

For more information on index propagation, see the Microsoft documentation for SharePoint.

SharePoint server failover considerations

In a disaster recovery scenario, VCS brings the SQL Server service group online in the secondary site. VCS does not bring the SharePoint servers online.

Therefore, you may prefer to maintain the secondary site SharePoint servers online but not in use until needed for disaster recovery.

You can configure VCS to perform a DNS update to switch user requests to the secondary site web servers if the primary site goes down.

See [“DNS update considerations”](#) on page 20.

DNS update considerations

When planning for disaster recovery in the SharePoint environment, you need to plan for updating IP addresses on the DNS server. You configure VCS to update the SQL Server virtual IP address on the DNS server when the remote site comes online. Optionally, if needed for your environment, you can configure VCS to update the web server/NLB virtual IP address on the DNS server.

About updating the SQL Server IP address

As part of the disaster recovery process of switching from the primary to secondary site, the DNS server must be updated with the site-specific virtual IP address for the SQL Server. Likewise, when switching back to the primary site, the DNS server must be updated again.

As an example, let's assume that the SQL virtual server name is SPSdb. When the primary site is online, SPSdb is associated with the primary site virtual IP address, for example, 10.0.0.1. When the secondary site comes online, the DNS

server address list is updated so that SPSdb is associated with the IP address 10.0.0.2 (the secondary site virtual IP address).

You can configure VCS so that the update occurs automatically as part of the process of the SQL Server instance coming online.

See [“Updating the SQL Server IP address”](#) on page 34.

About updating the web server/NLB IP address

Multiple SharePoint web servers are typically set up on a network load balancer (NLB) cluster. You can use a hardware or software solution to implement the NLB cluster. You can implement a global NLB that includes both sites or a local NLB for each site.

If a local NLB is used, each NLB has a separate static IP address. When a site goes down in a disaster recovery scenario, user requests must be switched to the NLB at the secondary site. Therefore, in the DNS server, the virtual IP address associated with the NLB on the primary site must be updated with the virtual IP address for the NLB on the secondary site.

You can configure VCS so that the update occurs automatically as part of the process of the SQL Server instance coming online.

See [“Updating the IP address for web requests”](#) on page 35.

The web servers may take a few seconds to flush the cached IP address for the SQL Server and replace it with the new one. During that time a “cannot find content” message may be displayed in response to user requests.

Configuring VCS with Microsoft SharePoint

This chapter covers the following topics:

- [Tasks for a new installation of SQL Server](#)
- [Tasks for an existing installation of SQL Server](#)
- [Configuring SharePoint](#)
- [Configuring the VCS SQL Server service group for the SharePoint environment](#)

Tasks for a new installation of SQL Server

Setting up a new installation of SQL Server with SFW HA for high availability and disaster recovery is covered in detail in the following solutions guides:

- *Veritas Storage Foundation and High Availability Solutions HA and Disaster Recovery Solutions Guide for Microsoft SQL*, which covers SFW HA solutions for Microsoft SQL Server 2000 and 2005
- *Veritas Storage Foundation and High Availability Solutions HA and Disaster Recovery Solutions Guide for Microsoft SQL 2008*

Some additional tasks are required to configure SFW HA for SharePoint, depending on your SharePoint environment.

[Table 2-1](#) lists the full set of tasks to use as a checklist. The table also shows which tasks are specific to the SharePoint environment and where to find more information on the SharePoint related tasks and requirements.

Table 2-1 Tasks for a new installation of SQL Server

Objective	Tasks	Additional information for SharePoint
Reviewing the prerequisites	<ul style="list-style-type: none"> ■ Verifying hardware and software prerequisites 	<p>See “Software requirements” on page 10.</p> <p>See “Network configuration requirements” on page 16.</p>
Reviewing the SFW HA configuration	<ul style="list-style-type: none"> ■ Understanding active/passive configuration ■ Reviewing the sample configuration 	
Reviewing the SharePoint configuration	<ul style="list-style-type: none"> ■ Reviewing SharePoint configurations supported by SFW HA 	<p>See “Supported SharePoint configurations” on page 15.</p>
Configuring the storage hardware and network on the primary site	<ul style="list-style-type: none"> ■ Setting up the storage hardware for a cluster environment ■ Verifying the DNS entries for the systems on which SQL will be installed 	
Installing and configuring SFW HA on the primary site	<ul style="list-style-type: none"> ■ Verifying the driver signing option for the system ■ Installing Veritas Storage Foundation HA for Windows ■ Selecting the options to install Veritas Cluster Server Database Agent for Microsoft SQL Server, the GCO option for disaster recovery, and the Veritas Volume Replicator (VVR) replication option 	

Table 2-1 Tasks for a new installation of SQL Server

Objective	Tasks	Additional information for SharePoint
Configuring cluster disk groups and volumes on the primary site	<ul style="list-style-type: none"> ■ Creating a dynamic cluster disk group using the Veritas Enterprise Administrator (VEA) ■ Creating dynamic volumes for the SQL system database, user databases, transaction logs, and replicated registry keys using the VEA 	
Configuring the cluster on the primary site	<ul style="list-style-type: none"> ■ Verifying static IP addresses and name resolution configured for each node ■ Configuring cluster components and setting up secure communication for the cluster using the Veritas Cluster Server Configuration Wizard 	
Installing and configuring SQL Server on the first node of the primary site	<ul style="list-style-type: none"> ■ Ensuring that the disk group and volumes are mounted on the first node ■ Following the guidelines for installing SQL Server in an SFW HA environment 	
Installing and configuring SQL Server on the second or additional nodes of the primary site	<ul style="list-style-type: none"> ■ Stopping the SQL services on the first node ■ Ensuring that the disk group and volumes are mounted on the second node ■ Following the guidelines for installing SQL Server on a failover node in an SFW HA environment 	
Setting the internal name of the clustered instance on the primary site	<ul style="list-style-type: none"> ■ (SQL 2000 or 2005 only) Setting the internal name of the clustered instance 	
Creating a SQL Server user-defined database	<ul style="list-style-type: none"> ■ Creating volumes, if not created already, for a user-defined database and transaction log ■ Creating a user-defined database in SQL Server 	

Table 2-1 Tasks for a new installation of SQL Server

Objective	Tasks	Additional information for SharePoint
Configuring the VCS SQL Server service group on the primary site	<ul style="list-style-type: none"> ■ Creating a SQL Server service group using one of the following: <ul style="list-style-type: none"> ■ the VCS SQL Server Configuration wizard for SQL Server 2000 or 2005 ■ the VCS SQL Server 2008 Configuration Wizard for SQL Server 2008 	
Verifying the SQL Server high availability configuration on the primary site	<ul style="list-style-type: none"> ■ Simulating failover ■ Switching online nodes 	
Setting up the SharePoint servers on the primary site	<ul style="list-style-type: none"> ■ Installing and configuring SharePoint on the primary site 	See “Configuring SharePoint” on page 33.
Modifying the SQL Server service group Lanman agent settings on the primary site	<ul style="list-style-type: none"> ■ Editing the attribute settings of the VCS Lanman agent resource to update the DNS server in a disaster recovery scenario 	See “Updating the SQL Server IP address” on page 34.
Optionally, configuring the SQL Server service group to update the SharePoint web server/NLB IP address	<ul style="list-style-type: none"> ■ Customizing a VCS script configuration file for the primary site ■ Editing the SQL service group to add a process resource for the script 	See “Updating the IP address for web requests” on page 35.
Creating a parallel SFW HA environment on the secondary site	<ul style="list-style-type: none"> ■ Reviewing the prerequisites ■ Reviewing the configuration ■ Configuring the network and storage ■ Installing SFW HA ■ Configuring the cluster using the Veritas Cluster Server Configuration Wizard ■ Configuring disk groups and volumes for SQL 	

Table 2-1 Tasks for a new installation of SQL Server

Objective	Tasks	Additional information for SharePoint
Installing and configuring SQL Server on the first node of the secondary site	<ul style="list-style-type: none"> ■ Ensuring that the disk group and volumes are mounted on the first node ■ Following the guidelines for installing SQL Server in an SFW HA environment 	
Installing and configuring SQL Server on the second or additional nodes of the secondary site	<ul style="list-style-type: none"> ■ Stopping the SQL services on the first node ■ Ensuring that the disk group and volumes are mounted on the second node ■ Following the guidelines for installing SQL Server on a failover node in an SFW HA environment 	
Setting the internal name of the clustered instance on the secondary site	<ul style="list-style-type: none"> ■ (SQL 2000 or 2005 only) Setting the internal name of the clustered instance 	
Creating the SQL service group configuration on the secondary site	<ul style="list-style-type: none"> ■ Creating the SQL service group configuration on the secondary site 	
Configuring VVR and global clustering	<ul style="list-style-type: none"> ■ Configuring VVR components and global clustering 	
Setting up the SharePoint servers on the secondary site	<ul style="list-style-type: none"> ■ Installing and configuring SharePoint on the secondary site 	See “Configuring SharePoint” on page 33.
Modifying the SQL Server service group Lanman agent settings on the secondary site	<ul style="list-style-type: none"> ■ Editing the attribute settings of the VCS Lanman agent resource to update the DNS server in a disaster recovery scenario 	See “Updating the SQL Server IP address” on page 34.
If using the scripts for updating web server IP address, installing and configuring the scripts for the secondary site	<ul style="list-style-type: none"> ■ Installing the script files in a location on the secondary site that matches the location on the primary site ■ Customizing the script configuration file settings for the secondary site 	See “Updating the IP address for web requests” on page 35.

Note: SFW HA provides a wizard that automates some disaster recovery configuration tasks on the secondary site. The task references in this table are based on configuring the secondary site manually rather than with the wizard.

Tasks for an existing installation of SQL Server

You can convert an existing standalone SQL Server site into an SFW HA high availability site. Setting up high availability for an existing standalone SQL Server environment is covered in detail in the following solutions guides:

- *Veritas Storage Foundation and High Availability Solutions HA and Disaster Recovery Solutions Guide for Microsoft SQL*, which covers SFW HA solutions for Microsoft SQL Server 2000 and 2005
- *Veritas Storage Foundation and High Availability Solutions HA and Disaster Recovery Solutions Guide for Microsoft SQL 2008*

Some additional tasks are required to configure SFW HA for SharePoint, depending on your SharePoint environment.

[Table 2-2](#) lists the full set of tasks so that you can use them as a checklist. The table also shows which tasks are specific to the SharePoint environment and where to find more information on SharePoint related tasks and requirements.

Table 2-2 Tasks for converting an existing SQL Server installation for SFW HA

Objective	Tasks	Additional information for SharePoint
Reviewing the prerequisites	<ul style="list-style-type: none"> ■ Verifying hardware and software prerequisites 	<p>See “Software requirements” on page 10.</p> <p>See “Network configuration requirements” on page 16.</p>
Reviewing the SFW HA configuration	<ul style="list-style-type: none"> ■ Understanding active/passive configuration ■ Reviewing the sample configuration 	

Table 2-2 Tasks for converting an existing SQL Server installation for SFW HA

Objective	Tasks	Additional information for SharePoint
Reviewing the SharePoint configuration	<ul style="list-style-type: none"> ■ Reviewing SharePoint configurations supported by SFW HA 	See “Supported SharePoint configurations” on page 15.
Configuring the storage hardware and network	<ul style="list-style-type: none"> ■ Setting up the storage hardware for a cluster environment ■ Verifying the DNS entries for the systems on which SQL will be installed 	
Preparing the standalone SQL Server	<ul style="list-style-type: none"> ■ Backing up existing data ■ Setting SQL Server services to manual start 	
Installing and configuring SFW HA on the primary site	<ul style="list-style-type: none"> ■ Verifying the driver signing option for the system ■ Installing Veritas Storage Foundation HA for Windows ■ Selecting the options to install Veritas Cluster Server Database Agent for Microsoft SQL Server, the GCO option for disaster recovery, and the Veritas Volume Replicator (VVR) replication option 	
Configuring cluster disk groups and volumes on the primary site	<ul style="list-style-type: none"> ■ Creating a dynamic cluster disk group using the Veritas Enterprise Administrator (VEA) ■ Creating dynamic volumes for the SQL system database, user databases, transaction logs, and replicated registry keys using the VEA 	

Table 2-2 Tasks for converting an existing SQL Server installation for SFW HA

Objective	Tasks	Additional information for SharePoint
Configuring the cluster on the primary site	<ul style="list-style-type: none"> ■ Verifying static IP addresses and name resolution configured for each node ■ Configuring cluster components and setting up secure communication for the cluster using the Veritas Cluster Server Configuration Wizard 	
Moving the existing SQL Server data files and user databases to shared storage	<ul style="list-style-type: none"> ■ Ensuring that existing data is backed up ■ Stopping SQL Server service ■ Modifying data file and user database locations 	
Installing and configuring SQL Server on additional nodes on the primary site	<ul style="list-style-type: none"> ■ Stopping the SQL services on the first node ■ Ensuring that the disk group and volumes are mounted on the second node ■ Following the guidelines for installing SQL Server on a failover node in an SFW HA environment 	
Setting the internal name of the clustered instance on the primary site	<ul style="list-style-type: none"> ■ (SQL 2000 or 2005 only) Setting the internal name of the clustered instance 	
Configuring the VCS SQL Server service group on the primary site	<ul style="list-style-type: none"> ■ Creating a SQL Server service group using one of the following: <ul style="list-style-type: none"> ■ the VCS SQL Server Configuration wizard for SQL Server 2000 or 2005 ■ the VCS SQL Server 2008 Configuration Wizard for SQL Server 2008 	
Configuring the SharePoint server connection to the SQL virtual server	<ul style="list-style-type: none"> ■ Configuring existing SQL Server clients to connect to the SQL virtual server name/instance name 	See “Configuring SharePoint” on page 33.

Table 2-2 Tasks for converting an existing SQL Server installation for SFW HA

Objective	Tasks	Additional information for SharePoint
Verifying the SQL Server high availability configuration on the primary site	<ul style="list-style-type: none"> ■ Simulating failover ■ Switching online nodes 	
Modifying the SQL Server service group Lanman agent settings on the primary site	<ul style="list-style-type: none"> ■ Editing the attribute settings of the VCS Lanman agent resource to update the DNS server in a disaster recovery scenario 	See “Updating the SQL Server IP address” on page 34.
Optionally, configuring the SQL Server service group to update the SharePoint web server/NLB IP address	<ul style="list-style-type: none"> ■ Customizing a VCS script configuration file for the primary site ■ Editing the SQL service group to add a process resource for the script 	See “Updating the IP address for web requests” on page 35.
Creating a parallel SFW HA environment on the secondary site	<ul style="list-style-type: none"> ■ Reviewing the prerequisites ■ Reviewing the configuration ■ Configuring the network and storage ■ Installing SFW HA ■ Configuring the cluster ■ Configuring disk groups and volumes for SQL 	
Installing and configuring SQL Server on the first node of the secondary site	<ul style="list-style-type: none"> ■ Ensuring that the disk group and volumes are mounted on the first node ■ Following the guidelines for installing SQL Server in an SFW HA environment 	
Installing and configuring SQL Server on the second or additional nodes of the secondary site	<ul style="list-style-type: none"> ■ Stopping the SQL services on the first node ■ Ensuring that the disk group and volumes are mounted on the second node ■ Following the guidelines for installing SQL Server on a failover node in an SFW HA environment 	

Table 2-2 Tasks for converting an existing SQL Server installation for SFW HA

Objective	Tasks	Additional information for SharePoint
Setting the internal name of the clustered instance on the secondary site	<ul style="list-style-type: none"> ■ (SQL 2000 or 2005 only) Setting the internal name of the clustered instance 	
Creating the service group configuration on the secondary site	<ul style="list-style-type: none"> ■ Creating a SQL Server service group using one of the following: <ul style="list-style-type: none"> ■ the VCS SQL Server Configuration wizard for SQL Server 2000 or 2005 ■ the VCS SQL Server 2008 Configuration Wizard for SQL Server 2008 	
Configuring VVR and global clustering	<ul style="list-style-type: none"> ■ Configuring VVR components and global clustering 	
Setting up the SharePoint servers on the secondary site	<ul style="list-style-type: none"> ■ Installing and configuring SharePoint on the secondary site 	See “Configuring SharePoint” on page 33.
Modifying the SQL Server service group Lanman agent settings on the secondary site	<ul style="list-style-type: none"> ■ Editing the attribute settings of the VCS Lanman agent resource to update the DNS server in a disaster recovery scenario 	See “Updating the SQL Server IP address” on page 34.
If using the scripts for updating web server IP address, installing and configuring the scripts for the secondary site	<ul style="list-style-type: none"> ■ Installing the script files in a location on the secondary site that matches the location on the primary site ■ Customizing the script configuration file settings for the secondary site 	See “Updating the IP address for web requests” on page 35.

Note: SFW HA provides a wizard that automates some disaster recovery configuration tasks on the secondary site. The task references in this table are based on configuring the secondary site manually rather than with the wizard.

Configuring SharePoint

For full information on installing SharePoint, see the Microsoft documentation for the product.

In addition, follow these guidelines when configuring SharePoint on the primary and secondary sites:

Installing the software	If installing SharePoint Portal Server 2003 in a SQL Server 2005 environment, see the Microsoft Knowledge Base article “How to install SharePoint Portal Server 2003 Service Pack 2 and Windows SharePoint Services Service Pack 2 in a deployment that uses SQL Server 2005 as the database back end”: http://support.microsoft.com/kb/917446
Setting up the SharePoint topology	You configure all the SharePoint components on the secondary site as part of the same server farm (topology) as the SharePoint components on the primary site.
Configuring the SharePoint server connections to the database	You configure the SharePoint servers to connect to the SQL database using the SQL virtual server name/instance. When you set up the SharePoint components at the secondary site, you configure the SharePoint servers at both sites to connect to the primary (active) site database.

Configuring the VCS SQL Server service group for the SharePoint environment

To create the VCS SQL Server service group on the primary site, follow the instructions in the SQL Server solutions guide, as follows:

- *Veritas Storage Foundation and High Availability Solutions HA and Disaster Recovery Solutions Guide for Microsoft SQL*, which covers SFW HA solutions for Microsoft SQL Server 2000 and 2005
- *Veritas Storage Foundation and High Availability Solutions HA and Disaster Recovery Solutions Guide for Microsoft SQL 2008*

See “[Tasks for a new installation of SQL Server](#)” on page 23.

See “[Tasks for an existing installation of SQL Server](#)” on page 28.

After creating the service group, you edit the default configuration of the VCS SQL Server service group to automate updating IP addresses when you switch between sites. After creating the service group on the secondary site, you repeat the procedure for the secondary site.

The following provide additional details:

- Edit the service group to change the attribute settings of the VCS Lanman agent resource.
See [“Updating the SQL Server IP address”](#) on page 34.
- Optionally, depending on your environment, edit the service group to add a process resource that implements a VCS script. You must customize the script configuration settings file separately for each site.
See [“Updating the IP address for web requests”](#) on page 35.

Updating the SQL Server IP address

You configure the VCS Lanman agent to update the DNS server with the virtual IP address for the SQL Server instance that is being brought online. The Lanman agent resource is created automatically as part of the SQL Server service group. However, you need to edit the default Lanman settings.

You must specify the following attribute settings for the Lanman agent, at a minimum:

DNSUpdate	True	This setting causes the update of the SQL Server IP address on the DNS server.
DNSCriticalForOnline	True	The server will not be able to come online if the DNS update is not successful.
DNSOptions	PurgeDuplicate	Removes duplicate DNS entries from the DNS servers.

More information on Lanman agent settings is provided in the agent documentation.

See *Cluster Server Bundled Agents Reference Guide*.

The procedure shows how to edit the Lanman resource of an existing SQL Server service group from the VCS Cluster Manager Java Console. You do this after you create the service group on the primary site and again on the secondary site after creating the service group there.

To configure the Lanman agent resource to update the SQL Server IP address

- 1 Start the Cluster Manager Java Console, log on to the cluster, and open the Cluster Explorer window (click anywhere in the active Cluster Monitor panel).
- 2 In the Cluster Explorer configuration tree, expand the SQL Server service group and expand **Lanman**.
- 3 Under Lanman, right-click the resource icon (labeled with the service group name and the "-Lanman" suffix) and click **View>Properties View**.
- 4 Expand the Properties View window as necessary to see all attributes under Type Specific Attributes.
- 5 Edit the following attribute settings by locating the row containing the setting, clicking the Edit icon in that row, and editing the setting as follows in the Edit Attribute dialog box. Leave Global (the default) enabled to apply the attribute to all nodes in the cluster. If initially prompted to switch to read/write mode, click **Yes**.

DNSUpdateRequired	Check DNSUpdateRequired and click OK .
DNSCriticalForOnline	Check DNSCriticalForOnline and click OK .
DNSOptions	Under Vector Values, click the plus icon to display the list, select PurgeDuplicate and click OK .

- 6 If your site uses additional DNS servers, edit the setting for AdditionalDNSServers to specify the IP addresses.
- 7 In the Cluster Explorer window, click **File>Save Configuration**, and then click **File>Close Configuration**.
- 8 If you are configuring a resource for the web servers, continue with that procedure; otherwise, log off the cluster and exit the Cluster Manager. See [“Configuring a resource for the web servers”](#) on page 38.

Updating the IP address for web requests

You can configure VCS to update the DNS server with a site-specific IP address for the SharePoint web servers or NLB. This update occurs as part of the process of bringing the SQL Server service group online.

To automate this, you configure a VCS process resource as part of the SQL Server service group. You configure the resource after you create the service group on the primary site and you repeat the procedure on the service group that you create on the secondary site.

See “[Configuring a resource for the web servers](#)” on page 38.

The process resource uses Perl scripts. The scripts read information from a configuration settings file that you must customize separately for each site.

See “[Customizing the DNS update settings for the web servers](#)” on page 37.

See “[Example VCS configuration file entries \(main.cf\)](#)” on page 40.

Requirements

To use the DNS update script files, download the required script and settings files from the Veritas Support Site:

<http://entsupport.symantec.com/docs/283930>

Download the following files:

- dnsupdate-online.pl
- dnsupdate-offline.pl
- dnsupdate-monitor.pl
- dnsupdate-settings.txt

You customize the settings file for your environment. You need two copies of the settings file, one with settings for the primary site and one with settings for the secondary site.

See “[Customizing the DNS update settings for the web servers](#)” on page 37.

After customizing the settings file for each site, place the script files and the appropriate settings file for the site in a location where they are available from the cluster nodes. Since you specify the file names and locations as part of the service group process resource, you can choose the file names and locations. To avoid editing the service group again on the secondary site, you must use the same names and locations on both sites.

Warning: Do not place the settings file on a replicated volume. Otherwise, the active site’s settings file would overwrite the passive site’s settings file during replication.

In addition, the scripts require DNScmd.exe, which can be installed from the operating system Support Tools.

The scripts log to the engine log. The name of the log is engine_A.txt.

Customizing the DNS update settings for the web servers

You customize the settings file `dnsupdate-settings.txt` with the values required by the script used to update the DNS server. For each keyword (in brackets) you enter a value.

[Table 2-3](#) describes the contents of the settings file.

Table 2-3 DNS update settings file

Keyword	Value	Notes
[web alias]	The web server (or NLB) name	Same in both setting files
[local ip]	Comma delimited pair of IP addresses: IP address for the web server or NLB on this site, IP address for the DNS server to be updated Example: 192.168.1.2, 192.168.10.10	When editing the primary site settings file, the local IP is that of the primary site web server or NLB. For the secondary site file, the local IP is that of the secondary site web server or NLB. If you have additional IP addresses for additional web servers or DNS servers, enter them as a comma delimited pair on separate lines.
[remote ip]	Comma delimited pair of IP addresses: IP address for the web server or NLB on the remote site, IP address of the DNS server to be updated Example: 192.168.1.1, 192.168.10.10	When editing the primary site settings file, the remote IP is that of the secondary site web server or NLB. For the secondary site file, the remote IP is that of the primary site web server or NLB. The DNS server to be updated is the one that manages the IP address for the web server or NLB. If you have additional IP addresses for additional web servers or DNS servers, enter them as a comma delimited pair on on separate lines.

Table 2-3 DNS update settings file

Keyword	Value	Notes
[dns command]	Path to the location of DNSCmd.exe Example: \Program Files\Support Tools	By default, the script will look for DNSCmd.exe in \Program Files\Support Tools on the drive where SFW HA is installed, unless you specify another value.
[domain name]	Fully qualified domain of the web server Example: symantecdomain.com	Same in both settings files
[nslookup command]	Full path for nslookup.exe Example: \Windows\System32\nslookup.exe	By default, the script will look for nslookup.exe on the drive where SFW HA is installed in the default directory shown, unless you specify another value.

Configuring a resource for the web servers

You can add a process resource to the SQL Server service group to enable switching to the web servers at the site where the SQL Server service group is brought online. The process resource executes a Perl script to update the DNS server IP address for the web servers.

You add the process resource after you create the service group on the primary site. After you create the service group on the secondary site, you add the process resource to that service group as well.

The procedure shows how to add a resource using the Java Console. You can also use other methods, as described in the VCS documentation.

See *Veritas Cluster Server Administrator's Guide*.

Verify that the Perl executable, the scripts, and the customized settings file is available from the systems on which the service group is configured.

In addition, ensure that DNSCmd.exe is installed from the operating system Support Tools to the same drive as the SFW HA application.

To configure a resource for the web servers

- 1 Start the Cluster Manager Java Console, log on to the cluster, and open the Cluster Explorer window (click anywhere in the active Cluster Monitor panel).
- 2 In the Cluster Explorer configuration tree, right-click the name of the SQL service group and click **Add Resource**. If prompted to switch to read-write mode, click **Yes**.
- 3 In the Add Resource dialog box, specify a name for the resource and in the Resource Type list, click **Process**.
- 4 Edit the following process resource attributes:

StartProgram The full path names of the following, in the order shown, separated by spaces:

- The Perl script executable
- The dnsupdate-online script
- The script settings file

Example:

```
c:\Program Files\Veritas\VRTSPerl\bin\perl.exe
c:\bin\dnsupdate-online.pl c:\bin\dnsupdate-settings.txt
```

StopProgram The full path names of the following, in the order shown, separated by spaces:

- The Perl script executable
- The dnsupdate-offline script
- The script settings file

Example:

```
c:\Program Files\Veritas\VRTSPerl\bin\perl.exe
c:\bin\dnsupdate-offline.pl c:\bin\dnsupdate-settings.txt
```

MonitorProgram The full path names of the following, in the order shown, separated by spaces:

- The Perl script executable
- The dnsupdate-monitor script
- The script settings file

Example:

```
c:\Program Files\Veritas\VRTSPerl\bin\perl.exe
c:\bin\dnsupdate-monitor.pl c:\bin\dnsupdate-settings.txt
```

UserName	The name of the user account to run the script. The account must have access and change rights to the DNS server.
Password	The password for the user account.
Domain	The domain name for that user account.

- 5 In the Add Resource dialog box, check **Enabled** and click **OK**.
- 6 In the Resource view, right-click the process resource you just created and click **Link**.
- 7 On the Link Resources dialog box, in the list of resources, select the name of the SQL Server resource and click **OK**.
- 8 In the Cluster Explorer window, click **File>Save Configuration**, and then click **File>Close Configuration**.

Example VCS configuration file entries (main.cf)

The following is an example of the configuration entries created for SQL Server in the VCS main.cf file as a result of adding the process resource for the web server update script.

```
group SPS-SQL_Grp (
    SystemList = { Primary-Sys1 = 0, Primary-Sys2 = 1 }
)

IP SPS-SQL_Grp-IP (
    Address = "192.168.0.1"
    SubNetMask = "255.255.255.0"
    MACAddress @Primary-Sys1 = "00-11-33-55-77-99"
    MACAddress @Primary-Sys2 = "00-22-44-66-77-00"
)

Lanman SPS-SQL_Grp-Lanman (
    VirtualName = SPSDB
    IPResName = SPS-SQL_Grp-IP
    ADUpdateRequired = 1
    DNSCriticalForOnline = 1
    DNSOptions = { UpdateAll, PurgeDuplicate }
)

MSSearch SPS-SQL_Grp-MSSearch (
    AppName = "SQLServer$SPSDB"
)

MountV SPS-SQL_Grp-MountV (
    MountPath = "L:"
    VolumeName = DG1_Vol1
    VMDGResName = SPS-SQL_Grp-VMDg
```

```

)

NIC SPS-SQL_Grp-NIC (
    MACAddress @Primary-Sys1 = "00-11-33-55-77-99"
    MACAddress @Primary-Sys2 = "00-22-44-66-77-00"
)

RegRep SPS-SQL_Grp-RegRep-MSSQL (
    MountResName = SPS-SQL_Grp-MountV
    ReplicationDirectory = "\\RegRep\\SPS-SQL_Grp-RegRep-MSSQL"
    Keys = {
        "HKLM\\SOFTWARE\\Microsoft\\MSSQLServer\\Client" = "",
        "HKLM\\SOFTWARE\\Microsoft\\Microsoft SQL
Server\\SPSDB" = "" }
    ExcludeKeys = {
        "HKLM\\SOFTWARE\\Microsoft\\Microsoft SQL
Server\\SPSDB\\Setup",
        "HKLM\\SOFTWARE\\Microsoft\\Microsoft SQL
Server\\SPSDB\\SQLServerAgent\\Subsystems",
        "HKLM\\SOFTWARE\\Microsoft\\Microsoft SQL
Server\\SPSDB\\Tracking" }
)

RegRep SPS-SQL_Grp-RegRep-MSSearch (
    MountResName = SPS-SQL_Grp-MountV
    ReplicationDirectory =
"\\RegRep\\SPS-SQL_Grp-RegRep-MSSearch"
    Keys = {

"HKLM\\Software\\Microsoft\\Search\\1.0\\Applications\\SQLServer$SP
SDB" = "",

"HKLM\\Software\\Microsoft\\Search\\1.0\\CatalogNames\\SQLServer$P
SDB" = "",

"HKLM\\Software\\Microsoft\\Search\\1.0\\Databases\\SQLServer$SPSDB
" = "",

"HKLM\\Software\\Microsoft\\Search\\1.0\\Gather\\SQLServer$SPSDB" =
"",
        "HKLM\\Software\\Microsoft\\Search\\1.0\\Gathering
Manager\\Applications\\SQLServer$SPSDB" = "",

"HKLM\\Software\\Microsoft\\Search\\1.0\\Indexer\\SQLServer$SPSDB"
= "" }
)

SQLServer2000 SPS-SQL_Grp-SQLServer2000 (
    Instance = SPSDB
    LanmanResName = SPS-SQL_Grp-Lanman
    MountResName = SPS-SQL_Grp-MountV
    DetailMonitor = 1

```

```

        Username = myuser
        Domain = mydomain.com
        Password = my_encrypted_password
        SQLFile = "c:\\Program Files\\Veritas\\cluster
server\\bin\\SQLServer2000\\sample_script.sql"
    )

    RVGPrimary SPS-SQL_Grp-RVGPrimary (
        RvgResourceName = SQL-RVG
    )

    Process SPS-SQL_Grp-Process (
        StartProgram =
"C:\\Progra~1\\Veritas\\VRTSPerl\\bin\\perl.exe
C:\\Bin\\prod_single_dns.pl C:\\Bin\\settings.txt"
        StopProgram =
"C:\\Progra~1\\Veritas\\VRTSPerl\\bin\\perl.exe
C:\\Bin\\dnsupdate-offline.pl C:\\Bin\\settings.txt"
        MonitorProgram =
"C:\\Progra~1\\Veritas\\VRTSPerl\\bin\\perl.exe
C:\\Bin\\dnsupdate-monitor.pl C:\\Bin\\settings.txt"
        UserName = myuser
        Password = my_encrypted_password
        Domain = "mydomain.com"
    )

    SPS-SQL_Grp-IP requires SPS-SQL_Grp-NIC
    SPS-SQL_Grp-Lanman requires SPS-SQL_Grp-IP
    SPS-SQL_Grp-MSSearch requires SPS-SQL_Grp-RegRep-MSSearch
    SPS-SQL_Grp-MSSearch requires SPS-SQL_Grp-SQLServer2000
    SPS-SQL_Grp-MountV requires SPS-SQL_Grp-RVGPrimary
    SPS-SQL_Grp-RegRep-MSSQL requires SPS-SQL_Grp-MountV
    SPS-SQL_Grp-RegRep-MSSearch requires SPS-SQL_Grp-MountV
    SPS-SQL_Grp-SQLServer2000 requires SPS-SQL_Grp-MountV
    SPS-SQL_Grp-SQLServer2000 requires SPS-SQL_Grp-RegRep-MSSQL
    SPS-SQL_Grp-SQLServer2000 requires SPS-SQL_Grp-Lanman
    SPS-SQL_Grp-Process requires SPS-SQL_Grp-SQLServer2000

    // resource dependency tree
    //
    // group SPS-SQL_Grp
    // {
    //   SPS-SQL_Grp-Process
    //   {
    //     MSSearch SPS-SQL_Grp-MSSearch
    //     {
    //       RegRep SPS-SQL_Grp-RegRep-MSSearch
    //       {
    //         MountV SPS-SQL_Grp-MountV
    //         {
    //           VMDg SPS-SQL_Grp-VMDg

```

```

//          }
//      }
//      SQLServer2000 SPS-SQL_Grp-SQLServer2000
//      {
//          MountV SPS-SQL_Grp-MountV
//          {
//              VMDg SPS-SQL_Grp-VMDg
//          }
//          RegRep SPS-SQL_Grp-RegRep-MSSQL
//          {
//              MountV SPS-SQL_Grp-MountV
//              {
//                  RVGPrimary SPS-SQL_Grp-RVGPrimary
//              }
//          }
//          Lanman SPS-SQL_Grp-Lanman
//          {
//              IP SPS-SQL_Grp-IP
//              {
//                  NIC SPS-SQL_Grp-NIC
//              }
//          }
//      }
//  }
//  }
//  }

```

