Dell™ PowerVault™ NX1950
Cluster Systems

Installation and Troubleshooting Guide

Notes, Notices, and Cautions

NOTE: A NOTE indicates important information that helps you make better use of your computer.

NOTICE: A NOTICE indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.

CAUTION: A CAUTION indicates a potential for property damage, personal injury, or death.

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Contents

1

Introduction

This document provides you with information required for configuring the Dell™ PowerVault™ NX1950 storage system as a cluster solution and offers troubleshooting tips. The PowerVault NX1950 cluster solution enables two PowerVault NX1950 nodes to provide highly-available system and data. Dell supports the following configuration of the PowerVault NX1950 cluster solution:

- Integrated solution—This solution consists of two PowerVault NX1950 storage systems configured with a Dell PowerVault MD3000 storage array.
- Gateway solution—This solution consists of up to eight PowerVault NX1950 storage systems configured with Dell|EMC storage arrays.

NOTE: Throughout this document, *PowerVault NX1950 storage system* refers to the individual cluster node. *PowerVault NX1950 cluster solution* refers to the configuration of two or more PowerVault NX1950 storage systems running Microsoft® Cluster Services (MSCS) attached to either PowerVault MD3000 storage array or a Dell|EMC storage array.

Overview of MSCS

A cluster is a collection of servers that work together to provide highly- available resources. Examples of resources include services, IP addresses, network names, and disk drives. The PowerVault NX1950 cluster solution uses MSCS and the **Dell Storage Initialization Wizard** to configure the solution for clustering. The Dell customized components help the user to integrate the solution with the services provided by the operating system in a seamless way to configure the system.

Microsoft Windows® Unified Data Storage Server 2003 provides two technologies for cluster solutions through MSCS—Server Cluster and Network Load Balancing (NLB). The PowerVault NX1950 cluster solution does not support NLB. This guide focuses on the Server Cluster technology provided by the operating system.

The following list includes basic features of MSCS:

- Highly-available and server consolidation
- Deployable on a single network
- Multiple-node cluster support

    NOTE: The multiple-node cluster is supported on PowerVault NX1950 cluster solution with Windows Unified Data Storage Server 2003, Enterprise x64 Edition operating system only.

For more information about MSCS features and functionality, see the Microsoft Support website at **support.microsoft.com**.

Nodes

Nodes or cluster nodes refer to the PowerVault NX1950 storage systems that are members of the cluster. The PowerVault NX1950 storage solution supports a multiple-node cluster.

Cluster Resources

The cluster resources are physical or logical entities with the following characteristics:

- Can be brought online/offline
- Can be managed within a cluster
- Can be hosted by one node within the cluster

Examples of resources are Network Name, IP addresses, services, applications, and disk storage. During cluster failover, only the cluster resources failover to another node.

The PowerVault NX1950 cluster solution supports cluster resources and you can use the cluster administration tools to configure them. For more information about cluster administration tools, see "Cluster Administration and Management" on page 12.

Resource Group

A resource group is a group of resources (IP addresses, disk storage) that can failover as a unit. An example of a resource group is a Highly-Available Server Instance.

Quorum Resource

MSCS uses quorum resource to maintain state and configuration information of the individual nodes and to enforce cluster unity. The quorum-device resource stores critical information about the cluster nodes and the resources in the cluster to ensure and manage consistency across both nodes. There are two types of quorum resources namely: quorum-device and majority-of-nodes cluster.

The quorum-device resource requires a storage class device that is accessible by the other node in the cluster. The quorum-device resource is typically a physical disk. The PowerVault NX1950 cluster solution uses a quorum-device that is located on the storage array.

For information about how to create or select a quorum resource, see "Assigning the Quorum Disk to the Cluster" on page 31.

Shared Versus Private Storage

The PowerVault NX1950 cluster solution supports two types of storage—Shared and Private. When you use Shared storage, each node within the cluster has access to all storage resources. When you use Private storage, only the individual node has access to the assigned storage resource. To enable the PowerVault NX1950 configuration as a cluster, the quorum disk must be deployed on a shared storage disk. The PowerVault NX1950 cluster solution is deployed as a Shared storage solution by default to ensure that the quorum disk can be created and mapped to both the nodes in the cluster.

The PowerVault NX1950 cluster solution supports both Private and Shared storage for the logical unit numbers (LUNs) created after the quorum disk is created.

NOTICE: In the Integrated solution, you can use the **Provision Storage Wizard** to configure Shared storage only. For more information, see "Limitations While Creating a Shared LUN" on page 41.

Firewall Port Exceptions

The PowerVault NX1950 cluster solution is pre-configured from Dell with Windows Firewall enabled. The port and application exceptions are configured for deployment, management, and use of the cluster solution. No user intervention is required to enable exceptions for clustering support.

NOTE: A Windows Firewall Exception is a Microsoft term used to denote ports or applications that are allowed access through the firewall.

If the Windows Firewall settings are restored to the default values either due to user action or because of a system restore, you must reset the firewall port exceptions for the cluster setup to be successful. Dell provides a batch file that sets the required port exceptions to deploy, manage, and use the PowerVault NX1950 cluster solution. For instructions to download and execute the batch file, see the *Dell PowerVault NX1950 Systems Deployment Guide*.

NOTICE: Ensure that you perform the procedure described in the *Dell PowerVault NX1950 Systems Deployment Guide* to avoid system failure.

Configuration Tools

The following tools assist in the configuration of the storage array and the Dell PowerVault NX1950 storage systems and enable them to operate as a cluster.

- The **Dell Storage Initialization Wizard** communicates with the storage array and ensures that set up is complete.

- The Microsoft Windows Unified Data Storage Server 2003, Enterprise x64 Edition provides the following:

    - The **PowerVault NX1950 Initial Configuration Tasks** wizard — This wizard helps you to configure the PowerVault NX1950 storage system to be a part of the cluster.

    - For cluster administration and troubleshooting, the operating system provides a graphical user interface (GUI) tool — Cluster Administrator (also referred to as Cluadmin.exe) and a command line interface (CLI) tool — cluster.exe. For more information about these tools, see "Cluster Administration and Management" on page 11.

    - Microsoft Cluster Setup tools — The Windows Unified Data Storage Server 2003, Enterprise x64 Edition provides cluster configuration and management tools for advanced users. The features of these tools are beyond the scope of this document. For more information about these features and functionality, see the Microsoft Support website at **support.microsoft.com**.

Supported Operating System

The PowerVault NX1950 cluster solution supports the Windows Unified Data Storage Server 2003, Enterprise x64 Edition operating system.

> **NOTE:** The Microsoft Windows Unified Data Storage Server 2003, Standard x64 Edition is supported on the PowerVault NX1950 storage system as a stand-alone solution only. You can purchase an upgrade kit from Dell to upgrade to the Windows Unified Data Storage Server 2003, Enterprise x64 Edition.

For more information about the upgrade procedure, see the *Dell PowerVault NX1950 Systems Upgrading Your Operating System* document located on the Dell Support website at **support.dell.com**.

Cluster Administration and Management

The Windows Unified Data Storage Server 2003, Enterprise x64 Edition provides cluster administration through Cluster Administrator (also referred to as Cluadmin.exe)—a GUI tool and cluster.exe—a CLI tool.

Cluster Administrator

Cluster Administrator allows administrators to manage cluster objects, establish groups, initiate failover, handle maintenance, and monitor cluster activity through a convenient graphical interface.

Follow one of these procedures to access the Cluster Administrator:

- Go to **Start→Administrative Tools→Cluster Administrator**.
- Type `cluadmin` at the MS-DOS® prompt.
- Access the tool from the **PowerVault NX1950 Management Console**.

For more information about Cluster Administrator, see the Microsoft Support website at **support.microsoft.com**.

Cluster.exe

The CLI tool for cluster administration is called cluster.exe and can be accessed from the MS-DOS prompt. For more information on the CLI commands for this tool, type `cluster /?` at the MS-DOS prompt or see the Microsoft Support website at **support.microsoft.com**.

Other Documents You May Need

You can refer to the following documents located on the Dell Support website at **support.dell.com**. See the:

*   *Dell PowerVault NX1950 Systems Hardware Owner's Manual* for physical, firmware, software interface features, and troubleshooting for your PowerVault NX1950 storage system.

*   *Dell PowerVault NX1950 Systems Getting Started Guide* for system features, installation, and configuration of your PowerVault NX1950 storage system.

*   *Dell PowerVault NX1950 Systems Deployment Guide* for configuration procedures on your system and a general overview of the Windows Unified Data Storage Server 2003 operating systems.

*   *Dell PowerVault NX1950 Systems Installation Guide* for deployment, cabling, configuring, and localizing your PowerVault NX1950 storage solution.

*   *Dell PowerVault NX1950 Systems Important Information* for known issues.

*   *Dell PowerVault NX1950 Systems Upgrading Your Operating System* for instructions to upgrade your operating system.

*   *Dell PowerVault NX1950 Systems Support Matrix* for supported hardware, software, and configurations.

*   *Dell PowerVault NX1950 Systems End-to-End Deployment Guide for iSCSI.*

2

Setting Up Your Cluster

This section provides information about the prerequisites and the procedure to set up your Dell™ PowerVault™ NX1950 cluster solution.

> **NOTE:** For known issues and fixes regarding configuring and managing your cluster, see "Important Information" on page 39.

Configuring Your Cluster

The PowerVault NX1950 cluster solution provides the following wizards to ensure that the solution is configured appropriately:

- The **Dell Storage Initialization Wizard** — automates all storage communication required for the **PowerVault NX1950 Initial Configuration Tasks** wizard to communicate with the array.

- The **PowerVault NX1950 Initial Configuration Tasks** wizard — walks you through the steps necessary to perform configuration tasks like deploying the PowerVault NX1950 cluster solution.

- The **Microsoft Management Console for Storage** — is a utility for all storage-related activities.

   > **NOTE:** Throughout this document and in the GUI, Microsoft® Management Console for Storage and PowerVault NX1950 Management Console are synonymous.

It is recommended that you follow the sequence of steps in Table 2-1 to successfully create a cluster.

Table 2-1. Steps to Create the Cluster Solution

Step/Phase	Recommended Sequence		
	Node 1	Node 2-8	Storage Array/ Network
1 Cable the solution	1	2	3
2 Turn on	5	6	4 **NOTE:** This step may take a few minutes to complete.
3 Initial setup	7	8	
• Setup and Verify Domain Controller Server			
• Setup and Verify Domain Name Server			
• Setup and Verify Network Connectivity			
• Setup and Verify Node Passwords			
• Change Region Information			
• Adjust Time & Date			
• Run the **Dell Storage Initialization Wizard (DSIW)** *			
4 Use the **PowerVault NX1950 Initial Configuration Tasks** wizard to create a cluster	9		
5 Add the remaining node(s)	10		
6 Join cluster		11	
7 Configure Highly-Available Server Instance (optional)	12		

* While the DSIW is running, be sure to select the **Clustered** option on both servers when prompted.

NOTICE: Before setting up the cluster, ensure that all the cluster nodes complete step 3. If you do not perform step 3 on all the cluster nodes, one of them may not be added to the cluster.

Before setting up a cluster, you must complete several initial tasks of connecting to the array, naming the array, and setting up the preliminary items. For more information regarding the initial tasks to perform, see "Prerequisites for Cabling Your Cluster" on page 15.

Prerequisites for Cabling Your Cluster

You must set up at least two LAN connections to enable your storage solution as a cluster. The PowerVault NX1950 cluster solution uses one or more connections for client access (public) IP addresses and a dedicated connection for heartbeat (private) network. Ensure that the heartbeat connection is configured on a separate subnet.

Figure 2-1.   PowerVault NX1950 Management Console
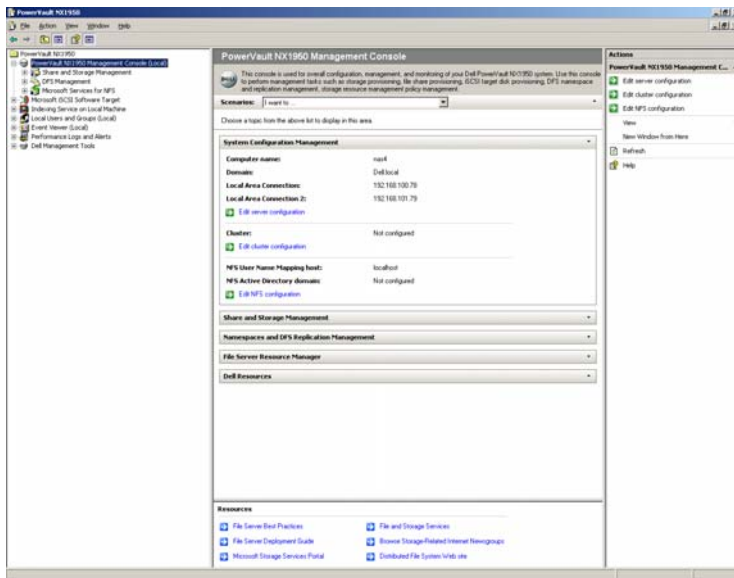
NOTE: You must set up two static IP addresses on two different subnets for the cluster—one for the private (heartbeat) network and one for the client access (public) network.

Cabling Your Integrated Solution

Figure 2-2 shows the supported cable configuration for the PowerVault NX1950 cluster solution.

You must connect the SAS 5/E Adapters on both the PowerVault NX1950 storage systems to the PowerVault MD3000 storage array to enable the storage systems as cluster nodes. For your Ethernet port connection, It is recommended that you use the on-board connections for the public network. These on-board NIC connections support TCP/IP Offload Engine (TOE). If available, dedicate one optional NIC port for the MSCS heartbeat connection; otherwise you must dedicate one on-board connection for the MSCS heartbeat.

Figure 2-2. Example of Cabling a PowerVault NX1950 Integrated Cluster Solution
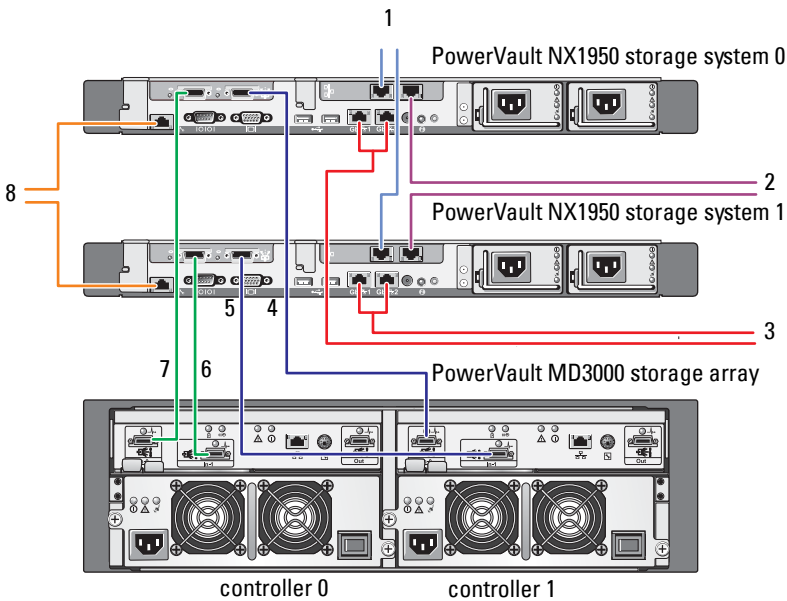
1	NIC port A to Gb Ethernet switch (optional) for MSCS heartbeat	5	Port 1 on PowerVault NX1950 storage system 1 SAS HBA to In-1 on controller 1
2	NIC port B to Gb Ethernet switch (optional)	6	Port 0 on PowerVault NX1950 storage system 1 SAS HBA to In-1 on controller 0
3	On-board Gb1 and Gb2 to Gb Ethernet switch(es)	7	Port 0 on PowerVault NX1950 storage system 0 SAS HBA to In-0 on controller 0
4	Port 1 on PowerVault NX1950 storage system 0 SAS HBA to In-0 on controller 1	8	DRAC port to Ethernet switch for lights-out management (optional)

Cabling Your Gateway Solution

Figure 2-3 shows the PowerVault NX1950 Gateway cluster solution. You must connect the Qlogic Adapters on both the PowerVault NX1950 storage systems to the Dell|EMC storage arrays to enable the storage systems as cluster nodes. For your Ethernet port connection, it is recommended that you use the on-board connections for the public network. These on-board NIC connections support TOE. If available, dedicate one optional NIC port for the MSCS heartbeat connection; otherwise you must dedicate one on-board connection for the MSCS heartbeat.

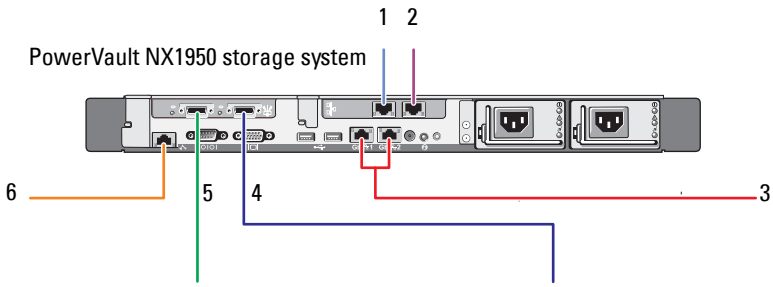**Figure 2-3.   Example of Cabling a PowerVault NX1950 Gateway Cluster Solution**

1	NIC port A to Gb Ethernet switch (optional) for MSCS heartbeat	4	Port 2 on HBA to SAN
2	NIC port B to Gb Ethernet switch (optional)	5	Port 1 on HBA to SAN
3	On-board Gb1 and Gb2 to Gigabit Ethernet switch(es)	6	DRAC port to Ethernet switch for lights-out management

PowerVault NX1950 Initial Configuration Tasks Wizard

It is recommended that you use the **PowerVault NX1950 Initial Configuration Tasks** wizard to configure the PowerVault NX1950 storage system and to access MSCS. Figure 2-4 illustrates the wizard. The **PowerVault NX1950 Initial Configuration Tasks** wizard helps you to perform various tasks to configure the resources required by a cluster.

Before setting up the cluster, you must perform step 1 to step 4 in Table 2-1.

NOTE: The **Customize this system** section in the wizard is specific to cluster setup. The PowerVault NX1950 cluster solution is supported only with the Microsoft® Windows® Unified Data Storage Server 2003, Enterprise x64 Edition.

Figure 2-4. PowerVault NX1950 Initial Configuration Tasks
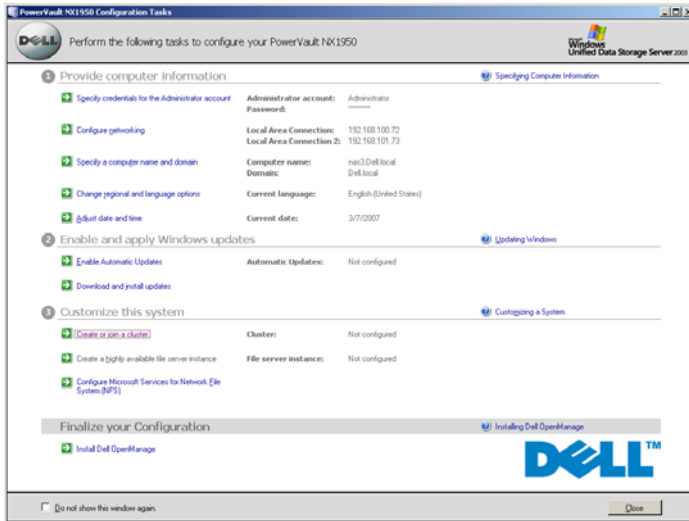
 **NOTE:** You can also access the **PowerVault NX1950 Initial Configuration Tasks** wizard from the **PowerVault NX1950 Management Console**. To launch this wizard, click **Edit server configuration** located in the right pane of the window as highlighted in the Figure 2-1 below.

Creating the Cluster

The **PowerVault NX1950 Initial Configuration Tasks** wizard can be used to create the cluster. Table 2-2 summarizes the steps for creating a cluster using this wizard.

Table 2-2. Phases in Creating a Cluster

Step/Phase	Node 1	Nodes 2-8
Start **Cluster Configuration** wizard	✓	
Create the Quorum Disk	✓	
Checking for Existing Cluster Configuration	✓	
Set the Cluster IP address	✓	

Table 2-2. Phases in Creating a Cluster *(continued)*

Step/Phase	Node 1	Nodes 2-8
Supply Administrative Information	✓	
Verify Configuration	✓	
Start Creation Process	✓	
Verify Completion	✓	
Add remaining nodes	✓	
Join Cluster		✓
Configure Highly-Available File Server Instance (optional)	✓	

✓ indicates that the step is applicable to the respective cluster component.

✎ **NOTE:** You can initiate the "Create or Join Cluster" from any node. The node that you create the quorum resource in; is referred to as node 1.

Perform the following procedure to create a cluster:

1 Go to the **PowerVault NX1950 Storage Tasks** wizard.

2 In the **Customize this System** section, click **Create or Join Cluster**.

This launches the **Cluster Configuration** wizard.

3 If a quorum resource is not configured already, the **Cluster Configuration** wizard creates the quorum disk. If the quorum disk creation fails, see the "Troubleshooting" on page 35 to correct the issue.

Figure 2-5. Quorum Creation
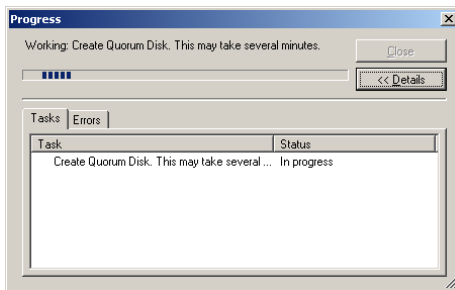
4 After the quorum disk is created, the **New Server Cluster Wizard** appears. This wizard takes you though the process of cluster creation. Click **Next** to begin the process.

5 The **Analyzing Configuration** window appears and the system configuration is analyzed. If a cluster configuration already exists, this step fails. For information about correcting this error, see "Troubleshooting" on page 35.

If no error is reported after the analysis is completed, click **Next**.

> **NOTE:** The **New Server Cluster Wizard** may caution you about the cluster configuration due to the Microsoft Windows Firewall exception being enabled. This does not impact successful cluster setup. For more information about Firewall port exceptions, see "Firewall Port Exceptions" on page 9.

6 The **IP Address** window prompts you to enter the IP address. Enter the IP address that you want to configure for the cluster and click **Next**.

> **NOTE:** This IP address is used for the cluster management (public) connection.

7 The **Cluster Service Account** window appears. Enter the domain controller administrative account information and click **Next**.

> **NOTE:** It is recommended that you create a domain account with limited privileges for this purpose. This domain account is granted with local administrator rights on each node and can be used for Controlling Services.

8 The **Proposed Cluster Configuration** window appears. This window gives you a summary of the configuration that is being created.

   a Before you proceed to the next screen, click **Quorum** to select the correct quorum disk. The **Cluster Configuration Quorum** screen appears.

   b Select a quorum disk (shared quorum disk) that is accessible to both the nodes. This is essential for a successful cluster creation.

9 After selecting the quorum disk, check for errors in the summary.

If there are errors, click **Back** to go to the incorrect section and correct the error. If no errors are reported, click **Next** to proceed to the next screen.

10 The **Creating the Cluster** screen appears. This dialog box gives you the progress of the cluster creation process and the warnings that might have occurred during the process as shown in Figure 2-6.

Figure 2-6. New Server Cluster Wizard
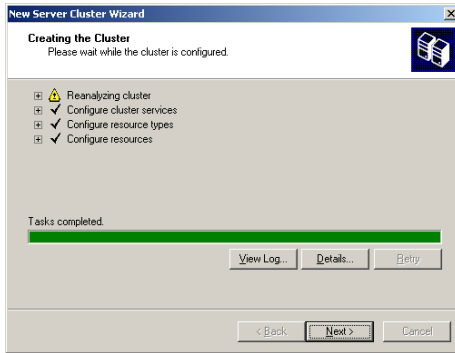
NOTE: The cautions in the **Creating the Cluster** window in Figure 2-6 are reported as a result of the firewall being enabled. This does not impact successful cluster creation. For more information about firewall port exceptions, see "Firewall Port Exceptions" on page 9.

11 The cluster creation process is complete. If any errors have occurred during the cluster creation, the color of the progress bar appears red. Click **Next**.

12 The **Completing the New Server Cluster Wizard** screen appears. Click **Finish**.

NOTE: This wizard gives you an option to add additional nodes to the cluster. The PowerVault NX1950 cluster solution supports only two nodes with the PowerVault MD3000 storage array (Integrated Solution) and up to eight nodes with the Dell|EMC storage arrays (Gateway Solution).

After the node(s) are added, complete the on-screen instructions.

13 Click **Create or Join Cluster** in the **PowerVault NX1950 Initial Configuration Tasks** wizard. In the remaining cluster nodes, start the **PowerVault NX1950 Initial Configuration Tasks** wizard, and click **Create or Join Cluster**.

14 The **Welcome to the Add Nodes** screen appears. Click **Next** to continue.

15 The **Cluster Name and Domain screen** appears. Enter the cluster name and domain of the cluster that you want to join and click **Next**.

16 The **Select Computers** screen appears. This dialog box allows you to add additional nodes to the cluster. Perform the steps below to choose and configure the additional node(s):

a In the **Select Computers** screen, click **Browse** and locate the additional node(s).

b After selecting the additional node(s), click **Advanced**.

> **NOTE:** Microsoft recommends that you follow this procedure to add new node(s). The process of adding new node(s) may fail if you do not perform this procedure.

c Select the **Advanced (minimum) configuration** option and then click **Next**. The analysis phase begins.

d If the wizard reports any issues during analysis, go to the corresponding section and fix the error. If no error is reported and the analysis is complete, click **Next**.

> **NOTE:** The Analyzing Configuration screen may display caution messages. These appear as the Windows Firewall is enabled and do not impact successful cluster creation.

17 The **Cluster Service Account** appears. Enter the administrator's user name and password. If you do not have this information, contact your system administrator.

18 The **Proposed Cluster Configuration** screen appears. This screen displays a summary of configuration. Review the configuration. If any configuration items are incorrect, click **Back** and change the items. If the configuration is correct, click **Next** to begin adding the node.

19 The **Adding Nodes to the Cluster** screen appears. This screen displays the status of adding the node to the cluster.

20 If the node is successfully added, the progress bar is green. If there are any errors, the progress bar is red. Click **Back** to fix any configuration errors that caused the failure. After the errors are corrected and the progress bar is green, click **Next**.

21 The **Completing the Add Nodes Wizard** screen appears indicating that the second node has been added successfully. You can view the log of events by clicking **View Log...**.

22 Click **Finish** to complete the process. You can use the Cluster Administrator tool to verify that the node has been added successfully.

✎ **NOTE:** Repeat step 13 to step 22 for each additional node.

3

Managing Your Cluster

Creating a Highly Available File Server Instance

In the Dell™ PowerVault™ NX1950 cluster solution, all cluster nodes must be configured with a Highly-Available File Server Instance to access the resources of the cluster. This creates a cluster resource group that includes a network name and IP address allowing the file shares that are provisioned on the Highly-Available Server Instance to failover between nodes.

To create a Highly-Available Server Instance, follow the procedure below:

1 Go to the **PowerVault NX1950 Management Console** and launch the **PowerVault NX1950 Initial Configuration Tasks** wizard.

2 Click **File Server Management (Local)**.

3 In the **Actions** pane, click **Edit Server Configuration** to start the creation wizard.

4 In the **Customize this system** section, click **Create a highly available file server instance**.

5 After the **Highly available file server instance** wizard launches, enter the name, IP address, and the Subnet mask for the IP address and then click **OK**. The process of creating a highly-available server instance begins and a progress bar indicates the status of this process.

NOTE: When you create a Highly-Available Server Instance on a cluster node using the **PowerVault NX1950 Initial Configuration Tasks** wizard, the status of the Highly-Available Server Instance is not visible to the other nodes within the cluster. This behavior is expected and is behaving as designed. To access the Highly-Available Server Instance, each node in the cluster must have ownership of the instance.

After this process is complete, all nodes have access to the cluster resource group.

NOTE: To set up Snapshots for iSCSI Targets, see the *Dell PowerVault NX1950 Systems End-to-End Deployment Guide for iSCSI* on the Dell Support website at **support.dell.com**.

Creating a Highly Available iSCSI Target Using Microsoft iSCSI Target 3.0

1 Click **Start**→**Administrative Tools**→**Services**→**Microsoft iSCSI Software Target**→(right-click) **Stop**, to stop the iSCSI service.

2 Stop the Microsoft® iSCSI service on each cluster node and set it to **Manual**.

3 On the Active node, go to **Start**→**Administrative Tools**→**Cluster Administrator**→**Groups**→**Cluster Group** (right-click)→**New Resource**.

4 Enter the following required information and click **Next**:

   – **Name**
   – **Description**
   – **Resource Type**: Select **Generic Service**
   – **Group**: Select **Cluster Group**

5 Verify that all cluster nodes are in the **Possible Owners** window and click **Next**.

6 Select the following dependencies, click **Add**, and then click **Next**:

   – **Cluster IP Address**
   – **Cluster Name**
   – **Physical Disk of Choice**

   NOTE: Do not select quorum disk.

7 In the **Service Name** field, type `WinTarget`, and then click **Next**.

8 When prompted for the registry key, click **Add**, type `Software\Microsoft\iSCSI Target`, and then click **Finish**.

9 Right-click on **Resource** and select **Online**.

10 On the active node, go to **PowerVault NX1950 Management Console**→ **Microsoft iSCSI Software Target**→**Devices**.

11 Select the physical disk that you chose in step 6. Right-click on the disk and complete the wizard steps to create a LUN.

12 Right-click **Microsoft iSCSI Software Target** and then click **Create New Target**.

13 Right-click the new Target and add the existing LUN that you created in step 11.

NOTE: If you are migrating from Microsoft Target 3.0 to Microsoft Target 3.1, see the *Dell PowerVault NX1950 Systems Solution Upgrade Guide*.

Creating a Highly Available iSCSI Server Instance Using Microsoft iSCSI Target 3.1

To create Targets and assign the .vhd files, the following steps need to be performed:

Create Highly Available iSCSI Instance

1. Right-click the Microsoft iSCSI Software Target icon in the Microsoft Management Console (MMC) and click **Create high availability instance for iSCSI**.

2. Type the desired name into the field for **Resource Group Name** and click **Add**. Fill out the rest of the required fields

   – **IP Address**

   – **Subnet mask**

   – **Network Interface**

3. Click **OK** twice.

The highly-available instance for iSCSI should be created successfully.

Create Target

Initiator Side

- If you are not using iSNS server, go to the host/initiator to add the newly created Target's iSCSI highly-available IP address in the Target portals for connectivity.

- Click **Advanced** and select the following options:

   – **Local Adapter**—Microsoft iSCSI Initiator

   – **Source IP**—Microsoft iSCSI Initiator

   – IP address of the client for iSCSI traffic

- If you are using iSNS server, then right-click the iSCSI Target icon in MMC, select **Properties**, go to **iSNS** tab and add iSNS IP address. Go to initiator and add iSNS IP address in the **Discovery** tab.

Target Side

1 Right-click the Target icon in the MMC and click **Create iSCSI Target**.

2 Type the Target name, Target description, and click **Next**.

3 Browse for the desired IQN identifier of the initiator or click **Advanced→ Add IP address** and enter the IP address of the initiator, and then click **Next**.

4 Select the desired Highly-Available iSCSI instance from the drop-down menu and click **Next**.

5 Click **Finish**.

The Target should be successfully created.

Create VDs for the iSCSI Target

NOTE: Prior to creating a VD for the iSCSI Target, you need to create a volume using the Storage Provision wizard.

Right-click the newly created Target and select **Create Virtual disk for iSCSI Target**. Follow the wizard to successfully create a VD.

Move Volume to desired iSCSI Instance

1 Launch Cluster Administrator by clicking **Start→Administrative Tools→ Cluster Administrator**. Locate the volume that the devices (.vhd files) were located on. This is under cluster groups.

2 Right-click the volume, select **Change Groups** and select one of the newly created highly-available instances you want to move the volume to.

3 A pop-up screen is displayed for confirmation. Click **Yes** twice.

Import Devices

1 Right-click the devices icon in the MMC, select **Import Virtual Disk**, and click **Next**.

2 Browse to the volume the .vhd files are located on, select the .vhd file, click **OK**, **Next**, and then **Finish**.

3 Repeat step 2 to import all .vhd files.

Virtual Disk/Target Associations

1 Right-click the Target and select **Add existing virtual disk**.

2 Select the desired virtual disk and click **OK**.

The virtual disk is associated to the Target and ready for use.

Creating a Shared Storage Disk

1 Click **Start**→**Administrative Tools**→**Windows unified Data Storage Server PowerVault NX1950 Management Console**→**Share and Storage Management**→**Run Provision Storage**.

2 Follow the on-screen instructions. When you are prompted to select server assignment, select the default selection (**All servers in this cluster**).

Complete the configuration steps in the wizard. Shared storage disk is created successfully.

📖 **NOTE:** For information about limitations in setting up a Shared storage disk, see the "Limitations While Creating a Shared LUN" on page 41.

Creating a File Share on a Highly Available File Server Instance

1 Go to **PowerVault NX1950 Management Console**→**Share and Storage Management**→**Run Provision Share**.

2 Select the disk that you want to create a file share on, click **Next**, and verify that the desired instance appears.

3 Complete the on-screen instructions to complete the creation of a file share on a Highly-Available Server Instance.

Adding a Node Manually

If a node is not available during the initial creation of the cluster, you have to run the **Add Node** wizard and add it manually to the cluster. In this scenario, running through the **Add Node** wizard does not complete all the items required for the cluster to function properly. You have to complete the remaining tasks that are listed in Table 3-1.

Table 3-1. Adding a Node Manually

Step/Phase	New Node(s)	Existing Node(s)
1 Add the cluster to the Server Connections	✓	✓
2 Edit the Cluster Connection to include all nodes	✓	✓
3 Assign the Quorum Disk to the Cluster	✓	✓
4 Configure the RPC Locator Service as **Automatic** and start the service	✓	✓
✓ indicates that the step is applicable to the respective cluster component.		

You must perform the actions in the table on each additional node for the cluster to function properly. These steps assume that the **Add Node** wizard has been run on the new node and the node is now ready to complete the configuration setup.

Server Connections

After the cluster setup is complete, perform the following procedure to update the server connections to reflect the cluster configuration.

1 Click **Start→Administrative Tools→Windows Unified Data Storage Server→Share and Storage Manager→Storage Manager for SANs→ LUN Management** to start the PowerVault NX1950 management console.

2 In the **LUN Management** section, click **Manage Server Connections**.

3 The **Manage Server Connections** window appears. Click **Manage Clusters** to add the cluster to the managed server connections.

4 In the **Manage Clusters** window, click **Add**.

5 Enter the name of the cluster and verify that the server is a local server. Click **OK**.

The cluster appears in the list of managed server connections.

Adding an Additional Node

After the cluster has been added to the server connections, the additional node must also be added to the list of server connections.

1   If you have already done so, click **Manage Server Connections** in the management console.

2   The **Manage Server Connections** window appears. Click **Add**.

3   The **Add Server** window appears. Click **Browse**.

4   In the **Select Computer** window, click **Find Now**, and enter the administrator user name and password. Click **OK**.

    The **Select Computer** window displays the available nodes.

5   Select the node that you want to add to the cluster and click **OK**.

6   In the **Manage Server Connections** window, click **Manage clusters**.

7   Select the cluster and then click **Edit**.

8   The **Edit Cluster** window appears. The server that you have added appears in the bottom pane of the window.

9   Select the server by selecting the check box beside it and then click **OK**.

Assigning the Quorum Disk to the Cluster

The next phase of manually adding the device is to assign the quorum disk to the cluster. In order to perform this step:

1   Go to **Share and Storage Manager→Storage Manager for SANs→ LUN Management**.

2   The management console appears. In the right pane of the console, select **Assign LUN...** in the **Selected LUN** section.

3   The **Assign LUN Wizard** launches the **Server Access** window.

4   Ensure that the **Assign the LUN now** option is selected and click **Next**.

5   Click **OK** to confirm the assignment of the logical unit number (LUN) to the cluster.

6   After the assignment is complete, go to the management console and assign the quorum LUN server to the cluster from the **LUN Management** view.

Configure the RPC Locator Service

The last step in creating your cluster is to set the RPC Locator Service to **Automatic**. Perform the procedure below to change this setting:

1 Click **Start**→**Programs**→**Administrative Tools**→**Services**.

2 Locate the **RPC Locator Service** and double-click the icon.

3 The **Remote Procedure Call (RPC) Locator Properties** window launches. In the **General** tab, set the **Startup type** as **Automatic**.

4 Click **Start** to start the service.

NOTE: MSCS uses the RPC Locator Service for remote management purposes. If this service is not configured, MSCS does not behave as expected.

After these steps are completed on all servers, the cluster configuration can be tested. For more information on testing the cluster configuration, see the Microsoft Windows Unified Data Storage Server 2003 Help.

Removing Nodes From the Cluster

NOTICE: Few actions described in this section are termed as destructive cluster operations. Ensure that you back up all data on the cluster nodes before performing these actions to avoid loss of data.

Removing a Node

You can use the Cluster Administrator or cluster.exe to remove a node from the cluster. To remove the node from the cluster using the Cluster Administrator, perform the following procedure:

1 In Cluster Administrator tool, open the cluster connection by selecting **File**→**Open Connection**.

2 If the cluster name is not provided, click **Browse** and select the cluster name.

3 After you select the cluster, the Cluster Administrator lists the cluster and all the member nodes. From the list of member nodes, select the one that is to be removed.

4 Right-click on the name of the node and then click **Stop the Cluster Service on the Node**.

5 After the node has been selected, click **File**→**Evict Node**. This removes the node from the cluster.

To remove the cluster node using the cluster.exe tool, you must stop the cluster service and then evict the node by performing the following procedure:

1 Open an MS-DOS® prompt.

2 Enter the following commands:

```
cluster node <node name> /stop

cluster node <node name> /evict
```

3 After executing these commands, enter the following command to ensure that the node has been removed:

```
cluster node <node name> /status
```

It is recommended that you verify that the node has been removed by checking from another node in the cluster.

Removing the Last Node

Removing the last node in the cluster is different than removing other nodes in the cluster. Removing the last node removes the cluster.

To remove the last node using Cluster Administrator, stop the Cluster Service on the node, and then click **File→Evict Node**.

To remove the last node, using the cluster.exe tool, enter the following commands:

```
cluster node <node name> /stop

cluster node <node name> /forcecleanup
```

NOTICE: If this operation fails, the PowerVault NX1950 cluster solution does not function properly. Exercise extreme caution in planning the cluster so that removal of the last node is not necessary.

Replacing a Node

To replace a node, you must remove the node and then add a node manually.

For instructions about removing a node, see "Removing Nodes From the Cluster" on page 32. For instructions about adding a node manually, see "Adding a Node Manually" on page 29.

Removing the Cluster

Removing the cluster is a destructive operation and may affect cluster functionality.

⊘ **NOTICE:** Ensure that you back up all data on the cluster nodes before performing these actions to avoid loss of data.

To remove cluster, remove all but one node and then remove the last node using the /forcecleanup option. After the last node has been removed, the cluster has been removed. To clear the history of the cluster:

1 Go to **Storage Manager for SANs**→**Manage Clusters**→**Edit Cluster**.

2 Deselect all the nodes.

3 Click **OK** and then click **Remove** to delete the cluster entry.

A

Troubleshooting

Microsoft® Windows® Unified Data Storage Server 2003 provides general cluster troubleshooting. To access this Help and Support content:

1 Click **Start**→**Help and Support**.

2 The **Help and Support** window appears. Search for content related to **Cluster Troubleshooting**.

In the search results, locate and select the **Troubleshooting: Server Cluster** option. This section gives you information about general cluster troubleshooting.

This section contains common issues you may encounter on your Dell™ PowerVault™ NX1950 cluster solution.

Table A-1. General Cluster Troubleshooting

Problem Area	Probable Cause	Corrective Action
Network Communication The nodes cannot access the storage system, or the cluster software is not functioning with the storage system.	The storage system is not cabled properly to the nodes or the cabling between the storage components is incorrect.	Ensure that all external cables are securely attached to the external connectors on your system. For an example of supported cabling configuration, see "Other Documents You May Need" on page 13.
	One of the cables or connectors is faulty.	Ensure that the cables or connectors are not damaged.
	The TCP/IP configuration is incorrect.	Ensure that the cluster nodes are on the same subnet to prevent network communication errors.
	IP addresses not configured correctly.	The cluster heartbeat IP address should be on a different subnet than the cluster IP address.

Table A-1.   General Cluster Troubleshooting *(continued)*

Problem Area	Probable Cause	Corrective Action
	Firewall exceptions are closed.	Execute the firewall exceptions script that is a part of the PowerVault NX1950 cluster solution software. This script restores the exceptions to factory settings and allows cluster operations to run.
The PowerVault NX1950 cluster solution is unable to detect the PowerVault MD3000 storage array	The PowerVault NX1950 cluster nodes and the PowerVault MD3000 storage array were not turned on in the correct sequence.	To correct this issue: **1** Turn off the cluster nodes and the PowerVault MD3000 storage array. **2** Turn on the PowerVault MD3000 storage array and allow it to initialize (The blue LED on the front panel of the PowerVault MD3000 storage array must glow). **3** After the PowerVault MD3000 storage array has initialized, turn on the PowerVault NX1950 cluster nodes. The PowerVault MD3000 storage array is now detectable.
Replacing the PowerVault MD3000 storage array		For instructions on replacing the storage array, see the documentation that shipped with the PowerVault MD3000 storage array.

Table A-1.   General Cluster Troubleshooting *(continued)*

Problem Area	Probable Cause	Corrective Action
Replacing the SAS 5/E host bus adapter (HBA)		To replace the HBA, perform the following steps: **1** Turn off the cluster node and remove the cabling. **2** Replace the HBA. **3** Cable and turn on the cluster node. **4** Exit from the **Dell Storage Initialization Wizard** when it attempts to run and launch the Dell Modular Disk Storage Manager. **5** Select **Manual Discovery** and type in local host. **6** Click **Resolve topology conflict** and follow the recommended steps to resolve the conflict.
Unable to access newly created volume from Windows Explorer.	LUN was created from another node in the cluster.	Log off and log on again.
The **Dell Storage Initialization Wizard** does not register additional cluster nodes to the PowerVault MD3000 storage array.	A dummy host may be configured to the PowerVault MD3000 storage array.	For information about fixing the error, see "Dell Storage Initialization Wizard Does Not Register the Cluster Node to the PowerVault MD3000 Storage Array if a Dummy Host is Registered" on page 42.

B

Important Information

This section provides important information about Dell™ PowerVault™ NX1950 cluster solution. The following topics are discussed:

- "Deleting LUNs With Storage Manager for SANs" on page 39
- "Dell Storage Initialization Wizard and Array Name" on page 40
- "If a Node is Configured With iSCSI LUNs Before Joining the Cluster, the iSCSI Target MMC Snap-in Crashes" on page 40
- "Connection to the iSCSI LUN is Lost When a Cluster Failover Occurs" on page 40
- "Limitations While Creating a Shared LUN" on page 41
- "Dell Storage Initialization Wizard Does Not Register the Cluster Node to the PowerVault MD3000 Storage Array if a Dummy Host is Registered" on page 42
- "Assigning LUNs/Volumes to a Cluster via Storage Manager for SANs" on page 42

Deleting LUNs With Storage Manager for SANs

When you are deleting logical unit numbers (LUNs) using Storage Manager for SANs in the Integrated Solution with the PowerVault MD3000 storage array, you cannot remove the reservation for disks that are within the cluster. To work around this issue perform one of the following procedures:

- Use the PowerVault NX1950 Management Console for Storage.
  - Go to **PowerVault NX1950 Management Console**→**Share and Storage Management**.
  - Stop the sharing of the LUN.
  - Select the LUN that is not be shared and remove it.
  - Delete the LUN using the PowerVault NX1950 Management Console's Storage Manager for SANs utility.

  This is the preferred method for deleting LUNs associated with the cluster.

- Use the Cluster Administrator to delete the LUN. Start the Cluster Administrator and then change the disk associated with the cluster to offline.

    NOTE: This action reports an error message from the **PowerVault NX1950 Management Console**, but the LUN has been deleted.

Dell Storage Initialization Wizard and Array Name

The **Dell Storage Initialization Wizard** in the Integrated Solution with the PowerVault MD3000 storage array configures the cluster nodes and the storage array for the PowerVault NX1950 cluster solution. When you are configuring the cluster, ensure that the array name is persistent across both nodes. If the array name is changed on one node and the change is not replicated across the second node, the node without the change encounters Virtual Disk Service (VDS) provider issues.

If a Node is Configured With iSCSI LUNs Before Joining the Cluster, the iSCSI Target MMC Snap-in Crashes

If iSCSI LUNs are configured on your PowerVault NX1950 storage system and you are upgrading the operating system from Microsoft® Windows® Unified Data Storage Server 2003 Standard Edition to Windows Unified Data Storage Server 2003 Enterprise Edition, you must follow the procedure described in the *Dell PowerVault NX1950 Systems Important Information Guide* located on the Dell Support website at **support.dell.com**.

Connection to the iSCSI LUN is Lost When a Cluster Failover Occurs

If the Microsoft iSCSI Software Initiator is not configured properly, the network settings for the Microsoft iSCSI Target may be reset when a resource group fails. To re-establish connection to the iSCSI LUN, follow the procedure described in the *Dell PowerVault NX1950 Systems Important Information Guide* located on the Dell Support website at **support.dell.com**.

Limitations While Creating a Shared LUN

In the Integrated Solution with the PowerVault MD3000 storage array, you can use the **Provision Storage Wizard** to create LUNs. In the **Server Assignment** window, you will be prompted to assign the LUN by choosing one of the options below as shown in Figure B-1.

- **This server only**
- **All servers in this cluster**
- **Other server or cluster**

Select the default option **All servers in this cluster** and follow the instructions on the screen to create the LUN.

Figure B-1.   Provision Storage Wizard
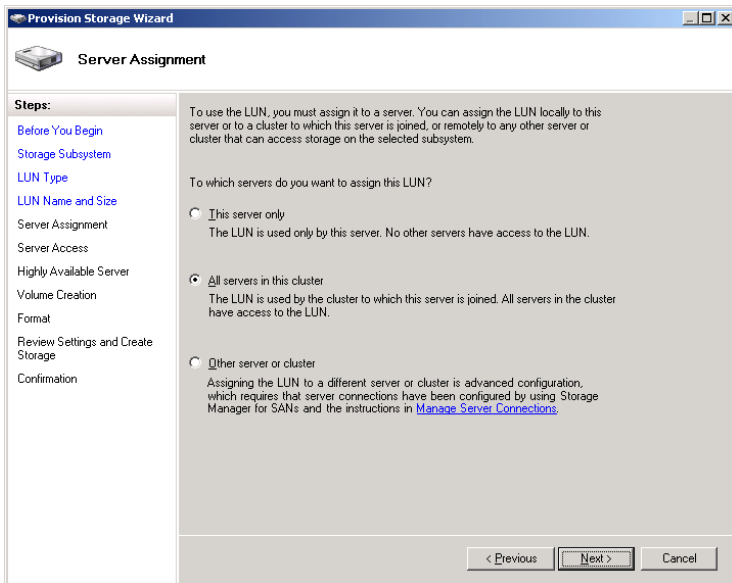
NOTICE: Selecting **This Server Only** option in the **Server Assignment** window of the **Provision Storage Wizard** when creating a LUN assigns the LUN to the cluster. You can create a private LUN manually only using the Dell PowerVault Modular Disk Storage Manager. For more information see the *Dell PowerVault Modular Disk Storage Manager User's Guide*.

Dell Storage Initialization Wizard Does Not Register the Cluster Node to the PowerVault MD3000 Storage Array if a Dummy Host is Registered

You can register a maximum of two hosts (or cluster nodes) with the PowerVault MD3000 storage array using the **Dell Storage Initialization Wizard**. The wizard does not register additional hosts after two hosts have been registered. You may encounter an error condition where you are not allowed to register an additional host even when a single physical host is registered. If you encounter this error, verify to ensure that a dummy host is not registered.

🖉 **NOTE:** A dummy host is created either when a host is renamed or when an existing host is turned off. This host is not operational but it is visible to the storage array. You can delete the dummy host from the storage array using the Dell PowerVault Modular Disk Storage Manager.

Assigning LUNs/Volumes to a Cluster via Storage Manager for SANs

The **Assign** function in Storage Manager for SANs only exposes the LUN/Volumes to the hosts and does not assign it to the cluster group. To assign the LUN/volume to a cluster group, perform the following steps:

1 Assign the LUN to the cluster.

2 Verify that the LUN has been assigned to the Host Group in **PowerVault Modular Disk Storage Manager**.

3 In **Disk Management**, verify that the disk is basic and assign it a drive letter.

4 Launch Cluster Administration by clicking **Start→Administrative Tools→ Cluster Administrator→Groups**. Right-click **Cluster Group** and select **New Resource**.

5 Enter the following required information:

– **Name**

– **Description**

– **Resource Type**: Select **Physical Disk**

– **Group**: Select **Cluster Group**

6 Click **Next**.

7 Verify that all cluster nodes are listed in the **Possible Owners** window and click **Next**.

8 Select the following dependencies:

   – **Cluster IP Address**

   – **Cluster Name**

   – **Physical Disk of Choice**

9 Click **Add** and then click **Next**.

10 Follow the instructions on the screen and then click **Finish**.

11 Right-click on **Resource** and select **Online**. The disk is now part of the cluster.

12 Refresh the **Volumes** tab under **Share and Storage Management**.

Glossary

CD
Compact Disk

Cluster
A configuration of two Dell™ PowerVault™ NX1950 storage systems and Storage Array that uses MSCS.

DRAC
Dell Remote Assistance Card

GB
Gigabyte

Gb
Gigabit

HD
Hard Drive

Host Group
A group of two or more hosts that share access to specific virtual disks on the storage array. All hosts in a host group must be running the same operating system.

iSCSI
Internet Small Computer System Interface

LUN
Logical Unit Number

MSCS
Microsoft® Cluster Services

NAS
Network Attached Storage

NAS Solution
A configuration that consists of at least one PowerVault NX1950 storage system with a PowerVault MD3000 storage array connected via SAS and Ethernet.

NIC
Network Interface Card

Node
A PowerVault NX1950 storage system that can be a member of a cluster configuration.

PCI
Peripheral Component Interface

PERC 5/i
PowerEdge Raid Controller (Internal)

RAM
Random Access Memory

SAN
Storage Area Network

SAS
Serial Attached SCSI

SAS 5/E
Dell Host Bus Adapter for Serial Attached SCSI

VDS
Virtual Disk Service

VSS
Volume Shadow Copy Service

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