Dell™ PowerVault™ NAS Fibre Channel Cluster Systems

Platform 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.**

Abbreviations and Acronyms

For a complete list of abbreviations and acronyms, see the *Dell PowerVault NAS Fibre Channel Cluster Systems Installation and Troubleshooting Guide.*

Contents

This document provides information for installing and connecting peripheral hardware, storage, and storage area network (SAN) components to your Dell™ PowerVault™ NAS Fibre Channel Cluster solution. The configuration information in this document is specific to the Microsoft® Windows® Storage Server 2003, Enterprise Edition operating system.

This document covers the following topics:

- Configuration information for installing peripheral hardware components (such as HBAs, NICs, and PCI adapter cards) in NAS cluster configurations
- Configuration rules and guidelines for direct-attached or SAN-attached configurations

NOTICE: Configurations not listed in this document may not be certified or supported by Dell or Microsoft.

NOTICE: In this guide and in other cluster documentation, the Microsoft Cluster Service (for Windows Storage Server 2003, Enterprise Edition) is also referred to as MSCS.

Supported Cluster Configurations

This section provides information about supported cluster configurations for your NAS cluster configuration.

Table 1-1 provides a list of supported cluster configurations for NAS cluster systems.

NOTE: Each cluster node must be the same system model and have two or more processors.

Table 1-1.   Supported Cluster Configurations

Supported PowerVault NAS Systems	Supported Storage Systems	Supported Cluster Interconnect HBA (for the Private Network)
770N, 775N	Dell | EMC CX600, Dell | EMC CX400, and Dell | EMC CX200	Any Ethernet NIC supported by the system **NOTE:** All nodes in the same cluster must use homogeneous (identical) Ethernet NICs for the cluster interconnect.

Obtaining More Information

See the *Dell PowerVault NAS Fibre Channel Cluster Systems Installation and Troubleshooting Guide* for a detailed list of related documentation.

High-Availability Cluster Configurations

This section provides information about the supported operating systems, HBAs, and HBA drivers for your NAS cluster configuration.

NOTICE: All cluster nodes in a NAS cluster must run the same operating system.

NOTICE: HBAs installed in NAS clusters using redundant paths must be identical. PowerVault NAS cluster configurations are tested and certified using identical HBAs installed in all cluster nodes. Using dissimilar HBAs in your cluster nodes is not supported.

HBA Support for NAS Cluster Configurations

NAS cluster nodes can use any of the following HBAs: Emulex LP9002L, Emulex LP982, Emulex LP9802, or QLogic QLA2340. See "Installing Peripheral Components in Your NAS Cluster Node PCI Slots" for PCI slot recommendations.

HBA Connectors

Only optical HBA connectors are supported.

Fibre Channel Switches

- Dual (redundant) fabric configurations are required.
- A maximum of 16 switches may be used in a SAN.
- A minimum of two and a maximum of eight Inter-Switch Links (ISLs) may exist between any two directly communicating switches. A single ISL is permitted only when connecting to a remote switch in an EMC® MirrorView™ configuration.
- A maximum of three hops (the number of ISLs that each data frame must traverse) may exist between a host and a storage system.

Rules and Guidelines

When configuring your NAS cluster, all cluster nodes must contain identical versions of the following:

- Operating systems and service packs
- Hardware drivers, firmware, or BIOS for the NICs, HBAs, and any other peripheral hardware components
- Systems management software, such as Dell OpenManage™ systems management software and EMC Navisphere® storage management software

Maximum Distance Between Cluster Nodes

- The maximum cable length allowed from an HBA to a switch, from an HBA directly connected to a storage system, or from a switch to a storage system is 300 meters using multimode fiber at 2 Gb/sec. This distance may be increased through the use of switch ISLs.

- The maximum cable length is 100 meters for Fast Ethernet and copper Gigabit Ethernet and 550 meters for optical Gigabit Ethernet. This distance may be extended using switches and VLAN technology. The maximum latency for a round-trip network packet between nodes is 500 milliseconds.

Obtaining More Information

See the *Dell PowerVault NAS Fibre Channel Cluster Systems Installation and Troubleshooting Guide* for installation instructions.

Installing Peripheral Components in Your NAS Cluster Node PCI Slots

This section provides configuration information for adding HBAs, a DRAC II or DRAC III, and RAID controllers into your NAS cluster node PCI slots.

Table 1-2 provides configuration information for PowerVault 770N and 775N cluster nodes.

⚠ **CAUTION: Only trained service technicians are authorized to remove and access any of the components inside the system. See your *System Information Guide* for complete information about safety precautions, working inside the computer, and protecting against electrostatic discharge.**

Table 1-2.   PCI Slot Assignments for NAS Cluster Nodes

PowerVault NAS System	PCI Buses	HBA	RAID Controller
770N	PCI bus 0: PCI slot 1 is 32 bit, 33 MHz. PCI/PCI-X bus 2: PCI slot 7 is 64 bit, 33/66/100/133 MHz. PCI/PCI-X bus 3: PCI slot 6 is 64 bit, 33/66/100/133 MHz. PCI/PCI-X bus 4: PCI slots 4 and 5 are 64 bit, 33/66/100 MHz. PCI/PCI-X bus 5: PCI slots 2 and 3 are 64 bit, 33/66/100 MHz. **NOTE:** If you are using expansion cards with different operating speeds, you should install the fastest card in slot 7 and the slowest card in slot 1.	For dual HBA configurations, Dell recommends installing the HBAs on separate 64-bit PCI buses to balance the load on the system.	Install in any available PCI slot, or use the integrated RAID controller on the system board.

Table 1-2. PCI Slot Assignments for NAS Cluster Nodes *(continued)*

PowerVault NAS System	PCI Buses	HBA	RAID Controller
775N	PCI/PCI-X bus 1: PCI slot 1 is 64 bit, 33/66/100 MHz. PCI/PCI-X bus 1: PCI slot 2 is 64 bit, 33/66/100/133 MHz. PCI/PCI-X bus 2: PCI slot 3 is 64 bit, 33/66/100/133 MHz. **NOTE:** PCI/PCI-X slot 1 must be empty for PCI/PCI-X slot 2 to attain an operating speed of 133 MHz.	For dual HBA configurations, Dell recommends installing the HBAs on separate PCI buses to balance the load on the system.	Install in any available PCI slot, or use the integrated RAID controller on the system board.

Attaching Your Cluster Shared Storage System in a Direct-Attach Configuration

This section provides the rules and guidelines for attaching your NAS cluster nodes to the shared storage system using a direct connection (without Fibre Channel switches).

In a direct-attach configuration, both cluster nodes are connected directly to the storage system.

Rules and Guidelines

The following rules and guidelines described in Table 1-3 apply to direct-attached clusters.

Table 1-3. Direct-Attached Clusters Rules and Guidelines

Rule/Guideline	Description
Primary storage	Each cluster can support up to 22 unique drive letters for shared logical drives. Only one storage system can be direct-attached to the cluster.
Fibre Channel HBAs	Emulex LP9002L, Emulex LP982 or LP9802, or QLogic QLA2340.
Emulex driver version	Storport miniport driver 5-1.00a15 or later.
QLogic driver version	Storport miniport driver 8.2.2.20 or later.
Operating system	Each direct-attached cluster must run Windows Storage Server 2003, Enterprise Edition.
Dell	EMC CX600 core software	2.04.0 or later; however, version 2.04.1 (EMC Access Logix™ enabled) or later is required if two clusters or a mix of clustered and nonclustered hosts are direct-attached to the CX600.

Table 1-3.   Direct-Attached Clusters Rules and Guidelines *(continued)*

Rule/Guideline	Description
Dell | EMC CX400 core software	2.04.0 or later.
Dell | EMC CX200 core software	2.04.0 or later.
Additional software application programs	EMC Navisphere Agent 6.4 or later.
	EMC Navisphere Manager 6.4 or later.
	EMC PowerPath® 3.00 (with 3.02 build 50 patch) or later.
	EMC SnapView™ version 2.10.03 or later (not supported on the Dell | EMC CX200).
	Emulex Configuration Utility version 1.41a10 or later.

Attaching Your Cluster Shared Storage System to a SAN

This section provides the rules and guidelines for attaching your NAS cluster nodes to the shared storage systems through a Dell | EMC SAN using redundant Fibre Channel switch fabrics.

Rules and Guidelines

The rules and guidelines described in Table 1-4 apply to SAN-attached clusters.

Table 1-4.   SAN-Attached Clusters Rules and Guidelines

Rule/Guideline	Description
Primary storage	Each NAS cluster can support up to 22 unique drive letters for shared logical drives.
	Up to four Dell | EMC Fibre Channel disk arrays are supported per cluster in a SAN environment.
Secondary storage	Up to two PowerVault 132T, 136T or 160T tape libraries.
	Any system attached to the SAN can share these devices.
Fibre Channel switch configuration	Redundant switch fabrics required.
Fibre Channel switch zoning	Single-initiator zoning.
Fibre Channel switches	Dell | EMC DS-16B2 (Brocade SilkWorm 3800), Brocade SilkWorm 3200, or Dell | EMC DS-24M2 (McData Spherion 4500).
Fibre Channel switch firmware	Version 3.0.2m or later for Brocade 3200 and 3800.
	Version 4.01.02 or later for McData.

Table 1-4.   SAN-Attached Clusters Rules and Guidelines *(continued)*

Rule/Guideline	Description
Fibre Channel HBAs	Emulex LP9002L, Emulex LP982, LP9802, or QLogic QLA2340.
Emulex driver version	Storport miniport driver 5-1.00a15 or later.
QLogic driver version	Storport miniport driver 8.2.2.20 or later.
Operating system	Each cluster attached to the SAN must run Windows Storage Server 2003, Enterprise Edition.
Dell	EMC CX600 core software	2.04.1 (with Access Logix and Access Control™ enabled) or later.
Dell	EMC CX400 core software	2.04.1 (with Access Logix and Access Control enabled) or later.
Dell	EMC CX200 core software	2.04.1 (with Access Logix and Access Control enabled) or later.
Additional software application programs	EMC Navisphere Agent 6.4 or later.
	EMC Navisphere Manager 6.4 or later.
	EMC PowerPath 3.00 (with 3.02 build 50 patch) applied.
	EMC MirrorView version 1.70 or later (not supported on the Dell | EMC CX200).
	EMC SnapView version 2.10.03 or later (not supported on the Dell | EMC CX200).
	Emulex Configuration Utility version 1.41a10 or later.

Obtaining More Information

See the *Dell PowerVault NAS Fibre Channel Cluster Systems Installation and Troubleshooting Guide* for more information about SAN-attached clusters. You can also go to the Dell Support website at **support.dell.com**.