# C H A P T E R  2
# *SAN Configurations*

This chapter explains the different operating system environments and configurations that you can use in your storage area network (SAN). It also introduces the SAN components and provides examples of SANs with high-level installation guidelines.

## Supported SAN Configurations

Dell supports Windows NT storage consolidation, Windows NT clustering, and Novell NetWare Storage Consolidation. Each of these operating system environments are supported on independent SANs or in separate zones on the same SAN.

### Windows NT Configurations

Table 2-1 lists the maximum Windows NT configurations that are supported by SAN 2.0.

*Table 2-1.  Supported Windows NT SAN Configurations*

| Component | Conditions/Requirements |
|---|---|
| Maximum of 10 servers running Net-Ware; a maximum of 12 servers are supported if it is a backup only SAN. | See the Release Notes on the *Dell PowerVault Fibre Channel Utilities Version 2.0* CD or the *Dell PowerVault Fibre Channel Update Version 2.0* CD for a list of supported servers. |
| Maximum of four storage nodes | A maximum total of four of the following nodes: PowerVault 35F bridge, PowerVault 650F disk processor enclosure (DPE), or PowerVault 651F DPE. |
| Maximum of four PowerVault 120T autoloaders per PowerVault 35F | Allows a maximum of 16 PowerVault 120T autoloaders per SAN. |
| Maximum of two PowerVault 130T tape libraries per PowerVault 35F | Allows a maximum of eight PowerVault 130T tape libraries per SAN. |

**Table 2-1. Supported Windows NT SAN Configurations** (continued)

| Component | Conditions/Requirements |
|---|---|
| Maximum of four Microsoft Cluster Server (MSCS) clusters | Each MSCS pair with its PowerVault 650F/651F must be in its own zone, see the latest clustering documentation for your systems. |
| Maximum of four PowerVault Fibre Channel switches per SAN | Four is the maximum number of switches for redundant configurations; two is the maximum number for non-redundant configurations. |

## Novell NetWare Configurations

NetWare 4.2 and 5.*x* with the appropriate service pack (see the Release Notes on the *Dell PowerVault Fiber Channels Utilities Version 2.0* CD for the correct service pack) are supported. See **http://support.dell.com** for the latest information about supported operating systems. Dell does not support redundant fabrics and path failover for NetWare.

The Dell OpenManage Storage Consolidation software does not support NetWare volumes. SAN requires that the administrator manually control the mounting of SAN volumes on each NetWare server.

Table 2-2 lists the maximum NetWare configurations that are supported by SAN 2.0.

**NOTICE: For volumes to be accessed by a NetWare server, the server must mount them. You can mount them by issuing the Mount command; however, most administrators place it in the autoexec.ncf file. After NetWare installation, the Mount all command is placed in the autoexec.ncf file by default. The administrator must remove this command and replace it with a series of Mount commands explicitly mounting the volumes on the SAN that should be available to the server. For instructions, see Chapter 12, "Novell NetWare Support for Dell PowerVault 6xxF Storage Systems." In the autoexec.ncf file, you must edit the `nss.nlm` line to read `nss.nlm zlss`.**

**Table 2-2. Supported Novell NetWare SAN Configurations**

| Component | Conditions/Requirements |
|---|---|
| Maximum of 10 servers running NetWare; a maximum of 12 servers are supported if it is a backup only SAN. | See the release notes on the *Dell PowerVault Fibre Channel Utilities Version 2.0* CD or the *Dell PowerVault Fibre Channel Update Version 2.0* CD for the latest list of servers and revision levels required. |
| One Windows NT system is required for managing storage | The Windows NT system must be in a LAN with a NetWare server. At least one of the SAN attached NetWare servers must run the Data Managed Node for NetWare. |

**Table 2-2. Supported Novell NetWare SAN Configurations** (continued)

| Component | Conditions/Requirements |
|---|---|
| Maximum of four storage nodes | A maximum of four of the following nodes: PowerVault 35F, PowerVault 650F, and PowerVault 651F. Because NetWare SANs are nonredundant, a PowerVault 650F and PowerVault 651F with two storage processors count as two nodes (for NetWare only). |
| Maximum of four PowerVault 120Ts per PowerVault 35F | Allows a maximum of 16 PowerVault 120Ts per SAN. |
| Maximum of two PowerVault 130Ts per PowerVault 35F | Allows a maximum of eight PowerVault 130Ts per SAN with a maximum of four drives per bridge type. |
| Maximum of two PowerVault Fibre Channel switches per SAN | Both the PowerVault 50F and the PowerVault 51F switches are supported. |

## Heterogeneous SANs

Heterogeneous SANs are SANs with multiple operating system environments. Each operating system environment must be a separate zone.

Table 2-3 lists the maximum Windows NT configurations that are supported by SAN 2.0

*NOTE: Windows NT, MSCS, and NetWare servers must all be in separate fabric zones and cannot share the same storage.*

**Table 2-3. Supported Heterogeneous SAN Configuration**

| Component | Conditions/Requirements |
|---|---|
| Maximum of 10 servers; a maximum of 12 servers are supported if it is a backup only SAN. | Each MSCS pair with its PowerVault 650F/651F must be in its own zone. All Windows NT servers running storage consolidation must be in their own zone along with their storage nodes. All NetWare servers must be in their own zone along with their associated storage nodes. NetWare 4.2 and 5.x may exist in the same zone. See the release notes located on the *Dell PowerVault Fibre Channel Utilities Version 2.0* CD or the *Dell PowerVault Fibre Channel Update Version 2.0* CD for the latest list of servers and revision levels required. |

**Table 2-3. Supported Heterogeneous SAN Configuration** (continued)

| Component | Conditions/Requirements |
|---|---|
| One Windows NT system is required for managing storage | The Windows NT system must be in a LAN with a NetWare Server, and at least one of the SAN attached NetWare Servers must run Data Managed Node for NetWare. |
| Each PowerVault 650F/651F requires one of the following:<br><br>• A SAN attached Windows NT management station within its zone<br><br>• A server running Data Managed Node within its zone and LAN attached Windows NT management station | This system is attached to the SAN via Fibre Channel.<br><br>**Windows NT zones:** Windows NT management station must be LAN-attached to a SAN-attached Windows NT server running Data Managed Node for Windows NT.<br><br>**NetWare zones:** Windows NT management station must be LAN-attached to a SAN-attached NetWare server running Data Managed Node for NetWare. *Note: The Windows NT management station may be used to manage storage in both Windows NT zones and NetWare zones concurrently.* |
| Maximum of four storage nodes | A maximum of four of the following nodes: PowerVault 35F bridge, PowerVault 650F, and PowerVault 651F. Because NetWare SANs are nonredundant, a PowerVault 650F and PowerVault 651F with two storage processors count as two nodes (for NetWare only). |
| Maximum of four PowerVault 120Ts per PowerVault 35F | Allows a maximum of 16 PowerVault 120Ts per SAN. |
| Maximum of two PowerVault 130Ts per PowerVault 35F | Allows a maximum of eight PowerVault 130Ts per SAN. |
| Maximum of four PowerVault Fibre Channel switches per SAN | Two switches per fabric allowing four switches for redundant configurations and two for nonredundant configurations. At least one PowerVault 51F per fabric is strongly recommended for its support of a zoning graphical user interface (GUI) (firmware version 2.1.*x*), see the *Dell PowerVault Systems Storage Area Network Revision Compatibility Guide*. |

# SAN Components

The following sections describe the various SAN components.

## Host Bus Adapter

Within a SAN, a host bus adapter (HBA) provides the connectivity from the host computer system to the external Fibre Channel device.

### QLA2100 and QLA2100F

The QLA2100 HBA is a high-performance, direct memory access (DMA) bus master Fibre Channel HBA designed for high-end systems. The card includes a 64-bit Peripheral Component Interconnect (PCI) 2.1 interface (fully backward compatible with 32-bit PCI systems), a reduced instruction set computing (RISC) processor, and a Fibre protocol module (FPM) with gigabit transceivers. This adapter supports copper media through a High Speed Serial Data Connector (HSSDC). For additional information, see Appendix A, "Cable Types."

The QLA2100F is a short wave optical version of the QLA2100 and provides fiber-optic connectivity from the host computer system to external storage or switches.

### QLA2200 and QLA2200F

The QLA2200 and QLA2200F HBA supports a 33-megahertz (MHz), 64-bit PCI host interface (fully backward compatible with 32-bit PCI systems), a RISC processor, a Fibre Channel protocol engine, dedicated transmit and receive frame buffers, integrated 106.25-megabytes per second (MB/sec) Fibre Channel serial transceivers, an F-port fabric login, and full-duplex operation.

The QLA2200F is an SW optical version of the QLA2200 and provides fiber optic connectivity from the host computer system to external storage or switches.

## PowerVault Fibre Channel Switches

The Dell PowerVault Fibre Channel switches (currently the PowerVault 50F and PowerVault 51F) are 8-port Fibre Channel switches for building and managing a SAN. The switch is the key component of a SAN whose primary function enables true Fibre Channel fabric configurations. The PowerVault Fibre Channel switches are necessary for PowerVault 600 family configurations that include more than two servers.

The PowerVault Fibre Channel switches allow multiple servers to access a single PowerVault Fibre Channel drive array. The Fibre Channel switch functions much like an Ethernet switch. The devices (a server, a drive array, or another switch) that are attached to the switch can all communicate with each other. Without the switch, no more than two servers can attach to the same PowerVault array, due to the number of connections on each storage processor (SP) in the Dell 650F/651F disk processor enclosure (DPE).

In a fully redundant SAN configuration, at least two switches are required. Each switch connects to one SP in the PowerVault 650F/651F DPE, and, in turn, provides access to all logical unit numbers (LUNs) bound on that SP to all servers connected to

the switch. This is also the reason each of the servers must have two HBAs installed. Each HBA connects to one switch and respectively to one SP. Due to the failover capabilities provided by the Dell OpenManage Application Transparent Failover (ATF) software, configuring this way also eliminates all cables, switches, gigabit interface controllers (GBICs), and HBAs as a single point of failure. Therefore, any one of those hardware components can fail and connectivity is maintained with no loss of data. The switch also provides the ability to add and remove devices while the SAN is operational.

### PowerVault 650F and 651F Disk Processor Enclosures

The PowerVault 650F DPE is a Fibre Channel-attached, external redundant array of independent disks (RAID) subsystem. It ships with one or two high-performance RAID controllers and up to 10 hard-disk drives. The configuration is expandable to 120 hard-disk drives with additional PowerVault 630F disk-array enclosures (DAEs). Standard features include redundant power supplies, fans, and link controller cards (LCCs).

The PowerVault 651F is a standalone deskside enclosure. The enclosure contains a PowerVault 650F DPE and a PowerVault 630F DAE, which provides a maximum of 20 hard-disk drives.

### PowerVault 35F Fibre Channel Multiport Bridge

The PowerVault 35F Fibre Channel multiport bridge is a small computer system interface (SCSI)-to-Fibre Channel protocol converter that enables SCSI-based high-voltage differential (HVD) tape libraries/autoloaders to attach to the Fibre Channel fabric and to be shared between multiple servers on the SAN.

The multiport bridge converts Fibre Channel signals from the switch into SCSI signals that the 120T digital linear tape (DLT) Autoloader or 130T DLT Library can use. It also presents the 120T DLT Autoloader or 130T DLT Library as a sharable device.

The main benefit of Fibre Channel backup is that the tape library becomes a central resource that can be shared among all servers on the SAN and data throughput is significantly faster than in a network backup. Dell SAN specific tape backup software is required to permit this sharing ability and to control access to the commonly available tape drives in this environment.

### PowerVault 130T DLT Library and 120T DLT Autoloader

The PowerVault 130T DLT*x* Library is a compact, tape-based, HVD SCSI-2 storage subsystem for data backup and restore for one or more servers and disk storage subsystems. Referred to as a DLT tape library, the PowerVault 130T features high-capacity, high throughput, data compression, automated backup capability, and reliable, accurate data restore functions.

The PowerVault 120T DLT*x* Autoloader is a fully automated, seven-tape, random access tape autoloader designed to be a more effective network backup solution than manually operated stand-alone tape drives.

*NOTE: In its current configuration, the PowerVault 130T Library and 120T Autoloader are native SCSI devices requiring conversion to Fibre Channel for attachment to the SAN through the PowerVault 35F Fibre Channel Multiport Bridge.*

# SAN Examples

The following sections describe the various SAN storage consolidation configuration examples.

## Getting the Connected Device WWNs Using the PowerVault 5xF Fibre Channel Switch Name Server Table

Zoning is required in heterogeneous SAN configurations and may be used in other configurations. Zoning uses World-Wide Names (WWNs).

You can obtain the WWNs of devices that are connected to each switch by using the **nsShow** command by using a Telnet or serial session. This command lists the contents of the name server table in the switch. The WWNs are sorted by the physical port number to which the devices are connected. (The position in the name server table listing does not identify the physical port on which the device is connected.) The WWN listing shows the port and node WWNs. This method of obtaining the WWNs is recommended if the fabric contains only PowerVault 50F switches, but it can be used for PowerVault 51F switches also.

In a fabric that has a PowerVault 51F switch (running version 2.1.*x* firmware), the name server information for the entire fabric can be accessed from the Dell Power-Vault Switch Manager application program by using a Web browser. Start the Switch Manager application program by connecting to a PowerVault 51F switch through a Web browser (see the *Dell PowerVault Switch Manager User's Guide* for more information). From the **Fabric View** page (the first page that is displayed in the browser), click the **Name Server Table** button to launch the **Name Server Table View**. The table displays the port and node WWNs of each device in the fabric, the switch to which the device is connected (identified by domain id), and the physical port on which the device is connected. The **Name Server Table View** also identifies the zone membership information for the device.

The WWN information can be used to identify the type of device that is connected to a switch.

`xx:xx:xx:60:69:xx:xx:xx` — PowerVault 5*x*F switch

`xx:xx:xx:60:16:xx:xx:xx` — PowerVault 650F storage

`xx:xx:xx:e0:8b:xx:xx:xx` — QLA2100/2200 Host Bus Adapter

`xx:xx:xx:e0:02:xx:xx:xx` — PowerVault 35F Bridge

## Windows NT Storage Consolidation SAN Example

Figure 2-1 shows a Windows NT storage consolidation SAN with nine Windows NT servers, two primary storage devices, and four backup storage devices.
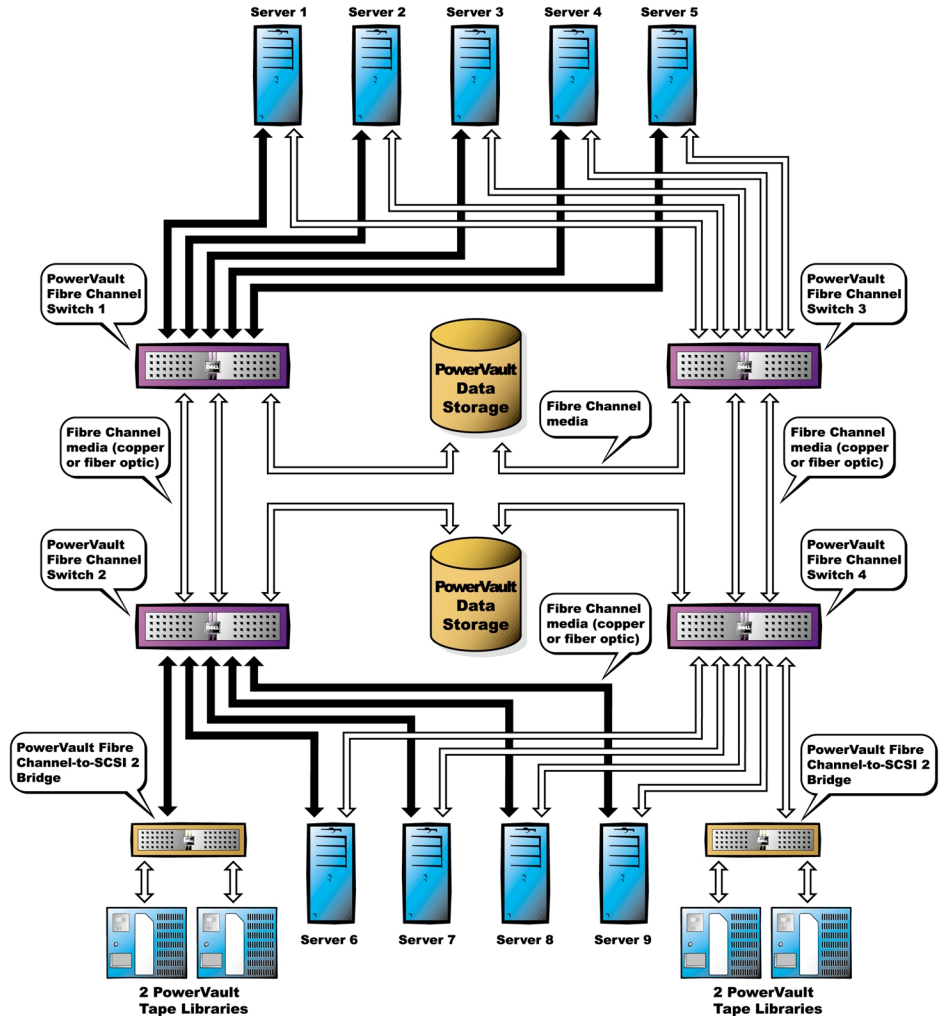
**Figure 2-1. Nine-Server Storage Consolidation With Two Storage Arrays and Four Tape Libraries**

## High-Level Installation Instructions for a Windows NT Storage Consolidation SAN

1. For all of the following devices, unpack and install all hardware (including mounting in the rack), and connect AC power and LAN cables, but do not connect any SAN cables. Check and update all firmware levels in the following components:
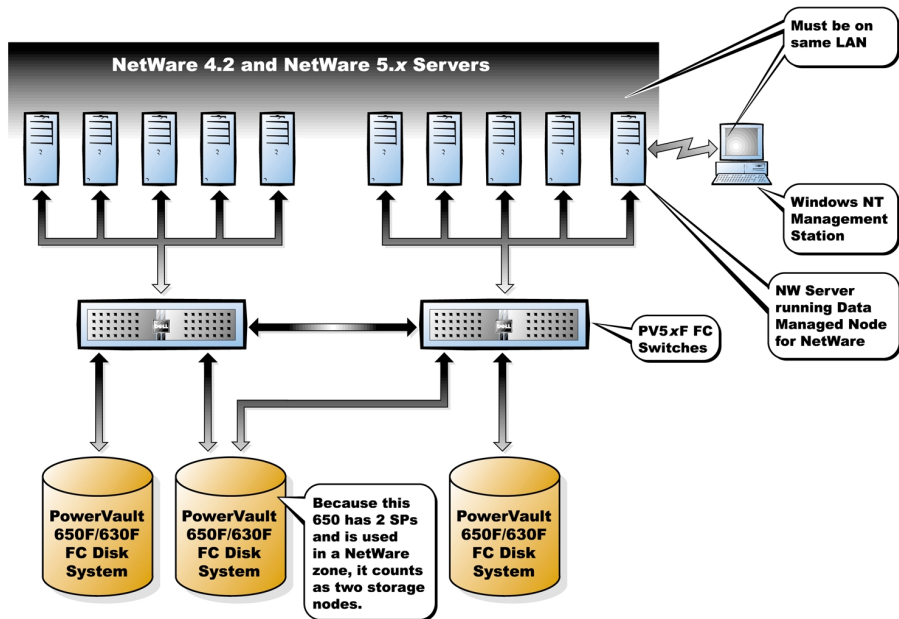
- All PowerVault 50F and PowerVault 51F Fibre Channel switches. For instructions, see Chapter 5, "Installing and Configuring PowerVault 5xF Switches."

- All PowerVault 650/651/630F storage arrays. For instructions, see Chapter 6, "Installing and Configuring the PowerVault 650F and 651F DPEs and 630F DAE."

- All PowerVault 120T tape autoloaders. For instructions, see Chapter 8, "Installing and Configuring the PowerVault 130T Tape Library/120T Autoloader."

- All PowerVault 130T tape libraries. For instructions, see Chapter 8, "Installing and Configuring the PowerVault 130T Tape Library/120T Autoloader."

- All PowerVault 35F Fibre Channel bridges. For instructions, see Chapter 7, "Installing and Configuring the PowerVault 35F Fibre Channel Multiport Bridge."

2. For all servers, perform the following functions:

   a. Unpack and install all hardware (including mounting in the rack), and connect AC power and LAN cables, but do not connect any SAN cables. For instructions, see the server documentation.

   b. Install the operating system. For instructions, see the operating system documentation.

   c. Install all Fibre Channel HBAs. For instructions, see Chapter 4, "Installing the Host Bus Adapter in the Server."

   d. Install Storage C. For instructions, see Chapter 10, "Installing and Configuring Windows NT SAN Software Components."

   e. Install QLogic drivers and BIOS, and set the execution throttle. For instructions, see Chapter 4, "Installing the Host Bus Adapter in the Server."

   f. Install ATF. For instructions, see Chapter 10, "Installing and Configuring Windows NT SAN Software Components."

3. Connect all SAN cables.

   a. Connect all SAN inter-switch links (ISLs).

   b. Connect all servers.

   c. Connect all storage array(s).

   d. Connect all bridge(s).

4. Reboot all servers.

5. Install the Data Managed Node and the Data Supervisor or the Data Administrator. For instructions, see Chapter 10, "Installing and Configuring Windows NT SAN Software Components."

6. Install the QLogic Fibre Channel Configuration Utility. For instructions, see Chapter 9, "Adding or Replacing SAN Components."

7.  Bind LUNs. For instructions, see the *Dell OpenManage Data Supervisor, Event Monitor, and Integrator Installation and Operation* guide or the *Dell OpenManage Data Administrator Installation and Operation Guide*.

8.  Reboot all servers once all LUNs have transitioned to owner status, and verify their status by using Dell OpenManage Data Supervisor or Dell OpenManage Data Administrator.

9.  Assign LUNs to servers by using Dell OpenManage Storage Consolidation. For instructions, see the *Dell OpenManage Storage Consolidation User's Guide*.

10. Install all system management software. For instructions, see Chapter 11, "Managing the SAN."

11. Install selected SAN tape backup software. For instructions, see the software documentation.

## *NetWare SAN Example*

Figure 2-2 shows a NetWare SAN with 10 NetWare servers, one Windows NT management station, and three storage devices. One of the NetWare servers on the SAN runs Data Managed Node for NetWare, which allows the Windows NT management station to manage the storage array.
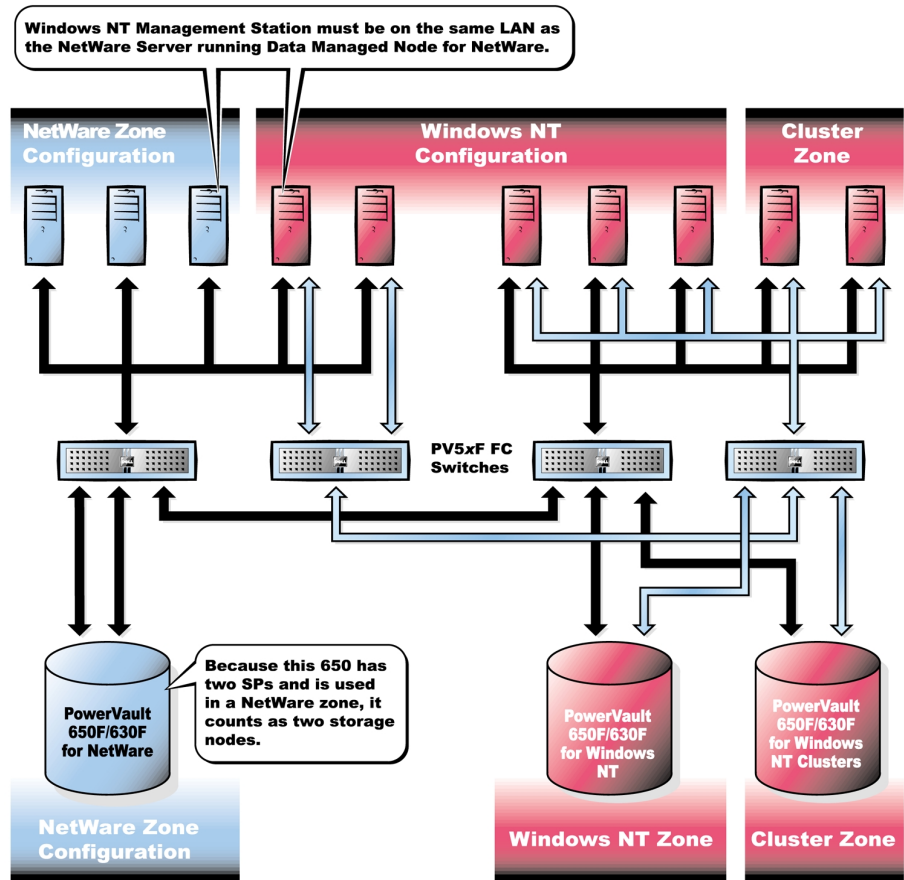


*Figure 2-2. NetWare Configuration*

## High-Level Installation Instructions for a NetWare SAN

1. For all of the following devices, unpack and install all hardware (including mounting in the rack), and connect AC power and LAN cables, but do not connect any SAN cables. Check and update all firmware levels in the following components:

   - For all PowerVault 50F and PowerVault 51F Fibre Channel switches, see Chapter 5, "Installing and Configuring PowerVault 5xF Switches."

   - For all PowerVault 650/651/630F storage arrays, see Chapter 6, "Installing and Configuring the PowerVault 650F and 651F DPEs and 630F DAE."

   - For all PowerVault 120T tape autoloaders, see Chapter 8, "Installing and Configuring the PowerVault 130T Tape Library/120T Autoloader."

   - For all PowerVault 130T tape libraries, see Chapter 8, "Installing and Configuring the PowerVault 130T Tape Library/120T Autoloader."

   - For all PowerVault 35F Fibre Channel bridges, see Chapter 7, "Installing and Configuring the PowerVault 35F Fibre Channel Multiport Bridge."

2. For all servers, perform the following functions:

   a. Unpack and install all hardware (including mounting in the rack), and connect AC power, but do not connect any LAN or SAN cables. For instructions, see the server documentation.

   b. Install the operating system. For instructions, see the operating system documentation.

   c. Install all Fibre Channel HBAs. For instructions, see Chapter 4, "Installing the Host Bus Adapter in the Server."

   d. Install QLogic drivers and BIOS, and set the execution throttle and LUNs per target. For instructions, see Chapter 4, "Installing the Host Bus Adapter in the Server."

3. Connect all SAN cables.

   a. Connect all SAN inter-switch link (ISL) cables.

   b. Connect all servers.

   c. Connect all storage array(s).

   d. Connect all bridge(s).

4.  Reboot all servers.

5.  Install the Data Managed Node for NetWare on one of the NetWare servers. For instructions, see Chapter 12, "Novell NetWare Support for Dell PowerVault 6xxF Storage Systems."

6.  Install the QLogic Fibre Channel Configuration Utility on the Windows NT management station. For instructions, see Chapter 4, "Installing the Host Bus Adapter in the Server."

7.  Install the Dell OpenManage Data Supervisor or the Dell OpenManage Data Administrator on the Windows NT management station. For instructions, see Chapter 10 "Installing and Configuring Windows NT SAN Software Components."

8.  Bind LUNs. For instructions, see the *Dell OpenManage Data Supervisor, Event Monitor, and Integrator Installation and Operation* guide or the *Dell OpenManage Data Administrator Installation and Operation Guide*.

9.  Reboot all servers.

10. Use **Mount** commands to allocate LUNs to the NetWare servers. For instructions, see Chapter 12, "Novell NetWare Support for Dell PowerVault 6xxF Storage Systems."

11. Install system management software. For instructions, see Chapter 11, "Managing the SAN."

12. Install the selected SAN tape backup software. For instructions, see the software documentation.

### *Heterogeneous SAN Example*

Figure 2-3 shows a heterogeneous storage consolidation SAN with Windows NT storage consolidation, Windows NT cluster, and NetWare 4.2 storage consolidation.

**Figure 2-3. Heterogeneous SAN Example**

## High-Level Installation Instructions for a Heterogeneous SAN

1. For all of the following devices, unpack and install all hardware (including mounting in the rack), and connect AC power and LAN cables, but do not connect any SAN cables. Check and update all firmware levels in the following components:

   - For all PowerVault 50F and PowerVault 51F Fibre Channel switches, see Chapter 5, "Installing and Configuring PowerVault 5xF Switches."

   - For all PowerVault 650/651/630F storage arrays, see Chapter 6, "Installing and Configuring the PowerVault 650F and 651F DPEs and 630F DAE."

   - For all PowerVault 120T tape autoloaders, see Chapter 8, "Installing and Configuring the PowerVault 130T Tape Library/120T Autoloader."

- For all PowerVault 130T tape libraries, see Chapter 8, "Installing and Configuring the PowerVault 130T Tape Library/120T Autoloader."

- For all PowerVault 35F Fibre Channel bridges, see Chapter 7, "Installing and Configuring the PowerVault 35F Fibre Channel Multiport Bridge."

2. For all servers, perform the following functions:

   a. Unpack and install all hardware (including mounting in the rack), and connect AC power and LAN cables, but do not connect any SAN cables. For instructions, see the server documentation.

   b. Install the Dell OpenManage Storage Consolidation software on the Windows NT storage consolidation servers. For instructions, see Chapter 10, "Installing and Configuring Windows NT SAN Software Components." (Do not load Storage C on Windows NT cluster servers or NetWare servers.)

   c. Install the operating system. For instructions, see the operating system documentation.

   d. Install all Fibre Channel HBAs. For instructions, see Chapter 4, "Installing the Host Bus Adapter in the Server."

   e. Install QLogic drivers and BIOS, and set the execution throttle and LUNs per target. For instructions, see Chapter 4, "Installing the Host Bus Adapter in the Server."

   f. Install ATF on Windows NT servers. For instructions, see Chapter 10, "Installing and Configuring Windows NT SAN Software Components."

   g. Reboot all servers.

3. Connect all SAN cables.

   *NOTE: Cable each zone separately. There will be one zone for Windows NT , one for NetWare, and one for each cluster.*

   a. Connect SAN inter-switch (ISL) cables.

   b. For Windows NT clusters, connect SAN cables for each cluster pair and that pairs storage devices one cluster at a time.

      1. Cable the cluster pair servers to the switches.

      2. Cable the 650F/651Fs associated with the cluster to the switches.

      3. Create a zone for the cluster's two servers and its storage and save the zone, add the zone to the configuration, save the configuration file, enable the configuration, and save the configuration file again. For instructions, see the *Dell PowerVault Switch Manager User's Guide* or the zoning documentation that came with your system.

      4. Reboot the cluster pair.

      5. Repeat steps 1 through 4 for each cluster.

    c.    For the Windows NT servers, do the following:

        1.    Cable the Windows NT servers to the switches.

        2.    Cable the 650F/651Fs associated with the Windows NT servers to the switches.

        3.    Create a zone for the Windows NT servers and its storage and save the zone, add the zone to the configuration, save the configuration file, enable the configuration, and save the configuration file again.

        4.    Reboot the Windows NT servers.

    d.    For the NetWare servers, do the following:

        1.    Cable the NetWare servers to the switches

        2.    Cable the 650F/651Fs associated with the NetWare servers to the switches.

        3.    Create a zone for the NetWare servers and its storage and save the zone, add the zone to the configuration, save the configuration file, enable the configuration, and save the configuration file again. For instructions, see the zoning documentation that came with your system.

        4.    Reboot the NetWare servers.

4.    Install the Data Managed Node on at least one server in each zone. For instructions, see Chapter 10, "Installing and Configuring Windows NT SAN Software Components."

5.    Install the QLogic Fibre Channel Configuration Utility on the Windows NT management station. For instructions, see Chapter 4, "Installing the Host Bus Adapter in the Server."

6.    Install the Dell OpenManage Data Supervisor or the Dell OpenManage Data Administrator on the Windows NT management station. For instructions, see Chapter 10, "Installing and Configuring Windows NT SAN Software Components."

7.    Bind LUNs. For instructions, see the *Dell OpenManage Data Supervisor, Event Monitor, and Integrator Installation and Operation* guide or the *Dell OpenManage Data Administrator Installation and Operation Guide*.

8.    Reboot servers all servers after all LUNs have transitioned to the owned state. You can verify the state by using the Dell OpenManage Data Supervisor or the Dell OpenManage Data Administrator.

9.    Configure Dell OpenManage Storage Consolidation on the Windows NT Storage Consolidation servers.

10.    Use **Mount** commands to allocate LUNs to NetWare servers. For instructions, see Chapter 12, "Novell NetWare Support for Dell PowerVault 6xxF Storage Systems."

11. Install system management software. For instructions, see Chapter 11, "Managing the SAN."

12. Install the selected SAN tape backup software. For instructions, see the software documentation.