Deployment Guide

Microsoft® Windows® Storage Server 2003 Feature Pack for Dell™ PowerVault™ NAS Systems

Guidelines for Deployment of the Feature Pack

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.**

Contents

Introduction

This guide assists in the deployment of the Microsoft® Windows® Storage Server 2003 Feature Pack on Dell™ PowerVault™ NAS systems. It includes topics such as installing the Feature Pack, moving Exchange databases and transaction logs to the Windows Storage Server computer, using Exchange database tools and applications with the Feature Pack, and troubleshooting common problems that might occur when using Feature Pack.

Overview of the Feature Pack

The Microsoft Windows Storage Server 2003 Feature Pack (Feature Pack) allows Microsoft Exchange Server 2003 databases and transaction logs to be stored on Dell PowerVault network attached storage (NAS) systems running Microsoft Windows Storage Server 2003. A single Windows Storage Server computer running the Feature Pack can host the databases and transaction logs of up to two Exchange servers and up to fifteen hundred Exchange mailboxes.

The Feature Pack installs new components on both the Windows Storage Server computer and Exchange Server 2003. These components provide tools and services that allow Exchange databases and transaction logs to be moved to a Windows Storage Server computer, and they perform the necessary configuration updates to give Exchange Server 2003 access to the remotely stored files.

Exchange database tools and applications that are currently being used by an organization can still be used in conjunction with the Feature Pack within the limitations of the Feature Pack.

Audience

The primary audience for this Deployment Guide includes:

- Network engineers who plan the components and the Feature Pack deployment.
- Exchange and storage administrators who perform the installation and are responsible for moving files to the storage server and for backing up and restoring the files.

It is assumed the reader is familiar with Exchange administration concepts, and has experience with Windows Storage Server 2003.

Scope

The Deployment Guide includes guidelines for deploying the Feature Pack in low-end, mid-level, and high-end Windows Storage Server installations, and in Exchange Server 2003 installations of either Standard or Enterprise Edition. Other topics include:

- Specific instructions for installing the Feature Pack
- Procedures for moving Exchange databases and transaction logs to the Windows Storage Server computer
- Examples of using Exchange database tools and applications with the Feature Pack
- Troubleshooting common problems that might occur when using the Feature Pack

Although the Feature Pack is used in conjunction with the Exchange server, and with Exchange tools and applications, there is no information provided in this guide about how Exchange tools and applications work or how to use Exchange Server 2003. Additional references point the reader to other documentation that is available to assist them in learning more about Exchange Server 2003.

Feature Pack Documentation

In addition to this Deployment Guide, other documentation for the Feature Pack is available in several formats.

Table 1: Additional Documentation for the Feature Pack

Type of Documentation	Description
Context-Sensitive Help for the Remote Storage Wizard	The Remote Storage Wizard on the Exchange Server is a Feature Pack tool that includes context-sensitive help topics accessible by using a Help button on each wizard page.
Context-Sensitive Web UI Help	A new task, for creating an SMB share for use with Exchange databases and transaction logs, has been added to the Shares section of the Web UI. It includes context-sensitive Help topics.
Help for Remote Storage Tools For Exchange	A stand-alone HTML Help system (.chm) is provided for the WSSExchMove.exe command-line tool.
Windows Storage Server 2003 Feature Pack Installation Guide	The Installation Guide presents hands-on procedures for immediate use during the physical installation of the software and hardware, and for the initial transfer of files to the Windows Storage Server computer. It is included in the Feature Pack Installation Package available at **support.dell.com** and is installed on both the Windows Storage Server computer and the Exchange server during the installation process.
Release Notes	The release notes include information about late-breaking bugs or workarounds for known issues. The file is included in the Feature Pack Installation Package available at **support.dell.com**.

Additional resources are cited when information exists outside this Deployment Guide that provides reference material related to the topic. For a listing of all references that are cited in the Deployment Guide, see Appendix B, "Additional Resources."

Product Support

For the latest product information and updates, see the Dell support web site at: http://support.dell.com.

For information on how to contact Dell Technical Support by phone, fax or e-mail, see: http://www.dell.com/us/en/gen/contact.htm.

CHAPTER 1

Planning a Deployment

The Microsoft Windows Storage Server 2003 Feature Pack enables organizations to consolidate Microsoft Exchange Server 2003 database and transaction logs on a single Windows Storage Server computer. This chapter describes how to plan the deployment of the Feature Pack. A thorough deployment plan is essential to minimize downtime during Feature Pack installation.

Planning Deployment of the Windows Storage Server Computer

The Feature Pack supports a total of 1,500 Exchange mailboxes on one or two active Exchange servers that are connected to one Windows Storage Server computer.
Supported configurations include:

- One or two stand-alone Exchange servers

- One or two active/passive two-node Exchange clusters

- One active/passive two-node Exchange cluster and one stand-alone Exchange server

- One active/active two-node Exchange cluster

To ensure that the Feature Pack deployment proceeds smoothly, it is important to carefully plan server and network configurations before beginning the deployment.

➡ Notice

The Feature Pack does not support NAS clusters. Do not install the Feature Pack on Dell PowerVault NAS Systems in a cluster configuration.

Windows Storage Server Deployment Scenarios

Most deployments of Windows Storage Server 2003 involve one of the following scenarios, depending upon the mailbox requirements of the system:

- Low-capacity scenario (for up to 250 mailboxes)

- Medium-capacity scenario (for up to 750 mailboxes)

- High-capacity scenario (for up to 1,500 mailboxes)

The following sections describe the recommended configuration for each of these scenarios. For both performance and security reasons, a dedicated Gigabit network is recommended for Exchange traffic between the Exchange server and the Windows Storage Server computer in all scenarios. In each scenario, the Windows Storage Server and Exchange servers must be in the same Active Directory. All disk partitions on the Windows Storage Server computer should use the NTFS file system.

📝 Note

The maximum number of Exchange mailboxes supported in a given configuration depends on variables such as network configuration as well as the frequency and type of use by the average Exchange user. The recommended number of mailboxes for each scenario is based upon the assumption that the Windows Storage Server computer (NAS system) is dedicated to the storing of Exchange databases and transaction logs. If the NAS system is also used for general-purpose user file sharing, the resulting performance impact must be taken into account when determining the proper number of maximum Exchange mailboxes for a given configuration.

Low-Capacity Scenario

The low-capacity scenario supports up to 250 mailboxes on one Exchange 2003 server.

Table 1.1   Low-Capacity Scenario for Exchange 2003

Configuration Component	Specifications
Capacity	One Exchange 2003 server and one Dell PowerVault NAS Storage Server 2003 system, supporting a total of 250 mailboxes
Windows Storage Server computer	One Dell PowerVault NAS Storage Server 2003 system 512 MB of RAM Four disk drives for storing Exchange databases One Gigabit Ethernet adapter and one 10/100 or greater Ethernet adapter
Exchange server	One Gigabit Ethernet adapter and one 10/100 or greater Ethernet adapter
Disk drive	The Exchange databases are stored on a RAID-5 volume that spans four disk drives on the Windows Storage Server computer. The Exchange transaction logs are stored on the direct attached storage (DAS) drive on the Exchange server.
Network	A dedicated network between the Exchange server and the Windows Storage Server computer that uses a crossover cable A 10/100 Ethernet hub connects the Exchange server, the Windows Storage Server computer, the domain controller, and client computers

Figure 1.1   Recommended Configuration for the Low-Capacity Scenario
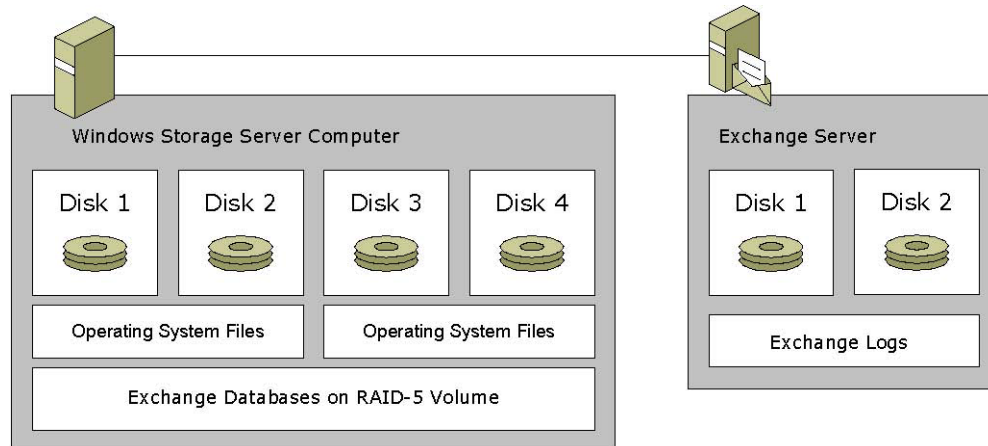
Low-Capacity Disk Drive Configuration

In the low-capacity scenario, the Exchange databases are stored on a RAID-5 volume that spans four disk drives on the Windows Storage Server computer.

File transfers are most efficient when Exchange databases and transaction logs are stored separately, as shown in Figure 1.1. Store Exchange databases on the Windows Storage Server computer, and store transaction logs on the direct attached storage (DAS) drive on the Exchange server. Physically separating the transaction logs and databases adheres to Exchange best practices and ensures that the writing of transaction logs does not interfere with the writing of the databases.

➡ **Notice**
It is not recommended to store Exchange databases and transaction logs on the same disk drive on the Windows Storage Server computer. This configuration degrades disk performance and leaves the server vulnerable to data loss in the event of physical disk corruption. Because corruption of the disk damages both the Exchange databases and the transaction logs, a recovery operation can restore only data from the last successful backup. All data stored after the last backup is lost.

Low-Capacity Network Configuration

As shown in Figure 1.1, a crossover cable connects the Windows Storage Server computer and the Exchange server across a dedicated network in the low-capacity scenario.

Medium-Capacity Scenario

The medium-capacity scenario supports up to 750 mailboxes on one Exchange 2003 server.

Table 1.2 Medium-Capacity Scenario for Exchange 2003

Configuration Component	Specifications
Capacity	One Exchange 2003 server and one Dell PowerVault NAS Storage Server 2003 system, supporting a total of 750 mailboxes
Windows Storage Server computer	One Dell PowerVault NAS Storage Server 2003 system with an optional PowerVault 220S / 221S External Storage Array 1 GB of RAM Four disk drives for storing Exchange databases Two disk drives for storing Exchange transaction logs (if available) One Gigabit Ethernet adapter and one 10/100 or greater Ethernet adapter
Exchange server	One Gigabit Ethernet adapter and one 10/100 or greater Ethernet adapter
Disk drive configuration	The Exchange databases are stored on a RAID-5 volume that spans four disk drives on the Windows Storage Server computer. The Exchange transaction logs are stored on the direct attached storage (DAS) drive on the Exchange server. -Or- Exchange databases and transaction logs stored on separate RAID volumes that span separate disk arrays (if available) on the Windows Storage Server computer
Network	A dedicated Gigabit network between the Exchange server and the Windows Storage Server computer A 10/100 Ethernet hub connects the Exchange server, the Windows Storage Server computer, the domain controller, and client computers

Figure 1.2 Recommended Configuration for the Medium-Capacity Scenario
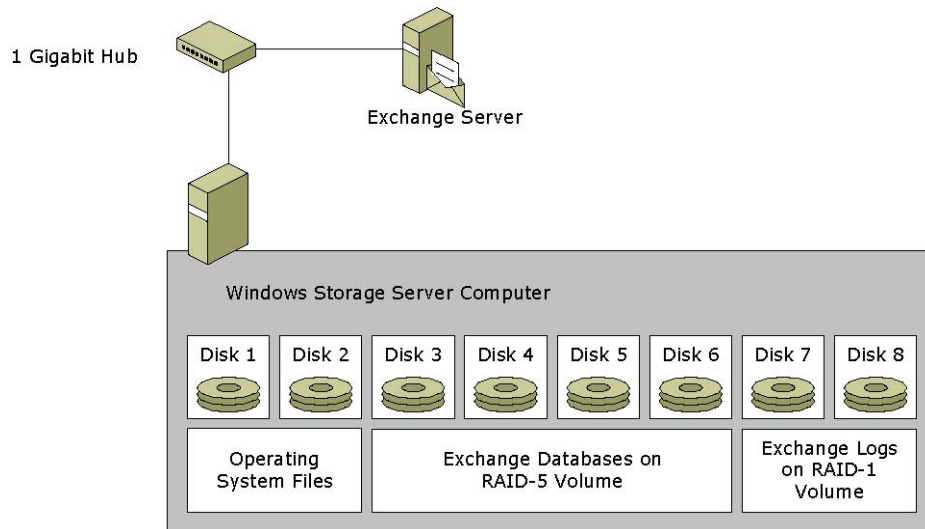
Medium-Capacity Disk Drive Configuration

The medium-capacity disk drive configuration stores the Exchange databases on a RAID-5 volume that spans four disk drives on the Windows Storage Server computer.

-Or-

The medium-capacity disk drive configuration stores the Exchange databases and transaction logs on separate RAID volumes that span separate disk arrays (if available) on the Windows Storage Server computer. This configuration conforms with Exchange best practices guidelines.

Medium-Capacity Network Configuration

As shown in Figure 1.2, the dedicated Gigabit network controls the traffic between the Windows Storage Server computer and the Exchange server.

High-Capacity Scenario

The high-capacity scenario supports up to a total of 1,500 mailboxes on one or two Exchange 2003 servers.

Table 1.3   High-Capacity Scenario for Exchange 2003

Configuration Component	Specifications
Capacity	One or two Exchange 2003 servers, and one Dell PowerVault NAS Storage Server 2003 system, supporting a total of 1,500 mailboxes
Windows Storage Server computer	One Dell PowerVault NAS Storage Server 2003 system with an attached PowerVault 220S / 221S External Storage Array, or a supported Dell/EMC fibre channel RAID Array 2 GB of RAM Six disk drives for storing Exchange databases Two disk drives for storing Exchange transaction logs for first storage group Two disk drives for storing Exchange transaction logs for second storage group One Gigabit Ethernet adapter and one 10/100 or greater Ethernet adapter
Exchange server	One Gigabit Ethernet adapter and one 10/100 or greater Ethernet adapter
Disk drive	Transaction logs for each storage group and Exchange databases for combined storage groups stored on separate RAID volumes that span separate disk arrays on the Windows Storage Server computer
Network	A dedicated network between the Exchange servers and the Windows Storage Server computer that uses a Gigabit switch with a virtual private local area network (LAN) A 10/100 Ethernet hub that connects the Exchange servers, the Windows Storage Server computer, the domain controller, and client computers

Figure 1.3 Recommended Configuration for the High-Capacity Scenario
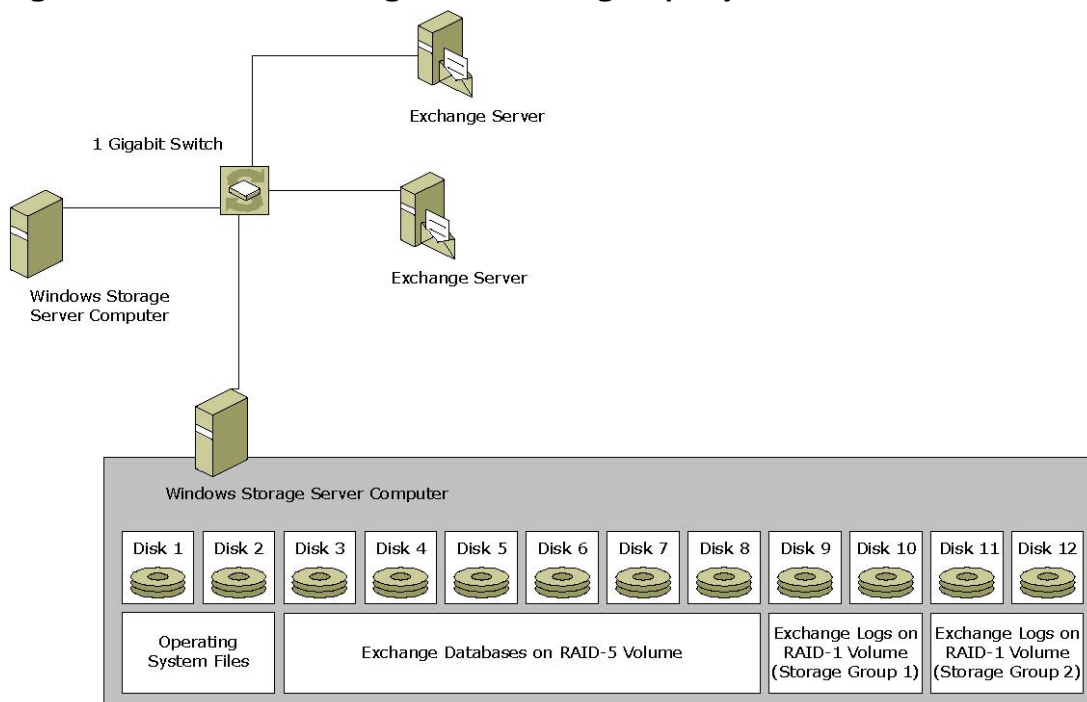
High-Capacity Disk Drive Configuration

The disks are configured according to Exchange best practices, in which the Exchange databases and transaction logs for each storage group are stored on separate RAID volumes that span separate disk arrays on the Windows Storage Server computer.

High-Capacity Network Configuration

In the high-capacity scenario shown in Figure 1.3, the dedicated network uses a Gigabit switch with a private local area network (LAN) between the Windows Storage Server computer and the Exchange server. This configuration ensures that communication between the servers can use the full network bandwidth.

Planning Deployment of the Exchange Server

This section describes the key areas to address when planning an Exchange deployment with the Feature Pack.

Planning the Network Topology

The following is the recommended configuration for the network between the Windows Storage Server computer and each Exchange server or Exchange cluster:

- A dedicated Gigabit network.

- At least two network adapters in *each* server or cluster:

  One network adapter supports the dedicated Gigabit network for Exchange traffic between the Exchange server and the Windows Storage Server computer. The hosts files on both the Exchange server and the Windows Storage Server computer are edited to use that network. For more information about editing the hosts file, see Chapter 2, "Installing the Feature Pack."

  One network adapter is used to connect the Exchange server to the public network and the Active Directory directory service.

> **Note**
> The Windows Storage Server computer and the Exchange 2003 servers must be in the same Active Directory domain.

The Feature Pack supports the following Exchange server configurations:

- One or two stand-alone Exchange servers
- One or two clustered Exchange servers
- One stand-alone Exchange server and one Exchange server cluster

Figure 1.4 shows a network topology for one Windows Storage Server computer that hosts databases and transaction logs for two stand-alone Exchange servers. For each Exchange server, a dedicated network handles Exchange traffic to and from the Windows Storage Server computer.

Figure 1.4 Sample Network Topology for One Windows Storage Server Computer Hosting Storage Groups for Two Stand-Alone Exchange Servers
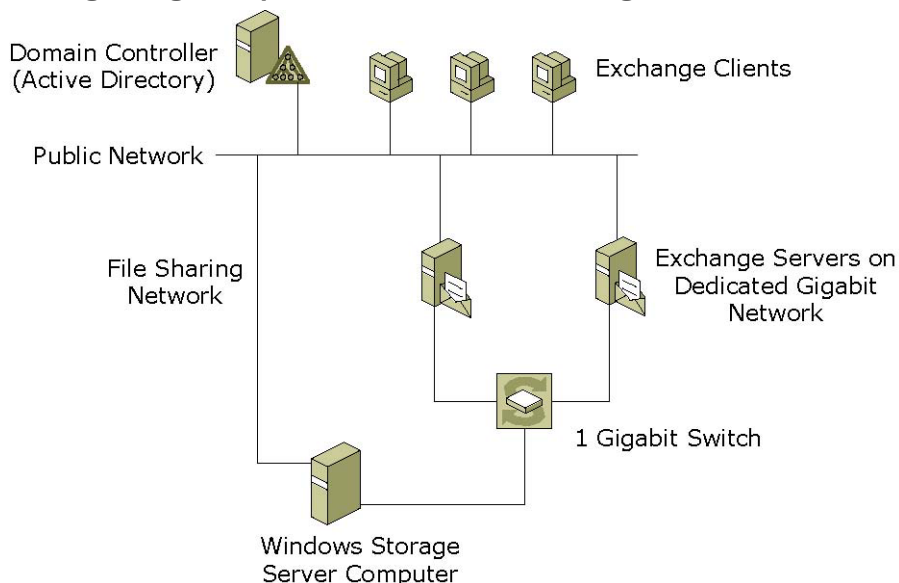
Planning the Move to the Windows Storage Server Computer

Deploying the Feature Pack on Exchange Server 2003 involves deploying the Exchange Server 2003 computer and then moving the Exchange databases and transaction logs to the Windows Storage Server computer. The Exchange server deployed can be a new Exchange Server 2003 computer, an existing Exchange Server 2003 computer, or an upgrade from Exchange 2000 Server to Exchange Server 2003.

Options for Moving Files

After the Exchange server is deployed, two options are available for moving the Exchange database to the Windows Storage Server computer:

- Move the existing Exchange database to the Windows Storage Server computer.
- Create a new Exchange database, move the new database to the Windows Storage Server computer, then move existing Exchange mailboxes to the new database.

Advantages of moving an existing Exchange database include:

- Less labor for the administrator; the remote storage tools included in the Feature Pack perform all required steps automatically.
- Less administrator time required to complete the move.

Advantages of creating a new Exchange database include:

- Improved Exchange server performance; a new database uses disk space more efficiently than a database that has been in use for some time.
- The ability to test the deployment with a small subset of users.
- Less down time per user; each mailbox remains offline for only the time it takes to move that mailbox.

Deploying the Feature Pack with Exchange Server 2003 requires the following steps:

1. Deploy the Exchange Server 2003 computer.

> **If a new Exchange Server 2003 computer is being deployed:** Perform the Exchange Server 2003 installation on the target computer.

> **If an existing Exchange Server 2003 computer is being deployed:** Perform a full backup of the Exchange database to minimize the size of transaction logs.

> **If an upgrade from Exchange 2000 Server is being deployed:** Perform a full backup of the Exchange database, then perform the upgrade from Exchange 2000 Server to Exchange Server 2003 on the target computer.

2. Move the Exchange database to the Windows Storage Server computer by taking the following steps:

> **If an existing Exchange database is being moved:** Using either of the remote storage tools included in the Feature Pack, move the existing Exchange database to the Windows Storage Server computer.

> **If a new Exchange database is being created:**

> > **a.** Using Exchange System Manager, create a new database on the Exchange server.

> > **b.** Using either of the remote storage tools included in the Feature Pack, move the new Exchange database to the Windows Storage Server computer.

> > **c.** Using Move Mailbox in Exchange System Manager, move existing Exchange mailboxes to the new Exchange database on the Windows Storage Server 2003 computer.

For complete instructions for moving the Exchange database, see Chapter 3, "Moving Exchange Files to a NAS System."

Estimating File Transfer Times

To estimate how long it will take to move Exchange files from the Exchange server to the Windows Storage Server computer, take an inventory of files to be moved, compute the total amount of disk space used by the files, and divide by the file transfer rate. Assuming the use of a recommended configuration, including a dedicated network between the Exchange server and the Windows Storage Server computer, use a file transfer rate of 720 MB per minute. If a recommended configuration is not being used, the file transfer rate is slower.

Table 1.4 provides an example for estimating file transfer time.

> ✐ **Note**
> The data used in the following example represents a new server running Exchange Server 2003.

Table 1.4   Sample File Transfer Time Estimate

File Type	Quantity	Size	Bytes (Approximate)
Exchange database (.edb)	1	6.14 GB	6,593,000,000
Streaming database (.stm)	1	2 MB	2,097,000
Transaction logs	1,375	6.71 GB	7,205,000,000
			Total = 13,800,097,000
File transfer rate is approximately 755,000,000 bytes per minute. 13,800,097,000/ 755,000,000 = ~18 File transfer time is approximately 18 minutes.			

Because Exchange Server 2003 Standard Edition limits database size to 16 MB, file transfer from Standard Edition generally takes fewer than 30 minutes. Because Exchange Server 2003 Enterprise Edition does not limit database size, file transfer from Enterprise Edition can take considerably more time.

Planning Exchange Cluster Configuration

The Feature Pack supports the following Exchange server cluster configurations:

- One or two 2-node active/passive Exchange clusters
- One 2-node active/passive Exchange cluster and one stand-alone Exchange server
- One 2-node active/active Exchange cluster

Active/passive clusters are recommended over active/active clusters, because they typically increase performance, availability, and scalability.

This section provides an overview of the basic requirements for deploying the Windows Storage Server computer with an Exchange server cluster.

➡ **Notice**

The Feature Pack does not support NAS clusters. Do not install the Feature Pack on Dell PowerVault NAS Systems in a cluster configuration.

For more information about Exchange clusters, including cluster capacity and configuration considerations, see the *Microsoft Exchange Server 2003 Deployment Guide* and the white paper, *Using Clustering with Exchange 2003: An Example*, on the Exchange 2003 Deployment website *(*http://go.microsoft.com/fwlink/?LinkId=23412).

For information about how to administer and manage Exchange server clusters, see the *Microsoft Exchange Server 2003 Administration* Guide on the Microsoft TechNet site (http://go.microsoft.com/fwlink/?LinkId=21769).

Remotely Storing Files from an Active/Passive Exchange Cluster

The Feature Pack supports one or two 2-node active/passive Exchange clusters per Windows Storage Server computer, as shown in Figure 1.5. In the supported configuration, no more than two Exchange servers — one from each cluster — access the Windows Storage Server computer at any time. In each cluster, the passive server accesses the Windows Storage Server computer only if the active server fails.

This configuration requires a dedicated Gigabit Ethernet connection between each Exchange 2003 active/passive cluster and the Windows Storage Server computer. A dedicated Gigabit Ethernet connection is either a direct point-to-point connection, or is implemented through a

switch that supports virtual LANs (VLANs). A separate connection to the public network is required for access to Active Directory and, optionally, to provide client access for general-purpose file sharing.

Figure 1.5   Topology with Two 2-Node Active/Passive Exchange Server Clusters
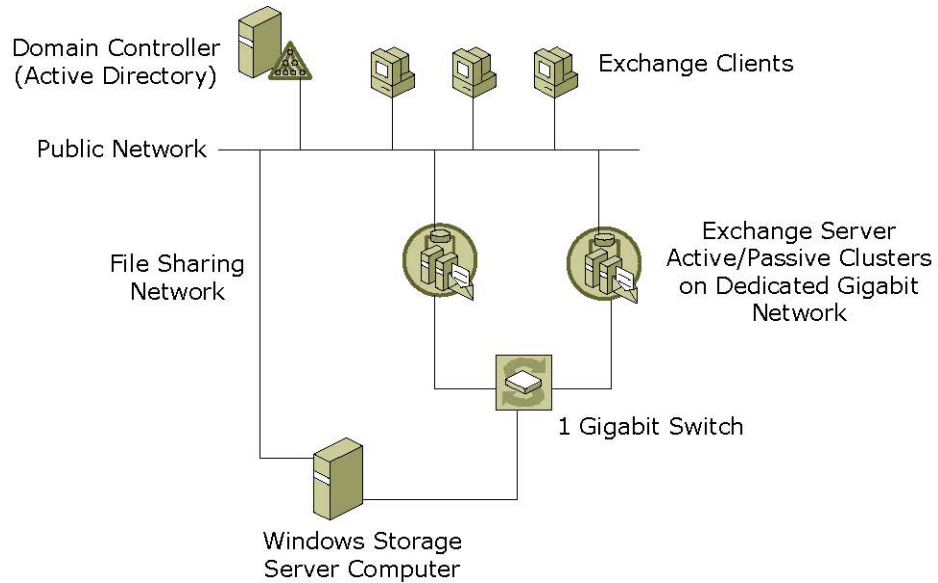
The Feature Pack also supports one 2-node active/passive Exchange cluster and one stand-alone Exchange server, as shown in Figure 1.6.

Figure 1.6 Topology with One Stand-Alone Exchange Server and One 2-Node Active/Passive Exchange Server Cluster
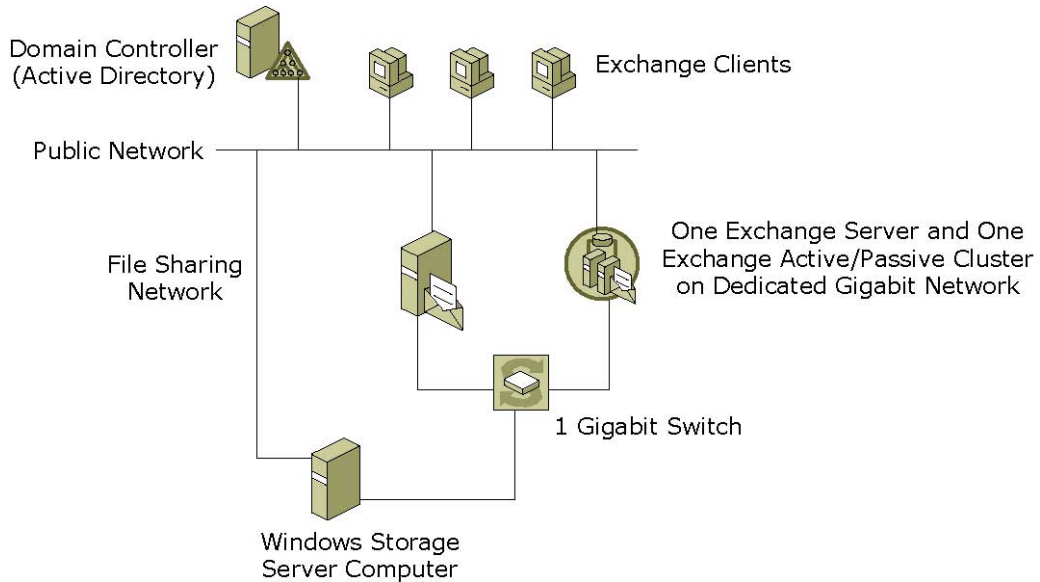
Remotely Storing Files from an Active/Active Exchange Cluster

The Feature Pack supports one active/active Exchange cluster, as shown in Figure 1.7. In the supported configuration, both Exchange servers in the cluster are active and access the Windows Storage Server computer at the same time. If one of the cluster nodes fails, the storage group operations of the failed node are handled by the other node, thereby preventing loss of service.

A dedicated Gigabit Ethernet connection is recommended between each Exchange 2003 server and the Windows Storage Server computer. A dedicated Gigabit Ethernet connection is either a direct point-to-point connection, or is implemented through a switch that supports virtual LANs (VLANs). A separate connection to the public network is required for access to Active Directory and, optionally, to provide client access for general-purpose file sharing.

Figure 1.7 Topology with One 2-Node Active/Active Exchange Server Cluster
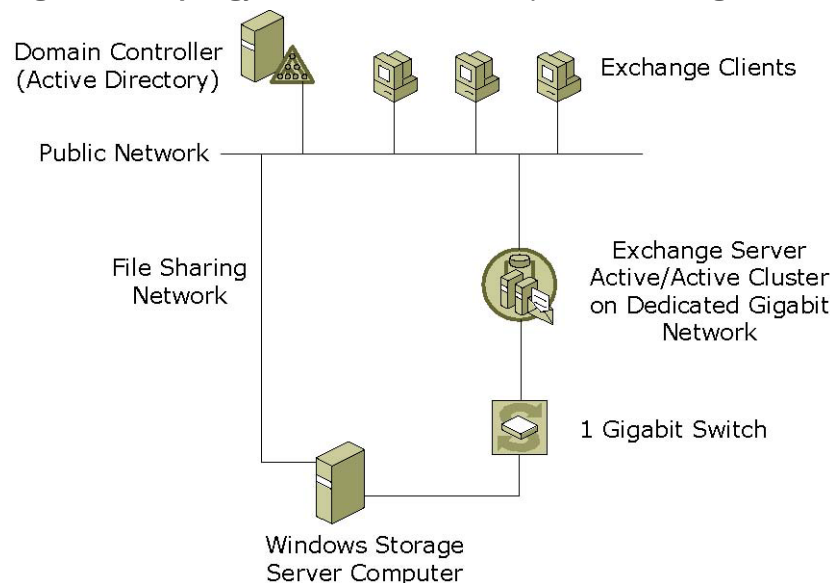
Planning for Security

Moving Exchange databases and transaction logs to a Windows Storage Server computer requires the Exchange server to access its data over a network connection. It is therefore important to verify the security of that connection. A dedicated Gigabit network for Exchange traffic is strongly recommended to help prevent network sniffing of Exchange data.

Additionally, the Server Message Block (SMB) share used to host the Exchange databases and transaction logs on the Windows Storage Server computer must be locked down to ensure data security. Limiting access to this share to the minimum number of administrators, backup operators, and Exchange servers required is strongly recommended.

♦ Important

> SMB shares that are created using the Win32 user interface grant Read permissions to the Everyone group by default. To ensure data security, this permission setting must be removed on shares that are used to host the Exchange databases and transaction logs.

For additional information about Exchange server security requirements, see "Planning an Exchange Server 2003 Messaging System" (http://go.microsoft.com/fwlink/?LinkId=23131).

CHAPTER 2

Installing the Feature Pack

This chapter provides instructions for installing the Feature Pack on both the Windows Storage Server computer and the server that is running Microsoft Exchange Server 2003. It describes the components that the Feature Pack installs on each server. These components provide tools and services that allow you to store Exchange databases and transaction logs on a Windows Storage Server computer. This chapter also provides instructions for uninstalling the Feature Pack.

Components Installed with the Feature Pack

The Feature Pack adds new components to both the Windows Storage Server computer and the Exchange server.

Windows Storage Server Computer

The Feature Pack installation procedure:

- Adds a New Share for Exchange Files task to the Microsoft Web User Interface for Windows Server Administration (Web UI). The new task allows an administrator to easily create and manage the shares that host Exchange databases and transaction logs.

- Creates a folder on the Windows Storage Server computer that contains the setup and installation files that the customer will use to install the Feature Pack on the Exchange server.

- Installs a copy of the *Windows Storage Server 2003 Feature Pack Installation Guide*, located in %ProgramFiles%\Windows Storage Server\Exchange\Installation_Guide.doc.

Exchange Server

The Feature Pack installation procedure installs three components on the Exchange server: two remote storage tools — the Remote Storage Wizard and the WSSExchMove.exe command line tool — and the Windows Storage Server Mapping Service (WSSExchMapSvc). Documentation for the Feature pack is installed on the Exchange server.

- The Remote Storage Wizard moves the databases and transaction logs for an Exchange storage group to a Windows Storage Server computer and performs the configuration updates that are required for Exchange to access the files.

- The WSSExchMove.exe command-line tool offers the same capabilities as the Remote Storage Wizard, as well as a few additional features, such as the ability to script an unattended move and to copy the Exchange files to their destination locations without deleting the original files.

- The Windows Storage Server Mapping Service (WSSExchMapSvc):

    - Creates a mapped drive during the initial installation. The drive is used with Exchange shares that are stored on Windows Storage Server computers.

    - Verifies the existence of the DFS root, DFS links, and share access after each restart of the Exchange server and each time Windows Storage Server Mapping Service is started.

    - Recreates the mapped drive, if required, after the Exchange server or the Windows Storage Server Mapping Service is restarted. The service starts automatically whenever the Exchange server is restarted. This allows the administrator to stop and restart the Exchange server without manually locating and starting the Windows Storage Server Mapping Service. The verification process and mapped drive creation process run to completion as soon as the service starts. The service shuts down five minutes after these processes complete.

- The documentation that is installed includes:

    - Windows Storage Server 2003 Feature Pack Installation Guide, located in %ProgramFiles%\Windows Storage Server\Exchange\Installation_Guide.doc.

    - Help for Remote Storage Tools for Exchange, located in %ProgramFiles%\Windows Storage Server\Exchange\RemoteStorage.chm.

Drive Mapping on the Exchange Server

The Feature Pack works with Exchange tools and services to enable the Exchange server to access remotely stored databases and transaction logs on the Windows Storage Server computer. The Distributed File System (DFS) sets up and provides access to the paths for remotely stored files and folders.

Using a Stand-Alone DFS for Local Drive Mapping

DFS is a service of Microsoft Windows Server 2003 and Microsoft Windows 2000 Server that makes it easier to manage distributed resources. The DFS service provides the consolidated drive mapping and links that are required to access remotely stored Exchange databases and transaction logs on a Windows Storage Server computer.

The Exchange server accepts only mapped drives as valid paths for remote locations. Exchange cannot find databases and transaction logs that are stored in shared folders on the Windows Storage Server computer unless the shared folders are mapped to a local drive. To provide a manageable solution, the Feature Pack consolidates all drive mappings for Exchange shares that are hosted on Windows Storage Server computers into a single, stand-alone DFS root on the local Exchange server. The drive letter is mapped to the DFS root, and the links for all Exchange shares are created under the DFS root. The stand-alone DFS keeps configuration information in the local registry of the host server.

When the Feature Pack is installed on the Exchange server, a mapped drive is created, which maps to the stand-alone DFS root. By default, the S: drive is used. If that drive letter is already in use, the next available drive letter is assigned.

The DFS root is named based on the mapped drive letter. If the S: drive is used, the DFS root is named S$. The folder for the DFS root is located in %ProgramFiles%\Windows Storage Server\Exchange\.

Figure 2.1 shows how a path that is stored in Microsoft Windows Server 2003 Active Directory directory service and used by the Microsoft Exchange Information Store service is mapped to a UNC path for a shared folder on the Windows Storage Server computer.

Figure 2.1   How the Network Address for a Remotely Stored Exchange File Is Mapped to a Local Drive on the Exchange Server
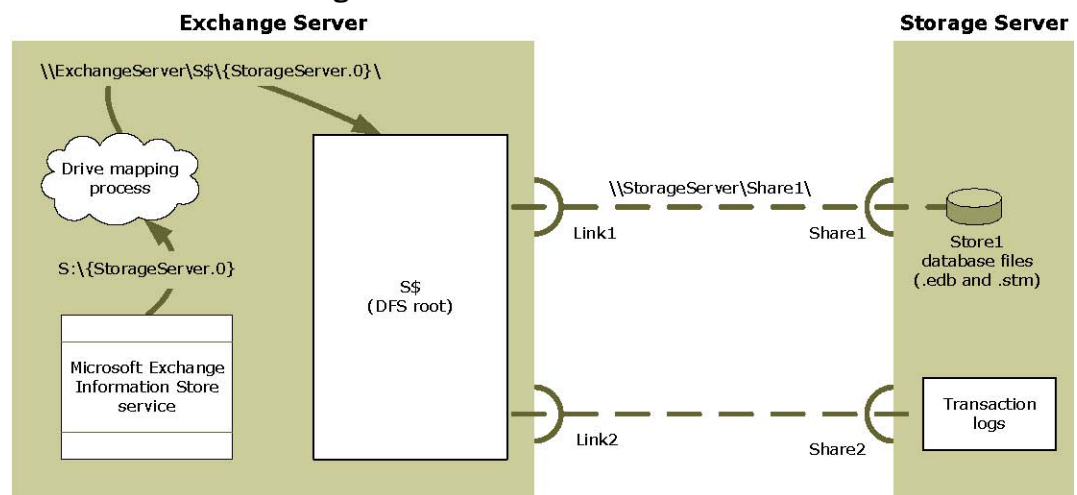
Table 2.1 explains how network addresses for remotely stored Exchange files are mapped to a local drive on the Exchange server by different services on the Exchange server. For a full discussion of how link names and link targets relate to the current location and the Active Directory location of remotely stored Exchange database files and transaction logs, see Appendix A, "Interpreting the Detailed Report Log File."

Table 2.1   Drive Mapping for the {StorageServer.0} DFS Link

Address	Explanation of Address
S:\{StorageServer.0}\	A mapped drive representation of the UNC path. This is the address that is stored in Active Directory and used by the Microsoft Exchange Information Store Service where: S: is a mapped drive that is mapped to \\Exchange Server\S$
\\ExchangeServer\S$\{StorageServer.0}\	The drive mapping process expands the mapped drive path, where: ExchangeServer is the name of the Exchange server. S$ is the target of the mapped drive S:, which is also the name of the stand-alone DFS root. {StorageServer.0} is the link name. The link associates a link name with a link target, which identifies the UNC path to the remote share that the link represents.
\\StorageServer\Share1	DFS replaces the expanded mapped drive path with the UNC path.

On the local Exchange server, Windows Storage Server Mapping Service ensures that the required drive mapping exists to allow Exchange to locate the remotely stored databases and transaction logs. When the Exchange server is started, Windows Storage Server Mapping Service verifies that the DFS root exists, that there is a DFS link for each share, and that there is access to the shares. If necessary, Windows Storage Server Mapping Service recreates the mapped drive.

Note
If the Exchange Server is installed on any edition of Windows 2000 Server or on Windows Server 2003, Standard Edition, only one local DFS root is allowed. If a DFS root was previously created, a DFS root cannot be created for the Feature Pack; the installation will not complete successfully.

DFS Configuration for an Exchange Cluster

The Feature Pack must be installed on each server in Exchange clusters.

Each cluster node has a separate mapped drive and DFS root. When the Feature Pack is installed on an Exchange server that is clustered, the DFS root and mapped drive are created and the DFS information is stored in the Cluster key of the registry. The DFS root and registry information is then replicated between cluster nodes so that both nodes use the same configuration. When the Feature Pack is installed on the second node of the Exchange cluster, the DFS root and registry information already exist and do not need to be recreated.

Note
The Feature Pack does not support Windows Storage Server clusters.

For more information about using the Feature Pack with Exchange server clusters, see Chapter 1, "Planning a Deployment."

Procedures for Installing the Feature Pack

The installation involves the following tasks:

1. Ensuring that installation requirements are met.

2. Setting up and configuring a dedicated network for Exchange database traffic (recommended).

3. Editing the hosts files on the Exchange server and Windows Storage Server computer to use the dedicated network.

4. Configuring the disk drives on the Windows Storage Server computer.

5. Installing the Feature Pack on the Windows Storage Server computer.

6. Creating a Server Message Block (SMB) share for the folder on the Windows Storage Server computer containing the setup files that are required to perform the installation on the Exchange server.

7. Installing the Feature Pack on the Exchange server from the SMB share on the Windows Storage Server computer.

Each of these tasks is described in detail in the following sections.

Meeting Installation Requirements

The installation of the Feature Pack on Exchange servers and in Exchange clusters requires specific hardware and software, as well as the use of Active Directory on each Exchange server.

Hardware Requirements

It is recommended that each Exchange server have at least 2 network adapters:

- One Gigabit adapter that is used to support the dedicated Gigabit network
- One adapter that is used to connect the Exchange server to the public network and to Active Directory

Software Requirements

Exchange server:

- The Exchange server must be running Microsoft Windows Server 2000 Service Pack 4 (or later) or Microsoft Windows Server 2003 (or later) with Exchange Server 2003.
- A DFS root and a drive letter must be available on the Exchange server.

  > ✎ **Note**
  >
  > If the Exchange Server is installed on any edition of Windows 2000 Server or on Windows Server 2003, Standard Edition, only one local DFS root is allowed. If a DFS root was previously created, a DFS root cannot be created for the Feature Pack and the installation will not complete successfully.

Windows Storage Server computer:

- The Windows Storage Server computer must be running Microsoft Windows Storage Server 2003.
- The Windows Storage Server computer must be a stand-alone NAS system. NAS clusters are not supported.

Active Directory Requirement

The Windows Storage Server computer, the Exchange server, and the Active Directory domain controller must be in the same domain.

Using a Dedicated Network

A dedicated network between the Exchange server and the Windows Storage Server computer is recommended to handle Exchange database traffic between the two computers. A second network adapter in each server is used to connect to the public network and to Active Directory.

For more information about setting up the dedicated network, see "Setting Up the Dedicated Network" later in this chapter.

Installing the Feature Pack on an Exchange Cluster

The Feature Pack must be installed on each Exchange server that uses a Windows Storage Server computer to host its databases or transaction logs. If the Exchange servers are clustered, the Feature Pack must be installed on each Exchange server in the cluster. For more information about using the Feature Pack in an Exchange server cluster, see Chapter 1, "Planning a Deployment."

Setting Up the Dedicated Network

Using the Feature Pack to remotely store Exchange databases and transaction logs requires that Exchange data travel over a network connection between the Exchange server and the Windows Storage Server computer. It is recommended that a dedicated network be used to handle Exchange database traffic between the Exchange server and the Windows Storage Server computer.

The recommended configuration for the network between the Exchange server and the Windows Storage Server computer consists of:

- A dedicated Gigabit network

- At least two network adapters in both the Windows Storage Server computer and the Exchange server:

  - One network adapter that supports the dedicated Gigabit network for Exchange traffic between the Exchange server and the Windows Storage Server computer

  - One network adapter that is used to connect the Exchange server to the public network and to Active Directory

Figure 2.2 shows a network topology for a single Windows Storage Server computer that hosts databases and log files for two Exchange servers. For each Exchange server, a dedicated network handles Exchange database traffic to and from the Windows Storage Server computer.

Figure 2.2   Sample Network Topology for a Single Windows Storage Server Computer Hosting Storage Groups for Two Exchange Servers
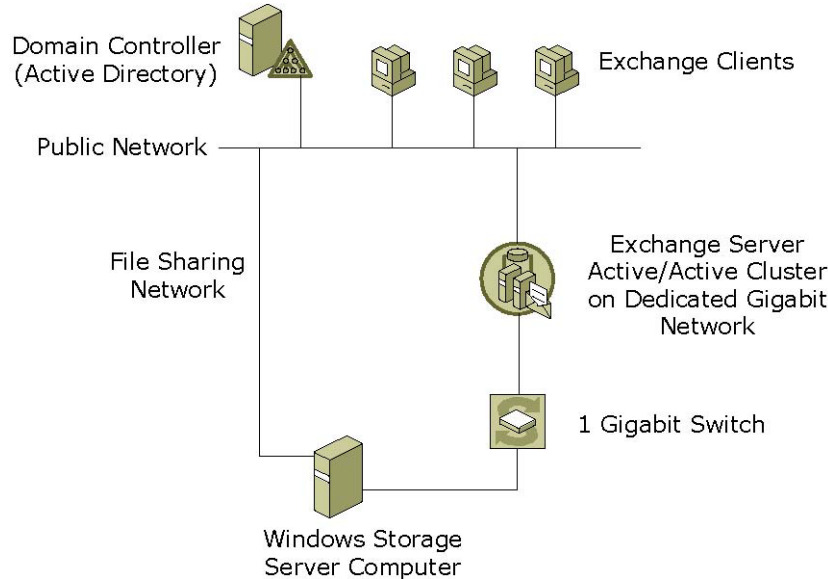
In the simplest case, the dedicated network is created by using a crossover cable. In a more complex case, a Gigabit switch with dedicated local area network (LAN) capability can be used. In either case, the Exchange server and Windows Storage Server computer should be in close physical proximity, with no more than one switch or hub between them. In addition, the network adapters that are used for the dedicated network should be configured to use static IP addresses.

If a dedicated network is not set up, the Exchange server and the Windows Storage Server computer communicate by using the public network. This can affect performance because of the bandwidth requirements of Exchange server.

Editing the Hosts File

If a dedicated network is set up between the Exchange server and the Windows Storage Server computer, the hosts file on both the Exchange server and the Windows Storage Server computer must be edited to use that network. The hosts file for each server is located in the %windir%\system32\drivers\etc\ folder. The referenced network adapters are used for the dedicated network.

The following procedure describes how to modify the hosts file for the Exchange server and the hosts file for the Windows Storage Server computer so they can use a dedicated network. The examples in the procedure use the sample hosts file information shown in Table 2.2.

Table 2.2   Sample Hosts File Information

Description	Windows Storage Server	Exchange Server
Computer name	storage-01	exchange-01
IP address of Gigabit network adapter	10.0.0.1	10.0.0.2

To edit the hosts file

1. On each server, open the hosts file, located in the %windir%\system32\drivers\etc\ folder.

2. On the Exchange server, add a line to the hosts file that maps the computer name to the IP address of the Gigabit network adapter. For example:

```
10.0.0.1              storage-01
```

3. On the Windows Storage Server computer, add a line to the hosts file that maps the Exchange Server name to the IP address of the Gigabit network adapter. For example:

```
10.0.0.2              exchange-01
```

Installing the Feature Pack on the Windows Storage Server Computer

The Feature Pack can be installed on the Dell PowerVault NAS system in attended mode or unattended mode. In attended mode, the components are installed interactively by using a Setup wizard. In unattended mode, the components are installed from the command line.

The installation process installs two components on the Windows Storage Server computer:

- The New Share for Exchange Files task is added to the Administrative Web User Interface (Web UI) for Windows Storage Server 2003. It is used to create and configure a share to host Exchange databases and transaction logs. The new task in the Web UI is accessed from the Tasks list on the Shares page.

- Setup and installation files for Exchange server installation are created in %ProgramFiles%\Windows Storage Server\Exchange\.

✎ Note

The 'WSS 2003 Feature Pack' installation package file must be run on the Dell NAS system before the Feature Pack can be installed. The 'WSS 2003 Feature Pack' installation package file is a self-extracting executable which places all files necessary to install the Feature Pack in the c:\Dell\Install\Feature Pack directory of the NAS System.

Run the 'WSS 2003 Feature Pack' Installation Package

1. Download the 'WSS 2003 Feature Pack' installation package from the Downloads section of your PowerVault NAS system at http://support.dell.com.

2. From the Dell NAS system, logged in either locally or through Terminal Services, execute the 'WSS 2003 Feature Pack' installation package file. The file may be local to the system or on a network share.

3. Follow the instructions to extract all installation and documentation files to the c:\Dell\Install\Feature Pack folder.

4. Once all files are extracted, a browser window will open displaying the Feature Pack Installation Web Interface.

To install the Feature Pack components using the Setup wizard

1. Launch the Feature Pack Installation Web Interface. The Installation Web Interface is launched when the 'WSS 2003 Feature Pack' installation package is first run on the NAS system. To subsequently launch the Installation Web Interface, double click on install.htm, located in the c:\Dell\Install\Feature Pack folder.

2. From the Feature Pack Installation Web Interface, click the Installation Tab. Next, click the Feature Pack Installation link. Read the End User License Agreement. You must accept the EULA to continue installation. If prompted by the browser, select **Open**.

3. Follow the instructions to complete the installation.

✎ Note

The Windows Storage Server computer does not require a reboot after Feature Pack installation.

4. Once Feature Pack installation is complete, return to the Installation Web Interface. To install updates to the Feature Pack, click any included Hotfix Installation links. If prompted by the browser, select **Open**.

5. Follow the instructions to complete the installation.

6. Visit the Downloads section of your PowerVault NAS System at http://support.dell.com for the latest updates to the Feature Pack.

To install Feature Pack components from a command prompt

1. At the command prompt, navigate to the folder c:\Dell\Install\Feature Pack\Setup.

✎ Note

If the folder does not exist, the 'WSS 2003 Feature Pack' installation package must be run from the NAS system. This will place all necessary installation files in the c:\Dell\Install\Feature Pack folder.

2. At a command prompt, type the following:

Setup.exe /i /qn where:

/i is the parameter that denotes the operation as an installation.

/qn allows the installation to run without user intervention.

3. Once Feature Pack installation is complete, install all included hotfixes.

4. Visit the Downloads section of your PowerVault NAS System at http://support.dell.com for the latest updates to the Feature Pack.

✎ Note

The Setup.exe program uses the same parameters as Windows Installer (Msiexec.exe). All Windows Installer arguments can be used when running Setup.exe from the command line. For more information about Windows Installer arguments, see "Command Line Options" in the Windows Installer documentation in the Platform Software Development Kit (PSDK) at the Microsoft Web site (http://msdn.microsoft.com).

Creating an SMB Share for Exchange Server Installation

The installation of the Feature Pack creates a folder on the Windows Storage Server computer that contains the setup and installation files for the Exchange server installation of the Feature Pack. Before installing the Feature Pack on the Exchange server, the contents of this folder must be shared.

To create an SMB share for Exchange server installation

1. In Windows Explorer on the Windows Storage Server computer, navigate to the folder %ProgramFiles%\Windows Storage Server\Exchange\.

2. Right-click the folder, then click **Sharing and Security**.

3. On the **Exchange Properties** page, on the **Sharing** tab, click the **Share this folder** radio button.

4. Click **Permissions** and assign Read permissions to Everyone.

5. Click **OK** to save the changes.

Installing the Feature Pack on an Exchange 2003 Server

The setup and installation files for installing the Feature Pack on the Exchange server are located in the SMB share on the Windows Storage Server computer. The installation can be run in attended mode or unattended mode.

The installation process installs the following components on the Exchange server:

▪ Two tools used to move Exchange storage groups to and from a Windows Storage Server computer:

  ▪ The Remote Storage Wizard

  ▪ WSSExchMove.exe command-line tool

▪ Windows Storage Server Mapping Service. This service creates a mapped drive for use by Exchange shares on the remote storage servers each time the Exchange server or Windows Storage Server Mapping Service is restarted.

All Feature Pack components on the Exchange server are automatically installed in the %ProgramFiles%\Windows Storage Server\Exchange\ folder.

To install Feature Pack components from the command line

At a command prompt, type the following:

*servername**sharename***Setup.exe /i /qn** where:

▪ *servername* is the computer name of the Windows Storage Server computer

▪ *sharename* is the name of the SMB share that contains the Setup.exe file

▪ **/i** is the parameter that denotes this operation as an installation

▪ **/qn** allows the installation to run without user intervention

> ✎ **Note**
> The Setup.exe program uses the same parameters as Windows Installer (Msiexec.exe). All Windows Installer arguments can be used when running Setup.exe from the command line.

To install the Feature Pack on an Exchange 2003 server by using the Setup wizard

1. At the **Run** command on each Exchange server that requires Feature Pack installation, connect to the SMB share on the Windows Storage Server computer by entering *\\servername\sharename* where:

   - *servername* is the name of the Windows Storage Server computer

   - *sharename* is the name of the SMB share on the Windows Storage Server computer that was previously created

2. Navigate to the folder that contains the installation files, and then double-click **Setup.exe**.

3. Follow the wizard instructions to complete the installation.

Installing Patches

At times, it may be necessary to install patches on Exchange Server 2003, on Windows Storage Server 2003, or on the operating system on which Exchange Server 2003 is installed. When this is necessary, follow these guidelines:

Installing Patches

Always shut down the Microsoft Exchange Information Store service before applying any patches. This ensures that the databases are not in use, in case the Exchange server must be restarted.

If multiple patches are released together, install them in the following order:

1. Install patches on the Windows Storage Server 2003 computer.

2. Install patches on the Exchange server in the following order:

   a. Install the patches on the operating system on which Exchange Server 2003 is installed.

   b. Install the patches on Exchange Server 2003.

Shutdown Order

Use the following shutdown order when you need to restart one or both of the servers:

- If you need to restart either the Exchange server or the Windows Storage Server computer, before shutting down either server, always shut down the Microsoft Exchange Information Store service on the Exchange server.

- If you need to restart both servers, restart the Windows Storage Server computer first and then the Exchange server. This ensures that any storage groups that are hosted by the Windows Storage Server computer are available when Exchange Server 2003 starts.

Uninstalling the Feature Pack

The Windows Storage Server 2003 Feature Pack Uninstaller uninstalls all components of the Feature Pack that have been installed on the server. On the Exchange server, the uninstaller also removes the DFS configuration from the registry.

To start the uninstaller, in Control Panel, double-click **Add/Remove Programs**, and then click **Windows Storage Server 2003 Feature Pack**.

Because the uninstaller removes all DFS configuration information, the DFS links cannot be automatically recreated when Windows Storage Server Mapping Service is started after a reinstallation of the Feature Pack. Therefore, Exchange databases and transaction logs that were transferred from the Exchange server to the Windows Storage Server computer should be returned to the Exchange server before the Feature Pack is uninstalled. Uninstalling Feature

Pack components while Exchange databases and transaction logs are on a Windows Storage Server computer will cause those databases and transaction logs to be inaccessible from Exchange, and can result in database loss or corruption.

If the Feature Pack is being uninstalled on the Exchange server, the uninstaller checks for Exchange databases or transaction logs from the Exchange server that are currently stored on a Windows Storage Server computer.

➡ Notice

Before uninstalling the Feature Pack, it is important that you move all Exchange databases and transaction logs that are currently stored on the Windows Storage Server computer back to the local Exchange server. Uninstalling the Feature Pack components while Exchange databases and transaction logs are on a Windows Storage Server computer renders the files inaccessible from Exchange, and can result in database loss or corruption.

Feature Pack components can be uninstalled in unattended mode from a command prompt, or in attended mode by using the Setup wizard.

To uninstall Feature Pack components from a command prompt (unattended mode)

Exchange server:

📝 Note

In order to uninstall the Feature Pack from the command prompt, the Exchange server must access the SMB share on the Windows Storage Server computer created in the "Creating an SMB Share for Exchange Server Installation" section referenced earlier in this chapter. If the share is no longer accessible or the Feature Pack has been uninstalled from the Windows Storage Server computer, the Feature Pack must be uninstalled from the Exchange server using the Setup Wizard described in the next section.

1. At the command prompt, type the following:

   *servername**sharename***Setup.exe /x /qn** where:

   - *servername* is the computer name of the Windows Storage Server computer
   - *sharename* is the name of the SMB share that contains the Setup.exe file
   - **/x** is the parameter for uninstalling a product
   - **/qn** allows the installation to run without user intervention

2. Repeat this process on all Exchange servers if in a cluster configuration.

Windows Storage Server:

1. At the command prompt, navigate to the folder %ProgramFiles%\Windows Storage Server\Exchange\.

2. At the command prompt, type the following:

   Setup.exe /x /qn where:

   - **/x** is the parameter for uninstalling a product
   - **/qn** allows the installation to run without user intervention

To uninstall Feature Pack components by using the Setup wizard (attended mode)

Exchange server and Windows Storage Server:

1. In Control Panel, double-click **Add or Remove Programs**.

2. Click **Windows Storage Server 2003 Feature Pack**, and then click **Uninstall**.

3. Repeat this process on the Exchange server (or on all clustered Exchange servers), and on the Windows Storage Server computer.

CHAPTER 3

Moving Exchange Files to a NAS System

The Feature Pack provides two tools that are used to move the databases and transaction logs for an Exchange storage group to a Windows Storage Server computer: the Remote Storage Wizard and the WSSExchMove.exe command-line tool. These tools perform the configuration updates that are needed to give Microsoft Exchange Server 2003 access to the remotely stored files.

This chapter explains how Exchange databases and transaction logs are moved to Windows Storage Server computers, and provides an overview of the remote storage tools that are used to move the files. This chapter also includes guidelines that address specific issues involved in creating the shares that host Exchange files on a Windows Storage Server computer and in moving the files. For detailed instructions on how to use either remote storage tool, see Help for Remote Storage Tools for Exchange, located on the Exchange server in %ProgramFiles%\Windows Storage Server\Exchange\RemoteStorage.chm.

Overview of the Remote Storage Tools for Exchange

To move the databases and transaction logs for an Exchange storage group to a Windows Storage Server computer, you must use a remote storage tool. If you move files without using a remote storage tool, Exchange Server 2003 cannot access the remotely stored files.

The Feature Pack provides two remote storage tools:

- Remote Storage Wizard
- WSSExchMove.exe command-line tool

The remote storage tools are used to move the databases and transaction logs for an *existing* Exchange storage group to *existing* shared folders that are hosted on a Windows Storage Server computer.

There is no way to specify a remote destination location when you create a new database in Exchange. Thus, you must first create a database locally, and then move the database to the remote location by using one of the remote storage tools.

The remote storage tools also do not create and share the folders on the destination server. Before moving Exchange files, you must create the shares and assign the required permissions.

> **Note**
>
> Moving a storage group to a remote location requires that Exchange access the databases and transaction logs over a network connection. Before moving a storage group, verify that your network is configured correctly. For configuration recommendations when deploying Windows Storage Server 2003 Feature Pack, see Chapter 1, "Planning a Deployment."

Shutdown Order for the Exchange and Windows Storage Server Computers

When you have Exchange databases and transaction logs stored on a Windows Storage Server computer, use the following shutdown order when you need to restart one or both of the servers:

- If you need to restart either the Exchange server or the Windows Storage Server computer, always shut down the Microsoft Exchange Information Store service on the Exchange server before shutting down the server.

- If you need to restart both servers, restart the Windows Storage Server computer first and then the Exchange server. This ensures that any storage groups that are hosted by the Windows Storage Server computer are available when Exchange Server 2003 starts.

Two Types of Move

The Remote Storage Wizard and the WSSExchMove.exe command-line tool both support two types of move: a full move or a configuration update. The key distinctions between these two types of move are the physical locations of the files after the move and the prerequisites that must be met to successfully complete the move.

Full Move

During a full move, the physical files are transferred and the required configuration updates are performed. The existence of the physical files is verified before any action is taken. If the physical files cannot be accessed, the move fails.

During a full move, any stores that are being moved must be dismounted; if transaction logs are being moved, all stores from the storage group are dismounted. After the files are moved, any

dismounted stores are remounted to restore service from the Exchange databases. After a full move, the Exchange server is fully operational; no further action is required.

Configuration Update

Configuration updates are performed without transferring the physical files. The existence or the state of the physical files is not verified before any action is taken. Therefore, a configuration update can succeed even if the original files no longer exist, can no longer be accessed, or are in a state in which they should not be moved. A configuration update fails only if settings in Microsoft Windows Server 2003 Active Directory directory service, or other configuration settings, cannot be updated.

During a configuration update, stores are dismounted and all configuration updates are performed. After a configuration update, the Exchange server is not fully operational until the files have been copied to the specified destination locations and the stores have been remounted in Exchange.

How a Move Is Processed

This section describes how full moves and configuration updates are processed, and identifies key differences between the two types of move. The section also explains the configuration differences when both types of move are performed for an Exchange cluster.

Processing a Full Move

During a full move, the remote storage tool performs the following steps:

1. Dismounts any mounted stores that are being moved. If transaction logs for the storage group are being moved, all stores are dismounted.

2. Verifies that the stores have been dismounted cleanly and are consistent.

3. Copies the files to their destination locations, assigning read-only access to the source files.

4. Updates Active Directory with the new file locations.

5. On the local Exchange server, creates a DFS link for each database (.edb) file and each streaming database (.stm) file that was moved, and a link for the transaction logs if they were moved. The tool then updates the Windows registry with the DFS links and link targets.

6. Mounts each store that was dismounted.

7. Deletes the files that were copied from their original locations.

> ### Note
> When using WSSExchMove.exe, Step 7 is optional. The /n parameter copies the files to the destination location without deleting the source files. For additional syntax information for WSSExchMove.exe, see Help for Remote Storage Tools for Exchange, located on the Exchange server in %ProgramFiles%\Windows Storage Server\Exchange\RemoteStorage.chm.

The Exchange administrator who performs the move, and the Exchange server that contains the files that the Windows Storage Server computer will host, must have Full Control permission for the destination share and also for the underlying shared folder. If the required permissions have not been assigned, the move fails.

Mapping Exchange Shares to a Local Drive

During a full move or a configuration update, a DFS link is created for each database (.edb) file and streaming database (.stm) file that is moved. If transaction logs are moved, a single DFS link is created for the log file path.

The link names have the format {*servername.n*}, where *servername* is the name of the Windows Storage Server computer that hosts the files and *n* is a sequentially assigned number that uniquely identifies the link on the host computer. The curly brackets ({ }) are included in the name. The link target is the UNC address.

The address that is stored in Active Directory is the address that is mapped to the local drive letter being used for Exchange shares.

For more information about how the DFS links are created and mapped for use by Exchange Server 2003, see Chapter 2, "Installing the Feature Pack." For a full discussion of how link names and link targets relate to the current location and Active Directory location of remotely stored Exchange database files and transaction logs, see Appendix A, "Interpreting the Detailed Report Log File."

Processing a Configuration Update

During a configuration update, the remote storage tool performs the following steps:

1. Dismounts any mounted stores that will be moved. If the transaction logs for the storage group are being moved, the remote storage tool dismounts all stores of the storage group.

2. Updates Active Directory with the specified destination locations.

3. On the local Exchange server, creates a DFS link for each database (.edb) file and each streaming database (.stm) file that was moved, and a link for the transaction logs if they were moved. The tool then updates the registry with the DFS links and link targets.

Because the tool does not check for the existence of the source files or the state of the database during a configuration update, the configuration update can complete successfully, even if the files no longer exist or are no longer accessible.

As in the full move, the remote storage tool dismounts any mounted stores involved in the move. However, the tool does not physically move the files; nor does it attempt to remount any stores that were dismounted after updating the configuration. To restore access from the Exchange database, the Exchange administrator must physically move the files to the destination locations that were configured and then remount any stores that were dismounted.

Notice

After you perform a configuration update, it is important to finish physically copying the files to their destination locations before attempting to mount the Exchange stores. Mounting the Exchange stores before all of the existing transaction logs have been moved will invalidate previous backups. It is recommended that you perform a full backup of Exchange immediately after successfully mounting the storage groups.

A configuration update can succeed even if the databases that are involved have not been shut down correctly. Moving databases that have not been shut down correctly will prevent the automated recovery of those databases by the Microsoft Exchange Information Store service.

Processing a Move for an Exchange Cluster

If the Windows Storage Server computer stores databases and transaction logs for an Exchange server cluster, each move is performed on the virtual server that owns the Exchange server that currently owns the Exchange storage group. When you move a storage group for an Exchange cluster, all nodes in the cluster must be online; otherwise, the move will not begin.

Each node in the cluster has its own stand-alone DFS root, which is used for Exchange files that are hosted on Windows Storage Server computers. However, the DFS root is mapped to the same drive letter on all of the servers so that the DFS links for Exchange storage groups on all of the servers have the same local drive mapping.

The registry entries for DFS links are stored in the Cluster registry key, which is replicated on all servers in the cluster. Therefore, all Exchange servers in the cluster store the configuration of all remotely stored Exchange storage groups on all of the servers.

> **Note**
> For information about the Exchange cluster configurations the Feature Pack supports, see Chapter 1, "Planning a Deployment." For information about how the DFS configurations are replicated within an Exchange cluster when the Feature Pack is installed, see Chapter 2, "Installing the Feature Pack."

Choosing a Remote Storage Tool

You can use either the Remote Storage Wizard or WSSExchMove.exe to move Exchange databases and transaction logs to a Windows Storage Server computer. There are some differences, however, between the two remote storage tools.

- The Remote Storage Wizard guides you through the process of configuring the current Exchange storage group to store its databases and transaction logs on a Windows Storage Server computer and, optionally, moves the files to the shared folders.

- The WSSExchMove.exe command-line tool offers the same capabilities as the Remote Storage Wizard. In addition, you can use the tool to:
  - Script an unattended move.
  - Copy the Exchange files to their destination locations without deleting the original files.
  - Map a different drive on the local Exchange server for use by Exchange.
  - View the current configuration of Exchange storage groups on the local Exchange server.

Both remote storage tools must be run from the local Exchange server.

Table 3.1   Comparison of the Remote Storage Wizard and WSSExchMove.exe

Remote Storage Task	Tool	
	Remote Storage Wizard	WSSExchMove.exe
Perform a full move of Exchange databases and transaction logs, deleting the files from their original locations.	●	●
Perform a configuration update without moving the physical files.	●	●
Perform a full move without deleting the original files.		●
View the current configuration and status of storage groups on the local Exchange server. For a clustered Exchange server, view the configuration of all storage groups on all virtual servers in the cluster. *		●
Perform an unattended full move or configuration update by using a script.		●
Change the drive letter used for shares that host Exchange databases and transaction logs on Windows Storage Server computers.		●

* The Remote Storage Wizard includes an option for displaying the Detailed Report log file when the wizard completes. However, you cannot display a Detailed Report with the current configuration unless you initiate a full move or configuration update.

Moving Files to a Windows Storage Server Computer

The remote storage tools for Exchange are used to move the databases and transaction logs for an *existing* Exchange storage group to *existing* shared folders on the destination Windows Storage Server computer.

For this reason, moving Exchange files to a Windows Storage Server computer involves two steps:

1. On the Windows Storage Server computer, create shared folders to store the Exchange databases and transaction logs.

2. Use the Remote Storage Wizard or WSSExchMove.exe to move the Exchange transaction logs and databases to the destination folders.

After completing a move, you can view the configuration of the storage groups on the local Exchange server by displaying a Detailed Report.

Creating Shares to Host the Exchange Files

Before using a remote storage tool to move Exchange databases and transaction logs, you must create and share the folders that will store them on the Windows Storage Server computer.

Guidelines for Creating Shares

When creating shares to host Exchange databases and transaction logs, the following guidelines apply:

- With the Feature Pack installed, a Windows Storage Server computer supports as many as four storage groups; the storage groups can come from as many as two Exchange servers. If the Exchange servers are clustered, the Windows Storage Server computer supports storage groups from two virtual Exchange servers.

  For information about the Exchange cluster configurations that the Feature Pack supports, see Chapter 1, "Planning a Deployment."

- On the Windows Storage Server computer, the database files for any Exchange store will always be moved to the same designated share. These include the database (.edb) file and the streaming database (.stm) file.

- To optimize performance and allow for complete restore operations with minimal mail loss, it is recommended that you store database files on a separate volume from the transaction logs. For guidance in deciding where to locate the shared folders that host the databases and transaction logs on the Windows Storage Server computer, see Chapter 1, "Planning a Deployment."

- You can create a share either by using the New Share for Exchange Files task in the Microsoft Windows Server Administration Web user interface (Web UI) or by using Windows Explorer in Windows Storage Server 2003 to share a folder.

  Note

  For help in troubleshooting problems with creating shares for Exchange files, see Chapter 5, "Troubleshooting."

Using the Administration Web UI to Create an Exchange Share

You can use the New Share for Exchange Files task in the Administration Web UI to create a share that is configured to host stores or transaction logs for an Exchange storage group. The Exchange share is configured to use the Server Message Block (SMB) protocol.

As you create the share, you can automatically assign the permissions that are needed to give Exchange access to the files. This is done by listing the user and computer accounts that require access. Each account that you list is assigned Full Control permission for both the share and the shared folder. All other users, groups, and computers are denied access to the share.

The following accounts must have access to the Exchange share and the underlying folder:

- The domain user account for the Exchange administrator who will move Exchange transaction logs and databases to the Windows Storage Server computer.

  In addition, list any users who would require access to the share if it were on Direct Attached Storage (DAS) or a Storage Area Network (SAN) — for example, backup operators.

- The computer account for the Exchange server. For an Exchange cluster, each server in the cluster must have access.

Note
To create a share using the Web UI, a user must be logged on to the Windows Storage Server computer under a domain account with administrative rights on the computer.

To add an Exchange share by using the Web UI

1. Log on to the Web UI on the Windows Storage Server computer by opening https://*servername*:*portnumber*, where:

    servername is the name of the Windows Storage Server computer that will host the Exchange files.

    portnumber identifies the port that is in use. (The default port is number 1279.)

2. On the primary navigation bar, click **Shares**.

3. On the **Shares** page, click **Shares**.

4. In the **Tasks** list, click **New Exchange**.

5. To set up the share, enter the share name, share path, and an optional comment.

Note
Both the share name and share path are restricted to ASCII (single-byte) characters. The following ASCII characters cannot be used in the share name: \ / : * ? "< > |. The same restrictions apply to the path, with the exception of the backslash (\ ).

6. To provide access to the share:

- Add each Exchange administrator who will need access to the share to the list of user and group accounts.

- Add each Exchange server that must access the share to the list of computer accounts. For an Exchange cluster, add each node in the cluster.

  Adding an account to the list assigns Full Control permission to both the share and the shared folder.

For detailed instructions that tell how to create a share for Exchange files by using the Web UI, see Help for the Web UI.

Sharing a Folder by Using Windows Explorer

If you prefer to use Windows Explorer to share a folder to host Exchange databases and transaction logs, create an SMB share. Assign the required Full Control permissions for the share. Then assign the same permissions for the underlying folder. If you create a share by using Windows Explorer, its properties can only be updated by using Windows Explorer. For information about sharing resources in Windows Explorer, see Help and Support Center for Microsoft Windows Server 2003.

You can use Windows Explorer to assign permissions to a share and folder that you have created for Exchange by using the Web UI. However, the Web UI only supports Full Control permissions. If you update share properties in the Web UI, only Full Control permissions are supported and displayed; when you save the updated properties for the Exchange share, the displayed permissions replace all other permissions assigned to the share and to the underlying folder.

Moving the Files

After creating SMB shares to host the Exchange files on the destination Windows Storage Server computer and assigning the required permissions, use one of the two remote storage tools for Exchange — either the Remote Storage Wizard or the WSSExchMove.exe command-line tool — to move the files.

Both tools must be run locally on the Exchange server. The Remote Storage Wizard is run from Exchange System Manager by choosing the Remote Storage Manager task for the current Exchange storage group. WSSExchMove.exe can be run from any command prompt on the Exchange server and can be used to perform a scripted move. For a full comparison of the tools, see "Choosing a Remote Storage Tool," earlier in this chapter.

This section presents basic procedures that you can use to perform a full move in order to move databases and transaction logs for an Exchange storage group to a Windows Storage Server computer. For a full description of the features of each tool and the methods for using the tools, see Help for Remote Storage Tools for Exchange, in %ProgramFiles%\Windows Storage Server\Exchange\RemoteStorage.chm on the Exchange server.

For help in troubleshooting problems with the remote storage tools, see Chapter 5, "Troubleshooting."

✎ Note

To use either of the remote storage tools, you must be logged on to the local Exchange server as an Exchange administrator.

Guidelines for Moving Files

When moving databases and transaction logs to a Windows Storage Server computer, use the following guidelines:

- You must create the Exchange storage group and all of its stores on the local Exchange server before moving the storage group. For information about creating storage groups in Exchange 2003, see Help for Exchange System Manager.

- To minimize service interruptions from the Exchange databases, schedule the move outside normal business hours, when e-mail traffic is low. Moving an Exchange database requires dismounting the store and then remounting it after the files are moved. Depending upon the size of files being moved, this might require a significant amount of time.

- To script a move, use WSSExchMove.exe. The script must be run locally on the Exchange server. Only one instance of WSSExchMove.exe should be run at a time on the Exchange server.

- When you perform a configuration update, it is important to finish copying the files before you attempt to remount the Exchange stores. Mounting the Exchange stores before all existing transaction logs have been moved will invalidate previous backups. If the database is remounted before the transaction logs are moved, the Restore utility will only be able to restore the database through the time of the last backup.

  It is recommended that you perform a full backup immediately after successfully mounting the Exchange stores.

- When performing a full move or configuration update for an Exchange cluster, all nodes in the cluster must be online. Otherwise, the move will not proceed.

- To move a Recovery Storage Group to a Windows Storage Server computer, you must create the Recovery Storage Group on the Exchange server and then use a remote storage tool to move the storage group before mounting its stores or performing any restore operations. For additional information, see Chapter 4 "Using Exchange Tools and Applications."

➡ Notice

Before uninstalling the Feature Pack, it is important that you move all Exchange databases and transaction logs that are currently stored on the Windows Storage Server computer back to the local Exchange server. Uninstalling the Feature Pack components while Exchange databases and transaction logs are on a Windows Storage Server computer renders the files inaccessible from Exchange, and can result in database loss or corruption.

Moving Files by Using the Remote Storage Wizard

Use the Remote Storage Wizard to move transaction logs and databases for the current Exchange storage group to a Windows Storage Server computer.

📝 Note

To use the Remote Storage Wizard, you must be logged on to the local Exchange server as an Exchange administrator.

To move files for an Exchange storage group by using the Remote Storage Wizard

1. On the Exchange server, start Exchange System Manager: On the **Start** menu, point to **Programs**, point to **Microsoft Exchange**, and then click **System Manager**.

2. Open the **Server** container in the console tree.

3. Click the storage group that contains the databases and transaction logs that you want to move, point to **All Tasks**, and click **Remote Storage Manager**.

4. Complete the Remote Storage Wizard by using the information in Table 3.2.

   For a full description of how to use each wizard page, click the **Help** button on the wizard page.

Table 3.2   Moving Exchange Files by Using the Remote Storage Wizard

Wizard Page	Description
Storage Destination	Specify either the Windows Storage Server computer or the Exchange server as the storage destination for the Exchange files.
Type of Move	To specify the type of move, choose either Full move (to update the configuration and move the physical files) or Configuration update (to update the configuration without moving the files).
Server Selection	If you are moving files to a Windows Storage Server computer, enter the computer name of the destination Windows Storage Server computer. This page is not displayed if you are moving files back to the local Exchange server.
File Location Selection	Specify the folders to which you plan to move the databases and transaction logs for this storage group. If you are moving files to a Windows Storage Server computer, the folders must be shared on the Windows Storage Server computer, and the current user and the Exchange server must have access to the shares.
	To specify the destination location for a storage group component:
	1. In the components list for the storage group, click the component that you want to move (either transaction logs or a store), and then click Change Path.
	Note: If the database (.edb) and streaming database (.stm) files for a store are currently stored in different folders, the Current Path of the store displays the location of the .edb file. However, both files will be moved to the destination folder that you select for the store.
	2. In the Browse for Folder dialog box, click the folder to which you want to move the files, and click OK.
	Note: If you are moving files to a Windows Storage Server computer, and the Browse for Folder dialog box does not list the shared folder to which you want to move the files, make sure that the share exists on the Windows Storage Server computer and that Full Control permission for both the share and the underlying folder has been assigned to you and to the computer account for the Exchange server.

Moving Files by Using WSSExchMove.exe

When the Windows Storage Server 2003 Feature Pack is installed on the Exchange server, WSSExchMove.exe is installed in the %ProgramFiles%\Windows Storage Server\Exchange\ folder. WSSExchMove.exe is added to the %Path% variable at installation and can be run from any command prompt on the Exchange server.

To move files for an Exchange storage group by using WSSExchMove.exe

- From any command prompt on the Exchange server, enter:

  wssexchmove *server storagegroup* [**/l** *location*] [**/s** *store location*] ...]]

  Table 3.3 describes each parameter that is used to perform a full move of databases (stores) and transaction logs. By default, the source files are deleted after the move.

Table 3.3 WSSExchMove.exe Parameters Used to Move Exchange Files

Parameter	Description
server	Specifies the name of the Exchange server that owns the Exchange databases and transaction logs that are to be moved. This is the local Exchange server unless the Exchange server is clustered. For an Exchange cluster, enter the name of the virtual server. Note: When moving a storage group for an Exchange cluster, all servers in the cluster must be online.
storagegroup	Specifies the storage group for which transaction logs and/or database files are to be moved.
/l location	Specifies the destination location for the transaction logs for the storage group. If the destination is on a Windows Storage Server computer, location is the UNC path of the destination share. If the destination is the local Exchange server, enter the full path to the destination folder.
/s store location	/s store location specifies a store from the designated storage group that is to be moved and the destination location for the store. If the destination is on a Windows Storage Server computer, enter the UNC path of the destination share. If the destination is the local Exchange server, enter the full path to the destination folder. The same share will host both the database (.edb) file and the streaming database (.stm) file for a store. You can move multiple stores by using a single command.

For syntax examples and information about the additional options that WSSExchMove.exe provides, see Help for the Remote Storage Tools, on the Exchange server in %ProgramFiles%\Windows Storage Server\Exchange\RemoteStorage.chm.

➡ Notice

Only one instance of WSSExchMove.exe should be run on an Exchange server at any time. For a cluster of Exchange servers, run only one instance of WSSExchMove.exe on the virtual server at any time.

Verifying a Successful Move

Whenever a remote storage tool for Exchange is used, a Detailed Report log file is saved that contains the current configuration of storage groups on the Exchange server and the status of the shares that are currently hosting Exchange files on Windows Storage Server computers. If the Exchange server is clustered, the report gives information about all storage groups on all virtual Exchange servers in the cluster.

The final section of the report logs errors and messages that were generated during the process. You can use this information to troubleshoot problems with a move.

The log files are numbered sequentially and given the name Detailed Report - 01.log, Detailed Report - 02.log, and so forth. Each log file is stored in the My Documents\Windows Storage Server Logs\ folder of the current user.

When you use the Remote Storage Wizard, you can display the log file after the move is completed. WSSExchMove.exe includes a parameter for displaying the current configuration in the command window at any time.

To view a Detailed Report

- From the Remote Storage Wizard, on the completion page, select the **View detailed report when the wizard closes** check box to view a log file that contains the current configuration when the wizard completes.

  -Or-

- To view the results of a move that was just completed using WSSExchMove.exe, open the most recent Detailed Report log file that was saved in your My Documents\Windows Storage Server Logs\ folder.

Note

To view a display of the current configuration of storage groups on the Exchange server at any time, at a command prompt on the Exchange server, enter wssexchmove /i.

For a description of the configuration information that the Detailed Report log file provides, see Appendix A, "Detailed Report Log File." For help in troubleshooting problems with the remote storage tools, see Chapter 5, "Troubleshooting."

CHAPTER 4

Using Exchange Tools and Applications

The Feature Pack is designed to work seamlessly with the Microsoft Exchange Server 2003 administrative applications and tools that are currently used to manage Exchange Server 2003 storage groups. However, whenever a storage group is remotely stored, the number of network calls that are required to perform basic database operations can increase. These basic database operations include defragmentation, backup, and restoration. This chapter provides information about Exchange database tools and applications that are used with the Feature Pack, as well as information about how to plan database processes to work with the location of Exchange databases and transaction logs.

Planning for the Use of Exchange Tools and Applications with the Feature Pack

Exchange administrative tools and applications are used to perform database procedures that may require the transfer of data between servers and over the network. For example, data is typically transferred between the server that hosts the databases and transaction logs and either the Exchange server or a backup server.

The location of a tool or application relative to remotely stored Exchange databases and transaction logs can have a great impact on the amount of data transferred across the network, and, therefore, the amount of processing time that is required. The number of network data transfers depends on what kind of operation is requested.

Applications such as Backup Utility for Windows (NTBackup), which access Exchange databases and transaction logs by using an Exchange application programming interface (API), require additional network data transfers. This is especially true if such an application is run from the Windows Storage Server computer. In this situation, data must travel from the Windows Storage Server computer to the Exchange server, and then from the Exchange server back to the Windows Storage Server computer.

When deciding where to place an Exchange tool or application in relation to the Exchange databases and transaction logs hosted by a Windows Storage Server computer, consider the effects of different system configurations. Select a system configuration that is most efficient for database operations. This configuration is probably one that minimizes the number of network data transfers and, in turn, the processing time that is required for database operations.

For example, backup and restore operations are affected by the placement of Exchange databases in relation to the Exchange administrative tool or application, and by the addition of optional backup servers. These factors determine the number of network data transfers that are required to complete a database process. The number of required network data transfers in turn affects processing time.

Table 4.1 shows the effects of three different network configurations on data transfers over the network during backup and restore operations.

Configuration 1, shown in Figure 4.1, has the following components:

- An Exchange server running NTBackup, with an attached tape device
- A Windows Storage Server computer hosting the Exchange databases and transaction logs

Figure 4.1   Configuration 1: Backup/Restore on Exchange Server
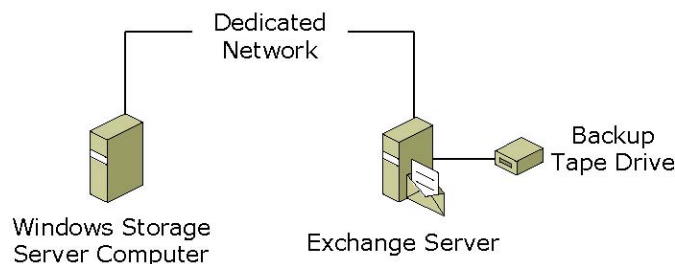
Configuration 2, shown in Figure 4.2, has the following components:

- An Exchange server
- A Windows Storage Server computer hosting the Exchange databases and transaction logs, and running NTBackup, with an attached tape device

Figure 4.2   Configuration 2: Backup/Restore on a Windows Storage Server Computer
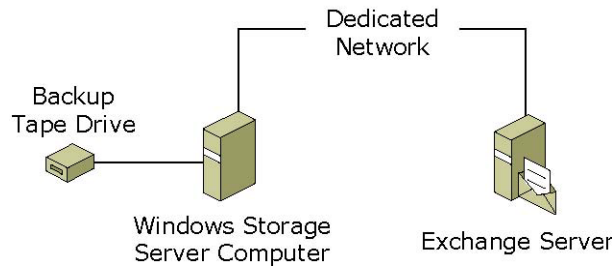
Configuration 3, shown in Figure 4.3, has the following components:

- An Exchange server
- A Windows Storage Server computer hosting the Exchange databases and transaction logs
- A stand-alone backup server

Figure 4.3   Configuration 3: Stand-alone Backup Server
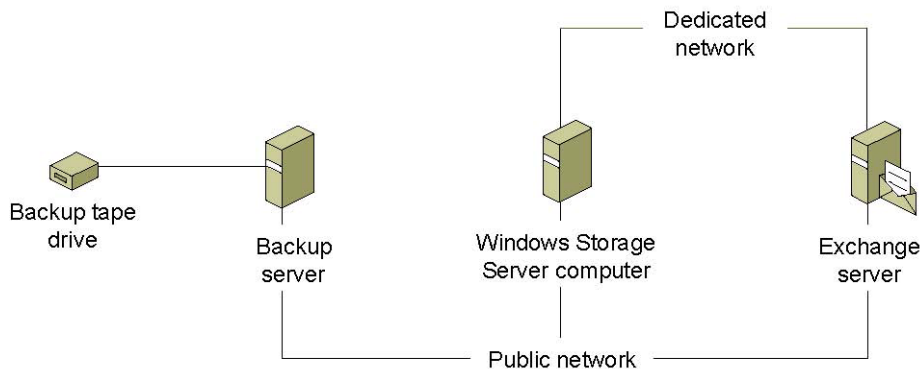
Table 4.1 compares the number of network data transfers that are required for backup and restore operations under each of the three configurations.

Table 4.1   Comparison of Network Data Transfers for Backup and Restore Operations

Configuration	Network Data Transfers for Backup	Network Data Transfers for Restore
Configuration 1 Backup/Restore on Exchange Server	One data transfer: One data transfer from the Exchange database on the Windows Storage Server computer to the backup device on the Exchange server.	One data transfer: One data transfer from the backup device on the Exchange server to the Exchange database on the Windows Storage Server computer.
Configuration 2 Backup/Restore on Windows Storage Server Computer	Two data transfers: One data transfer from the Exchange database on the Windows Storage Server computer to the Exchange server. One data transfer from the Exchange server to the backup device on the Windows Storage Server computer.	No data transfers over the network. Data is restored from the backup device on the Windows Storage Server computer to the Exchange database on the same server.
Configuration 3 Stand-alone Backup Server	Two data transfers: One data transfer from the Exchange database on the Windows Storage Server computer to the Exchange server. One data transfer from the Exchange server to the separate backup server.	One data transfer: One data transfer from the separate backup server to the Exchange database on the Windows Storage Server computer.

In general, applications that directly access Exchange databases or transaction logs should be run from the location of the databases or transaction logs. This configuration does not require network data transfers and may reduce processing time.

As described earlier, the location of Exchange administrative tools and applications affects the volume of network data traffic. Exchange tools and applications should be strategically located in relation to Exchange databases and transaction logs.

The following sections describe where to store administrative tools and applications so processing is optimized.

Using ESEUtil.exe with the Feature Pack

The ESEUtil.exe utility allows an Exchange administrator to perform tasks on Exchange databases including defragmentation, repair, and recovery. ESEUtil.exe normally runs on the Exchange server.

When Exchange databases and transaction logs are stored remotely on a Windows Storage Server computer, it is generally more efficient to run ESEUtil.exe procedures on the Windows Storage Server computer. This section describes the ESEUtil.exe procedures and provides information about the location from which each procedure should be run, for example, whether to run a specified procedure from the server that contains the Exchange database, from the Exchange server, or from the Windows Storage Server computer.

✎ Note

For more information about using ESEUtil.exe, see the following resources:

- To view a full listing of the syntax and parameters for each ESEUtil.exe procedure, type eseutil /? at any command-line prompt on the Exchange server.
- For more information about running ESEUtil.exe on a Windows Storage Server computer or on any server other than an Exchange server, see Microsoft Knowledge Base article 244525, "XADM: How to Run Eseutil on a Computer Without Exchange Server" (http://go.microsoft.com/fwlink/?LinkId=23123).

Procedures to Run from the Server that Contains the Exchange Databases

The procedures that are described in Table 4.2 must be run from the server that contains the Exchange databases, whether that server is the Exchange server or the Windows Storage Server computer.

Table 4.2   ESEUtil.exe Procedures that Should Be Run from the Server that Contains the Exchange Databases

Procedure	Description
Defragmentation Eseutil /d	Makes used storage contiguous, eliminates unused storage, and compacts the database. Eseutil.exe copies database records to a new database. If there is insufficient space on the original server, the new database could be created on a different server. The function reads all of the records in the database at least one time and writes all records to a new database. If the defragmentation process creates a new database on a different server —for example, on a Windows Storage Server computer — run the defragmentation procedure on the server that contains the new database. For more information about defragmenting a database by using the ESEUtil.exe utility, see Microsoft Knowledge Base article 192185, "XADM: How to Defragment with the Eseutil Utility (Eseutil.exe)" (http://go.microsoft.com/fwlink/?LinkId=23124).
Integrity Eseutil /g	Confirms the integrity of the pages in the database, as well as the integrity of the data on the pages themselves. Reads the database at least one time.
Checksum Eseutil /k	Confirms the integrity of pages in the database by recalculating the checksum on each database page. Reads the database one time. For more information about checking the integrity of a database by using the ESEUtil.exe utility, see Microsoft Knowledge Base article 825088: "How To: Use the Eseutil Utility to Detect File Header Damage in Exchange 2003" (http://go.microsoft.com/fwlink/?LinkId=23125).
Repair Eseutil /p	Modifies parts of the database that are incorrect. The amount of repair work that is necessary depends upon the amount of corruption. Reads the entire Exchange database at least one time. For more information about repairing a database by using the ESEUtil.exe utility, see Microsoft Knowledge Base article 327156: "Error Message: The Database Files in this Storage Are Inconsistent" (http://go.microsoft.com/fwlink/?LinkId=23126).

Procedures to Run from the Exchange Server

The procedure that is described in Table 4.3 should be run from the Exchange server.

Table 4.3   ESEUtil.exe Procedures that Should Be Run from the Exchange Server

Procedure	Description
Recovery Eseutil /r	Reads all log files that have not been committed to the database, and updates the database from the log records. Run this procedure from the Exchange server.

Procedures to Run from either the Exchange Server or the Windows Storage Server

The procedures that are described in Table 4.4 can be run either from the Exchange server or from the Windows Storage Server computer.

Table 4.4   ESEUtil.exe Procedures that Can Be Run from Different Locations

Procedure	Description
File Dump Eseutil /m	Displays the contents of a file on the screen. Run this procedure from either the Exchange server or the Windows Storage Server computer.
Copy File Eseutil /k	Reads and writes the database one time. This operation runs faster than the normal file copy process, but only one file can be copied at a time. Run this procedure on either the Exchange server or the Windows Storage Server computer that stores the source file.

Using Exchange Applications with the Feature Pack

The operation of Exchange applications does not change after the Feature Pack is installed. Applications such as backup, restore, and recovery by using a Recovery Storage Group continue to work in the same way as they did before the Feature Pack was installed.

The Feature Pack does not support the use of Volume Shadow Copy Service (VSS) to back up an Exchange database that is stored on a Windows Storage Server computer, except in conjunction with third-party applications that provide that functionality, as discussed later in this section.

Other third-party Exchange applications should function normally after the Feature Pack is installed. Contact the application vendor for the application to be used to determine if it is compatible with the Feature Pack.

Running Backup and Restore

Backups and restores of an Exchange storage group perform in the same way on the Windows Storage Server computer as they do on DAS or SAN storage. However, the location of the Exchange storage group in relation to the locations of the backup application and the backup tape drive can affect the amount of data that is transferred across the network and, in turn, affect the processing time. For this reason, it is important to consider the effects of different system configurations when setting up backup and restore operations. For more information about how different system configurations can affect backup and restore operations, see "Planning for the Use of Exchange Tools and Applications with the Feature Pack," earlier in this chapter.

During the restore process, the DFS root and links that were created by the Windows Storage Server Mapping Service redirect the restored data to the correct location on the Windows Storage Server computer. The application that is used for the restore process does not require additional information about the location of the Exchange databases and transaction logs.

If the tape drive that is used for the restore is attached directly to the Windows Storage Server computer, data does not have to go through the Exchange server. The backup application copies the contents from the tape and places them directly onto the Windows Storage Server computer by means of the DFS root redirection.

Using a Recovery Storage Group

The Recovery Storage Group feature allows a second copy of an Exchange database to be mounted on the same computer as the original Exchange storage group, or on any other server that is in the same administrative group. This Recovery Storage Group can then be used to recover data without installing and configuring a separate Exchange recovery computer.

To recover a database by using a Recovery Storage Group, the administrator moves the Recovery Storage Group to the server that will host the restored database. Once the move is complete, the restore process can begin. No network data transfer is required, which saves

recovery time.

The Feature Pack supports the use of Recovery Storage Groups for Exchange databases that are stored remotely on a Windows Storage Server computer. As with any storage group, either the Remote Storage Wizard or WSSExchMove.exe must be used to move the Recovery Storage Group to the Windows Storage Server computer. In this case, the move must be completed before the databases in the Recovery Storage Group are mounted and before the restore process begins. If the databases in the Recovery Storage Group are mounted or the restore operation has started, the Recovery Storage Group cannot be moved to the Windows Storage Server computer. Instead, delete the existing Recovery Storage Group and create a new Recovery Storage Group.

For more information about creating and using a Recovery Storage Group, see "Using Exchange Server 2003 Recovery Storage Groups" (http://go.microsoft.com/fwlink/?LinkId=23121).

For more information about using remote storage tools to move Exchange storage groups, see Chapter 3, "Moving Exchange Files to a NAS System."

Using the Volume Shadow Copy Service

The Feature Pack does not redirect requests for a shadow copy from Volume Shadow Copy Service (VSS) to the Windows Storage Server computer. If VSS is initiated from the Exchange server, it cannot take a shadow copy of remotely stored files on the Windows Storage Server computer.

VSS can be initiated from a Windows Storage Server computer to make an offline shadow copy of Exchange files that are remotely stored on the Windows Storage Server computer. If the Microsoft Exchange Information Store service is not stopped before the shadow copy is made, Exchange will continue to update Exchange databases and log files during the operation. This results in an inconsistent Exchange database or transaction log that cannot be used for data recovery. For more information about offline backup and restore procedures, see Microsoft Knowledge Base article 296788, "Offline Backup and Restoration Procedures for Exchange" (http://go.microsoft.com/fwlink/?LinkId=23509).

The Feature Pack does not affect the ability to use VSS to protect non-Exchange files that are stored on the Windows Storage Server computer.

CHAPTER 5

Troubleshooting

This chapter provides solutions to some common problems that occur when a Dell PowerVault NAS system running Microsoft Windows Storage Server 2003 is used to host Exchange databases and transaction logs.

Where multiple solutions are offered, the most common solution is presented first. Apply the solutions in the order in which they are presented.

> **Note**
> The most useful tool for troubleshooting the remote storage of Exchange files is the Detailed Report log file, which gives the current configuration of all storage groups that are owned by the Exchange server. A sequentially numbered Detailed Report log is stored in the My Documents directory tree of the current user each time the Remote Storage Wizard or WSSExchMove.exe is run. For information about the contents of the Detailed Report, see Appendix A, "Interpreting the Detailed Report Log File."

What do I do if my installation is not successful?

Solution: Eliminate sources of interference, and repeat the installation.

1. Make sure the server meets the software requirements for the Feature Pack.

For a listing of software requirements for using the Feature Pack with the Exchange server and the Windows Storage Server computer, see Chapter 2, "Installing the Feature Pack."

2. Close all open applications and install Microsoft Windows Storage Server 2003 Feature Pack again.

3. If a second installation does not succeed, restart the server, and then repeat the installation.

How can I determine which version of the Feature Pack is installed?

Solution: View the Feature Pack version number on the server or print a report that includes it.

- To view the version number of the Feature Pack that is installed on the server, use **Add and Remove Programs**. In **Control Panel**, click **Add and Remove Programs**, click **Windows Storage Server 2003 Feature Pack**, and then click **Click here** for support information.

  -Or-

- To print a Detailed Report that includes the version number of the Feature Pack,. type the following at a command prompt on the Exchange server: **wssexchmove /i**

  The version number for the Feature Pack is listed at the beginning of the report.

Which shares are hosting my Exchange databases and transaction logs?

Solution: View a configuration summary for Exchange storage groups.

- To view a Detailed Report that contains the current configuration of the Exchange storage groups on the server, type the following at a command prompt: `wssexchmove /i`

My move did not complete successfully because shares could not be accessed.

Solution: Verify that the shares exist, and assign missing permissions.

1. Confirm that the computer account for the Exchange server has the following permissions:

- Full Control permission for the share that hosts the Exchange files

- Full Control permission for the underlying folder that is associated with the share

📝 Note

The method that is used to view and update the permissions assigned to the share depends upon how the share was created. If the Web user interface (Web UI) for Windows Server Administration was used to create an Exchange share, properties for the share can be viewed and updated by using the Web UI.
For information about working with shares in the Web UI, see Help for the Web UI. If the share was set up by using Windows Explorer, view and update the properties of the share by using Windows Explorer. For information about setting up shares in Windows Explorer, see Help and Support Center for the Microsoft Windows Server 2003 operating system or the Windows 2000 Server operating system.

2. Assign the required permissions for the shares and for the underlying folders.

3. Use a remote storage tool to perform the full move again.

My move was not successful because the databases could not be remounted.

Solution: Troubleshoot problems with the Exchange databases.

When completing a full move, the remote storage tool attempts to mount any Exchange stores that were involved in the move. If the stores cannot be mounted, the move operation does not complete successfully, and an error message identifies the problem.

If the remote storage tool was able to access the Exchange shares on the Windows Storage Server computer and move the files to the shared folders (that is, inadequate permissions did not interfere with the move), but was unable to remount the store after moving the database, a problem with the Exchange database probably is preventing the store from mounting.

For information about troubleshooting problems with Exchange databases, see Knowledge Base article 328763, "Troubleshooting a Corrupted Exchange Database" (http://go.microsoft.com/fwlink/?LinkId=23122).

The DFS root or DFS links are missing on the Exchange server.

If the DFS root that is used by Exchange or the DFS links that are assigned to Exchange shares on Windows Storage Server computers are missing, you may be able to recreate the DFS root or DFS links by restarting the Windows Storage Server Mapping Service. If restarting the Windows Storage Server Mapping Service does not recreate the DFS root or the DFS links, the Feature Pack must be reinstalled.

Solution 1: Recreate the DFS root and DFS links by restarting the Windows Storage Server Mapping Service.

1. Restart the Windows Storage Server Mapping Service:

    a. On the **Program** menu, click **Administrative Tools**, and then click **Component Services**.

    b. In the console tree, click Services (Local).

    c. In the detail pane, right-click Windows Storage Server Mapping Service, and then click Start.

The service rebuilds the DFS structure that is used for Exchange shares on Windows Storage Server computers and then stops after 5 minutes.

2. To check whether the DFS root and links were created, view a Detailed Report that lists the current configuration of storage groups on the server. At a command prompt on the Exchange server, enter: `wssexchmove /i`

The "Distributed File System Structure" section of the report identifies the DFS root and the DFS links, and tells the state of each DFS link (Pass or Fail).

3. If the DFS links are still missing, restart the Exchange server. Restarting the Exchange server automatically restarts the Windows Storage Server Mapping Service.

Solution 2: Reinstall the Feature Pack; then perform a configuration update to recreate the DFS links.

⬤ **Notice**

Before you uninstall the Feature Pack, it is important to verify that all remotely stored Exchange databases were shut down cleanly. If you reinstall the Feature Pack while corrupted databases are stored on Windows Storage Server computers, recovery procedures in Exchange might not work correctly for those databases.

1. Dismount all Exchange databases stored on the Windows Storage Server computer.

2. Verify that all databases shut down cleanly. To verify the state of each database, perform the following steps:

> **a.** On the Exchange server, navigate to the %ProgramFiles%\Exchsrvr\bin folder.

> **b.** At a command prompt, type the following to view the first 4 kilobytes (KB) of the database file:

> > **eseutil /mh** *filename***.edb**

> **c.** In the **State** field, verify the state of the database: Clean Shutdown or Dirty Shutdown.

> If the Exchange databases did not shut down cleanly, you will need to fix the problems with the databases. For information about troubleshooting problems with Exchange databases, see Knowledge Base article 328763, "Troubleshooting a Corrupted Exchange Database" (http://go.microsoft.com/fwlink/?LinkId=23122).

3. If all remotely stored databases were shut down cleanly, dismount all stores on the Exchange server. For a clustered Exchange server, dismount all databases on the virtual server.

> This ensures that the reinstallation does not corrupt any remotely stored database that is functioning and online during the process.

4. Reinstall the Feature Pack by using the procedures that are described in Chapter 2, "Installing the Feature Pack."

> You must uninstall the Feature Pack before reinstalling the same Feature Pack version.

> Reinstalling the Feature Pack creates the DFS root and local drive mapping that Exchange uses.

5. To recreate the DFS links to Exchange shares on the Windows Storage Server computer, perform a configuration update for each storage group that the server hosts. You must do this for all databases, not just the ones that were corrupted.

> For instructions for moving Exchange files to a Windows Storage Server computer, see Chapter 3, "Moving Exchange Files to a NAS System"

6. Mount the stores in Exchange.

7. After you remount each store, back up the Exchange database immediately.

The mapped drive that Exchange uses was deleted or is not being created.

If the mapped drive that Exchange uses was deleted or is not being created, another application or process might be using the designated drive. If the designated drive is already in use, you can resolve the problem by changing the drive letter that Exchange uses. However, before you change the local drive letter that Exchange uses, try to solve the problem by restarting the Windows Storage Server Mapping Service.

Solution 1: Restart the Windows Storage Server Mapping Service to recreate the drive mapping for the DFS root.

1. Restart the Windows Storage Server Mapping Service:

   a. On the **Program** menu, click **Administrative Tools**, and then click **Component Services**.

   b. In the console tree, click **Services** (**Local**).

   c. In the detail pane, right-click **Windows Storage Server Mapping Service**, and then click **Start**.

   The service recreates the mapped drive that is used for the stand-alone DFS root and then shuts down after 5 minutes.

2. If restarting the Windows Storage Server Mapping Service does not recreate the drive mapping for the DFS root, try restarting the Exchange server. Restarting the Exchange server restarts the Windows Storage Server Mapping Service, which recreates the mapped drive that is used for the DFS root.

Solution 2: Change the drive letter being used for Exchange shares.

➡ Notice

Before changing the drive letter that Exchange uses, it is important to verify that all of the Exchange databases that are stored on a Windows Storage Server computer shut down cleanly. If the drive letter is changed while a corrupted Exchange database is stored on the Windows Storage Server computer, normal recovery routines might not work correctly.

1. Before changing the mapped drive that Exchange uses, verify that all dismounted Exchange databases on the Windows Storage Server computer shut down cleanly. To verify this, check the state of each dismounted database by performing the following steps:

   a. On the Exchange server, navigate to the %ProgramFiles%\Exchsrvr\bin folder.

   b. At a command prompt, type the following to view the first 4 KB of the database file:

   ```
   eseutil /mh filename.edb
   ```

   c. In the **State** field, verify the state of the database: Clean Shutdown or Dirty Shutdown.

   If the Exchange databases did not shut down cleanly, you will need to fix the problems with the databases. For information about troubleshooting problems with Exchange databases, see Knowledge base article 328763, "Troubleshooting a Corrupted Exchange Database" (http://go.microsoft.com/fwlink/?LinkId=23122).

   If the Exchange databases were shut down cleanly, it is possible that a newly installed application is starting more quickly than the Feature Pack and using the drive letter. To resolve this problem, remap the drive that is used for Exchange shares on the Windows Storage Server computer to a different drive letter.

   2. If the databases were shut down cleanly, use the WSSExchMove.exe command-line tool to map a different drive letter for use by Exchange. At a command prompt on the Exchange server, enter: **wssexchmove /m** *driveletter*

All DFS links for Exchange shares on the Windows Storage Server computer are recreated under a new DFS root, which is mapped to the new drive letter.

APPENDIX A

Detailed Report Log File

The Detailed Report log file provides a summary of the current configuration and status of storage groups on the Exchange server when Microsoft Windows Storage Server 2003 Feature Pack is in use. For an Exchange cluster, the log file provides information about all storage groups on each virtual server in the cluster. The report provides information about the Distributed File System (DFS) root, DFS links, and local drive mapping being used for Exchange shares that are hosted by Windows Storage Server computers, as well as any errors and warnings that occur. Use the report to diagnose problems with Exchange shares that are hosted on Windows Storage Server computers.

Viewing a Detailed Report Log File

Whenever a remote storage tool is used to move Exchange databases or transaction logs to a Windows Storage Server computer, a Detailed Report log file is saved. The Detailed Report describes the current configuration of storage groups on the Exchange server, and the status of the shares that are currently being used to host Exchange databases and transaction logs. The log files are numbered sequentially and given the name Detailed Report - 01.log, Detailed Report - 02.log, and so forth. Each log file is stored in the My Documents\Windows Storage Server Logs\ folder of the current user. Only the most recent 99 logs are retained for the user.

To view the current configuration of storage groups at any time, you can use WSSExchMove.exe to display a Detailed Report that contains the current configuration.

To view a Detailed Report

- At any command prompt on the Exchange server, enter **wssexchmove /i**

  This command displays the current configuration of storage groups on the Exchange server in the command windows in Detailed Report format.

  -Or-

- From the Remote Storage Wizard, on the completion page, select the **View detailed report when the wizard closes** check box to view a log file that contains the current configuration when the wizard completes.

To view an existing Detailed Report log file

- In the My Documents\Windows Storage Server Logs\, open the log file of interest. Each log file is named Detailed Report - *n*.log, where *n* is a sequentially assigned number that uniquely identifies the log in the My Documents directory tree of the Exchange administrator who performed the move operation.

Contents of the Detailed Report

The Detailed Report log file includes five sections, which provide detailed information about the locations and status of the transaction logs and databases for Exchange storage groups on the local Exchange server. For a cluster of Exchange servers, the report gives the configuration for each virtual server in the cluster. Table A.1 describes the sections of the Detailed Report log file.

Table A.1 Sections of the Detailed Report Log File

Report Section	Description
Report header	Identifies the version of the Feature Pack and the date and time when the report was generated.
Storage Group	Identifies the locations of transaction logs, system files, and database stores for an Exchange storage group. The report includes a separate section for each storage group on the Exchange server. For an Exchange cluster, a section is included for each storage group on each virtual server in the cluster.
Mapped Drive	Identifies the drive letter on the local Exchange server that is being used for Exchange shares on Windows Storage Server computers.
Distributed File System Structure	Identifies the DFS root and the link name, link target, and status of each DFS link associated with Exchange files that are stored remotely on Windows Storage Server computers.
WSSExchMapSvc	Identifies the mode and state of the Windows Storage Server Mapping Service (WSSExchMapSvc).
Errors and Warnings Encountered During Execution	Lists errors and warnings that were encountered during any operations that were performed.

Each section of the report is described in greater detail in the sections that follow.

Report Header

The report header identifies the current Feature Pack release, and the date and time when the report was generated.

Item	Description
Version Information	The version number of Windows Storage Server 2003 Feature Pack that is installed.
Performed On Date	The date and time when the report was generated.

Storage Group

Each "Storage Group" section in the Detailed Report log file gives the configuration of transaction logs, system files, and stores for a storage group. The log file contains a "Storage Group" section for each storage group on the local Exchange server. If the Exchange server is in a cluster, the log file contains a "Storage Group" section for each storage group on all virtual servers in the cluster.

To identify problems with the storage group configurations, it is necessary to understand the difference between the Current Location and the location that is stored in Microsoft Windows Server 2003 Active Directory directory service (identified as the AD Location) for the transaction logs and stores.

Exchange files stored on the Exchange server

If the transaction logs or database files are stored on the local Exchange server, the Current Location and the Current AD Location should be identical.

Exchange files stored on Windows Storage Server computers

If the transaction logs or database files are stored on a Windows Storage Server computer, the Current Location is a Universal Naming Convention (UNC) path to the transaction logs, and the

Current AD Location contains the mapped drive version of the UNC path, which Exchange uses.

For example, remotely stored Exchange transaction logs with the UNC path \\storageserver01\Exchange_TLOGS might have an AD location of S:\{storageserver01.0}, where S: is the local drive letter mapped for Exchange shares on Windows Storage Server computers and {storageserver01.0} is the link name that was assigned when the transaction logs were moved to the Windows Storage Server computer, storageserver01.

If these two addresses point to the same physical location, the link target for the link matches the UNC path in the Current Location. To check this, look for the Link Target that is associated with the Link Name in the "Distributed File System Structure" section, later in the Detailed Report log file. The link name is the portion of the AD Location that is enclosed in curly brackets; the curly brackets are part of the name. In the example, the Link Target for the {storageserver01.0} link is \\storageserver01\Exchange_TLOGS, indicating that the two settings represent the same physical location.

Log Files

The "Log Files" section reports whether any action was taken on the transaction logs for the Exchange storage group, and indicates both their physical location and the location that is configured in Active Directory.

Item	Description
Original Location	The location of the transaction logs on the Exchange server before any action was taken.
Action Requested	The action that was performed on the transaction logs: Configuration Update, Relocate, or None.
Action Result	The result of the requested action, indicating whether the operation succeeded or failed.
Current Location	The physical path of the transaction logs after any requested action is performed. If the logs are stored on the local Exchange server, this is the full path to the destination folder. If the logs are stored on a Windows Storage Server computer, this is the UNC path of the destination share — for example, \\storageserver01\Exchange_TLOGS.
Current AD Location	The path that is currently stored in Active Directory, which Exchange uses to locate the transaction logs. If the logs are stored on a Windows Storage Server computer, this is the mapped drive version of the UNC path — for example, S:\{storageserver01.0}.

System Files

The "System Files" section reports the Current Location and the Current AD Location for the system files for the Exchange database. Because the remote storage tools do not move these files, the Current Location and the Current AD Location should be a local path on the Exchange server, and the two locations should be identical.

Item	Description
Current Location	The physical path of the system files.
Current AD Location	The path that is currently stored in Active Directory, which Exchange uses to locate its system files.

Store

Each "Store" section reports the configuration of the database files in a store. The configuration of the database (.edb) file is listed separately from the configuration of the streaming database (.stm) file. Because the remote storage tools move the .edb and .stm files for a store to the same destination at the same time, the current configuration of any databases that have been moved by using one of the tools should be identical, except for the file names.

Item	Description
Original Location	The location of the database file on the Exchange server before any action was taken.
Action Requested	The action (if any) that was performed on the database file: Configuration Update, Relocate, or None.
Action Result	The result of the requested action, indicating whether the operation succeeded or failed.
Current Location	The physical path of the database file after any requested action was performed. If the database file is stored on the local Exchange server, this is the full path to the .edb file on the local computer. If the database file is stored on a Windows Storage Server computer, this is the UNC path of the database file — for example, \\storageserver01\Exchange_DB\mail1.edb.
Current AD Location	The path that is currently stored in Active Directory, which Exchange uses to locate the database file. If the database file is stored on a Windows Storage Server computer, this is the mapped drive version of the UNC path — for example, S:\{storageserver01.1}\mail1.edb.

Mapped Drive

The "Mapped Drive" section provides the following information about the mapped drive that Exchange is using for databases and transaction logs that are stored on Windows Storage Server computers.

Item	Description
Original Location	The UNC path of the mapped drive before any action was taken — for example, \\Exchange01\S$.
Action Requested	The action that was performed on the mapped drive: Configuration Update or None.
Action Result	The result of the requested action, indicating whether the operation succeeded or failed.
Current Location	The UNC path of the mapped drive after any requested action was performed.

By default, the Exchange shares are mapped to the S: drive when the Feature Pack is installed. If the S: drive is already in use, the next available drive letter on the Exchange server is assigned.

An organization can change the mapped drive, automatically updating the configuration of the DFS root and DFS links on the Exchange server, by using the **/m** parameter with WSSExchMove.exe. For more information about the syntax of this command, see Chapter 3, "Moving Exchange Files to a NAS System."

Distributed File System Structure

The "Distributed Files System Structure" section summarizes the elements of the Distributed File System (DFS) structure that is currently in use for Exchange files on Windows Storage Server computers. The Feature Pack uses a mapped drive in combination with the DFS to enable

the remote storage of Exchange files on Windows Storage Server computers.

DFS Root

The "DFS Root" section identifies the DFS root folder and root name that Exchange is using.

Item	Description
DFS Root Folder	The folder that is hosting the stand-alone DFS root on the Exchange server. This will be the absolute path of %ProgramFiles%\Windows Storage Server\Exchange\DFS. Note: Do not move, rename, or remove this folder at any time.
DFS Root Name	The name of the DFS root. This should correspond to the drive letter that is being used for the mapped drive. By default, letter S is used for the mapped drive, and the DFS root name is S$.

DFS Links

The "DFS Links" section provides the following information about each DFS link that has been created for Exchange shares on the Exchange server.

Item	Description
DFS Link	The name given to the DFS link. The format of this name is {storageserver.n}, where orageserver is the name of the destination Windows Storage Server computer and n is a sequentially assigned number that uniquely identifies the link on the Windows Storage Server computer. The curly brackets ({}) are included in the name. A separate link is created for each .edb file and each .stm file for each store; a single link is created for all transaction logs for the storage group.
Link Target	The UNC path to the destination location of the link — for example, \\storageserver01\Exchange_TLOGS. For transaction logs, the link target should match the Current Location that is presented in the "Storage Group Information" section. For a database file, the link target should be the Current Location without the file name.
State	The current state of the Server Message Block (SMB) share located at the link target: Pass or Fail - Share not found. To have Pass state, the share must exist and be accessible. For the share to be accessible, the Windows Storage Server must be online, the Exchange server must have Full Control permission for the share as well as the underlying folder, and the Exchange administrator who is performing the current operation must have the same permissions.

WSSExchMapSvc

The "WSSExchMapSvc" section indicates the status and run mode of Windows Storage Server Mapping Service, a service that creates the mapped drives and link targets that Exchange uses to recognize Exchange storage groups that are stored on Windows Storage Server computers.

Item	Description
Current Status	The current status of Windows Storage Server Mapping Service: Running, Stopped, or Unknown.
	Note: Windows Storage Server Mapping Service is active for only a 5-minute period when the Exchange server is restarted or when the Exchange Information Store Service is started. After the Windows Storage Server Mapping Service verifies the existence of the DFS root and DFS links, and verifies access to the shares that are associated with the DFS links, the service shuts down. A status of Stopped is normal.
Run Mode	The current run mode of Windows Storage Server Mapping Service: Automatic, Manual, Disabled, or Unknown.
	For the Feature Pack to operate correctly, always set Run Mode to Automatic.

Errors and Warnings Encountered During Execution

The "Errors and Warnings Encouraged During Execution" section concludes the Detailed Report log file. This section lists all errors and warnings that were encountered during any operations that were requested when the Detailed Report log file was generated.

APPENDIX B

Additional Resources

This appendix lists additional resources that may be helpful when working with the Microsoft Windows Storage Server 2003 Feature Pack.

Installing the Feature Pack

- For detailed instructions for installing the Feature Pack on the Windows Storage server computer and the Exchange server, see the *Microsoft Windows Storage Server 2003 Feature Pack Installation Guide*, located in %ProgramFiles%\Windows Storage Server\Exchange\Installation_Guide.doc.

- For information about Windows Installer arguments, see "Command Line Options" in the Windows Installer documentation in the Platform Software Development Kit (PSDK) at the Microsoft Web site (http://msdn.microsoft.com).

Moving Exchange Files to a Windows Storage Server Computer

- For information about using the Remote Storage Wizard or the WSSExchMove.exe command-line tool to move Exchange databases and log files to a Windows Storage Server computer, see Help for Remote Storage Tools for Exchange (%ProgramFiles%\Windows Storage Server\Exchange\RemoteStorage.chm, on the Exchange server).

- For information about using the Microsoft Web User Interface for Windows Server™ Administration (Web UI) to create Server Message Block (SMB) shares to host Exchange files on a Windows Storage Server computer, see Help for the Web UI.

Administering Exchange Databases

- For general information about using Exchange Server 2003 to perform database administration, or to learn how to administer and manage Exchange server clusters, see the Microsoft Exchange Server 2003 Administration Guide on the Microsoft TechNet site (http://go.microsoft.com/fwlink/?LinkId=21769).

- For information about creating storage groups in Exchange 2003, see Help for Exchange System Manager.

- For information about using Recovery Storage Groups in Exchange, see "Using Exchange Server 2003 Recovery Storage Groups" (http://go.microsoft.com/fwlink/?LinkId=23121).

- For more information about Exchange clusters, including cluster capacity and configuration considerations, see the Microsoft Exchange Server 2003 Deployment Guide on the Exchange 2003 Deployment website (http://go.microsoft.com/fwlink/?LinkId=23412).

- For general information about troubleshooting problems with Exchange databases, see Microsoft Knowledge Base article 328763, "Troubleshooting a Corrupted Exchange Database" (http://go.microsoft.com/fwlink/?LinkId=23122).

- For information about running ESEUtil.exe on a Windows Storage Server computer or on any server other than an Exchange server, see Microsoft Knowledge Base article 244525, "XADM: How to Run Eseutil on a Computer Without Exchange Server" (http://go.microsoft.com/fwlink/?LinkId=23123).

- For information about defragmenting a database by using the ESEUtil.exe utility, see Microsoft Knowledge Base article 192185, "XADM: How to Defragment with the Eseutil Utility (Eseutil.exe)" (http://go.microsoft.com/fwlink/?LinkId=23124).

- For information about checking the integrity of a database by using the ESEUtil.exe utility, see Microsoft Knowledge Base article 825088: "How To: Use the Eseutil Utility to Detect File Header Damage in Exchange 2003" (http://go.microsoft.com/fwlink/?LinkId=23125).

- For information about repairing a database by using the ESEUtil.exe utility, see Microsoft Knowledge Base article 327156: "Error Message: The Database Files in this Storage Are Inconsistent" (http://go.microsoft.com/fwlink/?LinkId=23126).

- For more information about offline backup and restore processes, see Microsoft Knowledge Base article 296788, "Offline Backup and Restoration Procedures for Exchange" (http://go.microsoft.com/fwlink/?LinkId=23509).

Testing Performance of the Exchange Server

- For more information about LoadSim or to download the tool, see Microsoft Exchange 2003: Load Simulator 2003 on the Microsoft Download Center website (http://go.microsoft.com/fwlink/?LinkId=23364).

- For more information about the MMB3 user profile, see Exchange Server 2003 MAPI Messaging Benchmark 3 (MMB3) on the Microsoft Exchange Server website (http://go.microsoft.com/fwlink/?LinkId=23367).

Planning Security

- For security guidelines for an Exchange server running Microsoft Exchange Server 2003, see Planning an Exchange Server 2003 Messaging System (http://go.microsoft.com/fwlink/?LinkId=23131).