SnapManager® StoreVault® Edition 4.0S1 for Microsoft® Exchange
Installation and Administration Guide

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Preface

About this guide

This guide describes how to install and configure SnapManager StoreVault Edition 4.0S1 for Microsoft Exchange software and use its online backup and restore features. It also describes how to use StoreVault Replication functionality with SnapManager.

This guide does not explain how to install, configure, and use the SnapDrive® features that enable you to create and connect to LUNs, which you must do before you use SnapManager. For this information and details about how to configure storage system volumes and enable storage system access, see your SnapDrive documentation.

This guide does not cover basic system or network administration topics, such as IP addressing, routing, and other network topology.

Audience

This guide is for system and database administrators with a working knowledge of Microsoft Exchange. The discussion assumes familiarity with the following topics:

- Microsoft Exchange server administration
- Network functions and operations
- Basic concepts for moving data over a network
- Your operating system, network, and storage system, such as a FAS system
- CIFS protocols, as used for file sharing and file transfers
- FCP and iSCSI LUN access protocols

Typographic conventions

The following table describes the typographic conventions used in this guide.

Convention	Type of information
Italic type	Words or characters that require special attention. Placeholders for information you must supply. For example, if the guide says to enter the `arp -d` *hostname* command, you enter the characters “arp -d” followed by the actual name of the host. Book titles in cross-references.

Convention	Type of information
`Monospaced` font	Command and daemon names. Information displayed on the system console or other computer monitors. The contents of files. Formulae and calculations.
`Bold monospaced` font	Words or characters you type. What you type is always shown in lowercase letters, unless you must type it in uppercase letters.

Special messages

This document might contain the following types of messages to alert you to conditions you need to be aware of. Danger notices and caution notices only appear in hardware documentation, where applicable.

Note

A note contains important information that helps you install or operate the system efficiently.

Attention

An attention notice contains instructions that you must follow to avoid a system crash, loss of data, or damage to the equipment.

Danger

A danger notice warns you of conditions or procedures that can result in death or severe personal injury.

CAUTION

A caution notice warns you of conditions or procedures that can cause personal injury that is neither lethal nor extremely hazardous.

Understanding SnapManager 1

This section explains how SnapManager 4.0 for Microsoft Exchange works and how it integrates with the rest of your environment. The following topics are covered in this section:

- "SnapManager overview" on page 2
- "How SnapManager works with the other system components" on page 9
- "How SnapManager works with other backup methods" on page 14

Related topics:

- Chapter 2, "Preparing to Install SnapManager," on page 19
- Chapter 3, "Installing SnapManager," on page 31
- Chapter 4, "Starting SnapManager for the First Time," on page 47

SnapManager overview

SnapManager provides an integrated data management solution for Microsoft Exchange that dramatically boosts the availability, scalability, and reliability of Exchange databases. See the following topics for more information:

- "New functionality for this version" on page 2
- "What SnapManager does" on page 5
- "What SnapManager does not do" on page 6
- "Where you install and run SnapManager" on page 6
- "About the SnapManager graphical user interface (GUI)" on page 7
- "About the SnapManager command line interface" on page 8
- "How you use SnapManager" on page 8

Related topics:

- "How SnapManager works with the other system components" on page 9
- "How SnapManager works with other backup methods" on page 14

New functionality for this version

SnapManager 4.0 for Microsoft Exchange supports the following new features:

- Support for Exchange Server 2007
- Support for 50 storage groups and 50 databases (Exchange Server 2007)
- Support for Exchange Server 2007 replication features: Local Continuous Replication (LCR)
- Restoration of backups created on a different Exchange server
- Restoration to recovery storage group
- SnapManager 64-bit and 32-bit versions
- Support for SnapDrive 5.0
- MMC 3.0 user interface with centralized dashboard view
- SnapManager for Exchange PowerShell command line interface

Support for Exchange Server 2007: SnapManager 4.0 provides support for Exchange Server 2007, a new Microsoft Exchange product. Exchange Server 2007 introduces new features to provide a more secure, flexible, and scalable messaging system. For more information about Exchange Server 2007, see the Microsoft Exchange Server 2007 guide. For brief details on new Exchange features and database functionality, see "What is new in Exchange Server 2007" on page 18.

Storage groups and databases: SnapManager 4.0 for Microsoft Exchange supports migration, backup, and restoration of storage groups and databases. Exchange Server 2007 supports up to 50 storage groups and 50 databases, whereas Exchange Server 2003 supports only up to 4 storage groups and 20 databases.

Support for Exchange Server 2007 replication features: SnapManager 4.0 provides support for the following Exchange Server 2007 replication features, which can provide quick recovery and high availability of Exchange databases:

- Local Continuous Replication (LCR)

  LCR is a single-server solution that uses built-in asynchronous log shipping technology to create and maintain a copy, or replica, of a storage group on a second set of disks that are connected to the same server as the production storage group. This is the first time log shipping is supported in Exchange. An LCR protects the Exchange databases that are stored in the local production server. SnapManger support for an LCR also provides log replay and quick manual switch to a secondary copy of the data. Using an LCR support with SnapManager, you can back up replicas and restore replica backups to Exchange server during disaster recovery.

  The following table provides sources of information for the tasks that you can perform with the LCR feature.

Task	Source of information
Configure and migrate databases with an LCR replicas	See "Understanding the migration of LCR-enabled databases" on page 129.
Backup databases with an LCR replicas	See "Backing up an LCR-enabled database" on page 178.
Restore databases with an LCR replicas	See "Restoring from an LCR-enabled storage group" on page 218.

Restore backups created on a different server: With SnapManager 4.0, you can restore backups created on a different Exchange server during the restore operation. For more information, see "Restoring backups created on different Exchange servers" on page 235.

Restore to recovery storage group: With SnapManager 4.0 for Exchange, you can restore databases to the recovery storage group (RSG). You can perform this task both on Exchange Server 2003 and Exchange Server 2007 using SnapManager. For more information, see "Restoring to a recovery storage group" on page 226.

SnapManager 64-bit and 32-bit versions: SnapManager 4.0 for Exchange is now available in both 64-bit and 32-bit versions.

Support for SnapDrive 5.0: SnapManager 4.0 for Exchange is compatible with SnapDrive 5.0. SnapDrive versions prior to 5.0 are not supported with SnapManager 4.0 for Microsoft Exchange.

What SnapManager does

SnapManager provides rapid online backup and near instantaneous restoration of Exchange databases by using online Snapshot™ technology that is part of the Data ONTAP® software and integrating the Microsoft Exchange backup and restore APIs and VSS. SnapManager can also leverage the StoreVault Replication capabilities of storage systems to provide on-site or off-site SnapManager backup set mirroring for disaster recovery.

Data management: SnapManager supports the following data management capabilities:

- Migrating Exchange databases and transaction logs to LUNs on storage systems
- Backing up Exchange databases and transaction logs from LUNs on storage systems
- Verifying the backed-up Exchange databases and transaction logs
- Managing the SnapManager backup sets
- Restoring Exchange databases and transaction logs from previously created SnapManager backup sets

Data archival for long-term or remote storage of backups: You can use SnapManager to create offline archives of Snapshot copies containing Exchange backup sets for long term or remote backup storage. Three different archive methods are supported:

- Manually initiated archival using NDMP (Network Data Management Protocol) or the storage system's `dump` command
- Manually initiated archival using a Windows backup utility
- Automatic archival using the Run Command After Operation feature with your backup operation

The archival of Exchange database backup sets using SnapManager is described in Chapter 15, "Archiving SnapManager Backups," on page 293 and in Chapter 14, "Performing Disaster Recovery with SnapManager," on page 267.

Data replication for disaster recovery: When used with StoreVault Replication, SnapManager provides the ability to automatically replicate databases stored on the source volume to its mirrored target volume situated locally or remotely.

Data replication using SnapManager with StoreVault Replication is described in Chapter 13, "Using StoreVault Replication with SnapManager," on page 255 and in Chapter 14, "Performing Disaster Recovery with SnapManager," on page 267.

What SnapManager does not do

SnapManager 4.0 for Microsoft Exchange does not support the following uses:

- SnapManager does not support the capability to restore individual mailboxes or public folders.
- SnapManager does not support SnapDrive versions prior to 5.0.
- SnapManager does not create or restore backups of Microsoft Exchange databases that are stored on storage devices that are provided by companies other than .
- SnapManager does not support Microsoft Windows 2000.
- SnapManager does not restore Microsoft Exchange Server 2003 and Microsoft Exchange Server 2007 databases to an alternate location.
- SnapManager does not back up and restore Microsoft Exchange 5.5 and Exchange 2000 databases.
- SnapManager is not supported for use on Windows Server 2003 IA-64 edition.

Where you install and run SnapManager

You can run SnapManager on your Exchange server or on a different Windows host system. When you run SnapManager on a different Windows network host, it is called *SnapManager remote administration*.

Local administration: Typically, you install SnapManager on the same Windows host system as your Exchange server.

System requirements for a SnapManager local administration system are described in "Understanding Windows host system requirements" on page 26.

Remote administration: If you install SnapManager on a computer remote from the Exchange server, you can run SnapManager remotely to perform any task that you can on a locally installed SnapManager system.

System requirements for a SnapManager remote administration system are described in "Requirements for a remote administration server" on page 29.

Remote verification: From a remote administration server that is configured with SnapDrive and Exchange server, you can also perform remote database verification. Remote verification offloads the CPU-intensive database verification operations that can affect the performance of your production Exchange server.

System requirements for a SnapManager remote administration system used for remote verification are described in "Requirements for a remote verification server" on page 29.

The setup and use of a remote verification server is described in Chapter 10, "Backing Up Databases with SnapManager," on page 165.

About the SnapManager graphical user interface (GUI)

SnapManager 4.0 for Microsoft Exchange has a Microsoft Management Console (MMC) snap-in graphical user interface that can be used in combination with other MMC snap-ins to create a single console for managing Exchange and storage system components. The new graphical interface enables you to:

- Manage and administer multiple instances of SnapManager for Exchange successfully.
- Manage backup and restore operations of Exchange database files and transaction log files on LUNs.
- Schedule backups and verify the integrity of databases in SnapManager backup sets.
- Administer SnapManager for Exchange on another Exchange server computer on the network.
- Configure Exchange database, transaction logs, and SMTP queue locations that are required for SnapManager backup and restore operations.

The SnapManager graphical user interface enables you to manage backup and restore operations of Exchange database files and transaction log files on storage systems. The user interface also enables you to schedule backups and verify the integrity of databases in SnapManager backup sets. You can also use the SnapManager user interface to administer SnapManager for Exchange on another Exchange server computer on the network. SnapManager includes the following components:

- Configuration Wizard
- Configuration Wizard Option Settings
- Backup Wizard
- Backup Settings
- Backup Verification Settings
- Delete Backup
- Notification Settings
- Restore Wizard
- Run Command After Operation
- Fractional Space Reservation Settings
- Disconnect Server
- Connect Server
- Report Directory Settings

- Run SnapManager As
- Update Settings
- Refresh
- Help

For more information, see "Understanding the SnapManager GUI" on page 57.

About the SnapManager command line interface

SnapManager 4.0 for Microsoft Exchange supports the new SnapManager command line functionality called *cmdlet*, through SnapManager for Exchange PowerShell. This SnapManager command line interface enables you to initiate a new backup, verify backup, restore backup, and delete backup operations.

For more information, see "SnapManager Command-Line Reference" on page 323.

How you use SnapManager

You can run SnapManager on your Exchange server or on a different computer. When you run SnapManager on a different computer, it is called "SnapManager remote administration". Using a SnapManager remote administration system, you can perform any task you can on a locally installed SnapManager system. When you perform database verification on a remote system, it is referred to as "remote verification."

The following steps describe a typical way to use SnapManager:

- After installing SnapManager, you use SnapManager Configuration Wizard to dismount your Exchange databases and move them to LUNs on a storage system. The Configuration Wizard ensures that your Exchange data is placed correctly.
- After you configure the Exchange data store, you can use SnapManager Backup to create backups of the Exchange data.
- If the need arises, you can use SnapManager Restore to restore your Exchange data (either entire storage groups or individual databases) from one of the backups.

Using SnapManager's backup facility to initiate StoreVault Replication through SnapDrive, you can create mirror replications of these databases to be used for various purposes, such as disaster recovery.

How SnapManager works with the other system components

This section describes how SnapManager works with the other system components. See the following topics for more information:

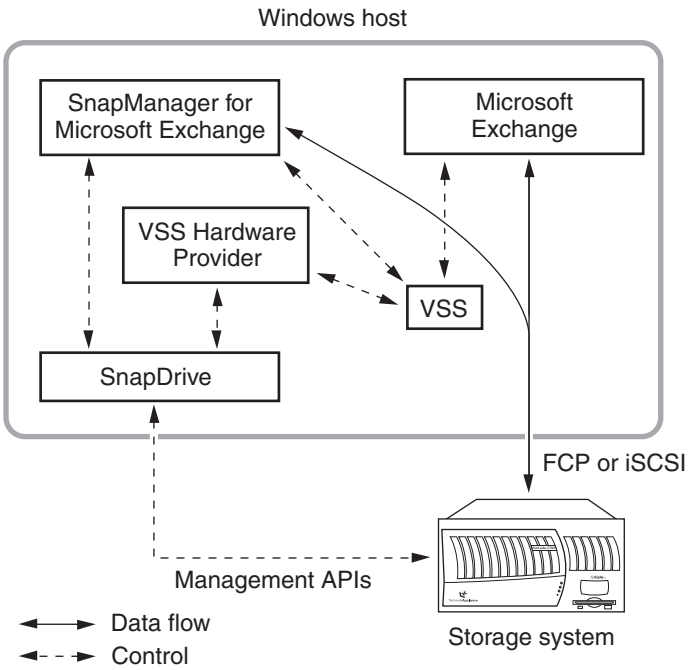
- "System overview" on page 9
- "SnapManager and SnapDrive" on page 10
- "SnapManager and VSS" on page 10
- "SnapManager and Snapshot copies" on page 11

Related topics:

- "SnapManager overview" on page 2
- "How SnapManager works with other backup methods" on page 14

System overview

The following diagrams show how SnapManager interacts with other components of an Exchange installation backed by a storage system, in Windows Server 2003 environments.



SnapManager on Windows Server 2003

SnapManager and SnapDrive

How SnapManager and SnapDrive work together: SnapManager is an Exchange-aware application that uses the VSS (for Exchange servers running Windows Server 2003) to provide backup and restore functionality in an Exchange environment.

SnapDrive integrates with the NTFS Windows file system, Windows Volume Manager, and LUNs to enable the management of storage resources on the storage system in the Windows environment. SnapDrive provides the underlying layer of support for SnapManager.

When to use SnapManager and when to use SnapDrive: You use SnapManager for all backups and related operations. For example, you use SnapManager to establish your Exchange databases on LUNs on a storage system and to back up and restore LUNs on the storage system.

You use SnapDrive only to create and manage the LUNs and storage system volumes that contain your Exchange data and to perform supplemental mirror updates of the transaction log volume when StoreVault Replication is used.

SnapManager and VSS

What VSS is: Microsoft Volume Shadow Copy Service (VSS) is a new feature of Microsoft Windows Server 2003 that coordinates between data servers, backup applications, and storage management software to support the creation and management of consistent shadow copies, or Snapshot copies. The Data ONTAP VSS Hardware Provider integrates the SnapDrive service and storage systems running Data ONTAP into the VSS framework. For more information about VSS, see your SnapDrive documentation.

How SnapManager uses VSS: In the Windows Server 2003 environment, SnapManager is a VSS requestor, which means that it uses the VSS subsystem to initiate backups.

How you manage VSS Snapshot copies created by SnapManager:

Although SnapManager uses VSS to create Snapshot copies, you manage the resulting Snapshot copies using SnapManager or SnapDrive. You cannot use the VSS administration tool `vssadmin` to manage Snapshot copies created by SnapManager.

Data ONTAP VSS Hardware Provider requirement: Because SnapManager uses VSS to create Snapshot copies on the storage system in the Windows Server 2003 environment, you must have the Data ONTAP VSS Hardware Provider installed for SnapManager to function properly. The Data ONTAP VSS hardware provider is now included with SnapDrive 5.0 and does not need to be installed separately.

SnapManager and Snapshot copies

About SnapManager and Snapshot copies: A Snapshot copy is a point-in-time, read-only copy of a LUN stored on a storage system volume. SnapManager Backup uses Snapshot functionality to create real-time, online, read-only copies of Exchange databases. A SnapManager backup can consist of several Snapshot copies, depending on how your Exchange data is configured.

Note

You must always use SnapManager to manage SnapManager backups, rather than managing the associated storage system Snapshot copies using SnapDrive, VSS, or storage system administration tools, such as the FilerView® interface.

When to use the various Snapshot copy and backup methods: There are multiple ways to take Snapshot copies or backups in an Exchange installation that includes SnapManager. It is important to understand when each of these methods can produce a restorable image and when they cannot.

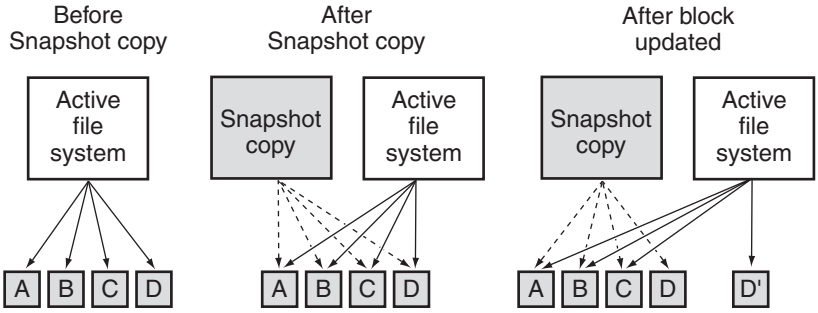
When one or more Exchange databases are mounted, Snapshot copy-based backups should be performed using only SnapManager. Taking a Snapshot copy of the Exchange databases from the storage system console, FilerView, SnapDrive, or a non-Exchange-aware Windows backup utility results in an inconsistent image of the Exchange database that is unusable for a restore process.

The following table illustrates when each of the Snapshot copy or backup methods can create restorable backups.

Tool used to create Snapshot copy or backup	System state		
	Exchange online	All Exchange dbs dismounted	All LUNs disconnected
SnapManager Backup	OK	N/A	N/A
SnapDrive	invalid	OK	N/A
Exchange-aware Windows backup utility	OK (copy backup only)	N/A	N/A
Non-Exchange-aware backup utility	invalid	OK (copy backup only)	N/A

Tool used to create Snapshot copy or backup	System state		
	Exchange online	All Exchange dbs dismounted	All LUNs disconnected
Storage system tools	invalid	invalid	OK

Understanding Snapshot copies: The following figure provides an example of how Snapshot copies work.



Example: Suppose you take a Snapshot copy of a file named file.txt that spans four disk blocks in the active file system. Initially, the Snapshot copy version of file.txt and the version in the active file system are identical: the same blocks on disk store both versions, so the Snapshot copy version of file.txt consumes no additional disk space.

Now suppose that you make a modification to file.txt that affects only one of the four disk blocks. The new data cannot overwrite the original block because that block is needed as part of the Snapshot copy. So the new data is written to a new disk block and the file's inodes are updated accordingly. The active file system inodes now reference the three original disk blocks that have not been touched since the Snapshot copy, plus the one new block. The Snapshot copy inodes still reference the original four blocks.

If you delete file.txt, the blocks holding its data are no longer part of the active file system, but they are still part of the Snapshot copy; deleting file.txt from the active file system does not free any disk space until the Snapshot copy is deleted.

Maximum number of Snapshot copies you can retain: Data ONTAP® software allows a maximum of 255 Snapshot copies per storage system volume. Because SnapManager backups create Snapshot copies, you must delete old SnapManager backups as they are no longer needed to avoid reaching the limit.

Note

The number of Snapshot copies on a volume can be greater than the number of SnapManager backups being retained. For example, if a single volume contains both the SnapInfo directory and the Exchange databases, each SnapManager backup generates two Snapshot copies on that volume.

How SnapManager works with other backup methods

It is best to employ SnapManager technology as a complement to conventional backup processes. See the following topics for more information:

- "SnapManager and your current backup processes" on page 14
- "Type of external backup to use with SnapManager" on page 14
- "Exchange files you should back up using a Windows backup utility in Exchange Server 2003" on page 16
- "Exchange files you should back up using a Windows backup utility in Exchange Server 2007" on page 17
- "What is new in Exchange Server 2007" on page 18

Related topics:

- "SnapManager overview" on page 2
- "How SnapManager works with the other system components" on page 9

SnapManager and your current backup processes

SnapManager complements conventional backup processes. For example, SnapManager backups reside on disk. To archive SnapManager backups to another storage medium, such as tape, you use the same tools and processes you currently employ.

However, some backup processes interfere with SnapManager's ability to back up and restore correctly. It is important that you understand which of your current backup tools and processes must be modified or eliminated when you implement SnapManager.

SnapManager backups are not intended to replace periodic disaster recovery measures, such as archiving to tape or other offline media.

Type of external backup to use with SnapManager

Exchange-aware backup tools (such as NTBackup) can create backups of different types. Generally, SnapManager backups replace these backups. However, if you need to create a backup using an Exchange-aware backup tool on a system with SnapManager installed, you must use only a copy or differential backup.

Attention

Using an Exchange backup tool to create a backup of a type other than copy or differential after you implement SnapManager causes your previously created SnapManager backups to become unusable for up-to-the-minute restores.

The following table describes the backup types.

Backup type	Description	Result
Copy	Backs up all selected files; does not clear archive bit	OK SnapManager backups unaffected
Normal (full)	Backs up all selected files and clears archive bit	DO NOT USE Truncates transaction logs; disables SnapManager up-to-the-minute restores
Differential	Backs up all selected files with archive bit set	OK SnapManager backups unaffected
Incremental	Backs up all selected files with archive bit set and clears archive bit	DO NOT USE Truncates transaction logs; disables SnapManager up-to-the-minute restores

Exchange files you should back up using a Windows backup utility in Exchange Server 2003

SnapManager does not back up all the files commonly used by Exchange Server 2003. You should use a standard Windows backup utility, such as NTBackup, to back up the following items:

- File systems on hard disks connected to the Exchange server
- Windows registry
- Windows Active Directory
- Internet Information Service (IIS) metabase
- Key Management Service (KMS) database
- Site Replication Services (SRS) database
- System state

Note

You can use NTBackup to back up to a file, instead of using tape, and write or store that file directly on a storage system.

Exchange files you should back up using a Windows backup utility in Exchange Server 2007

SnapManager does not back up all the files commonly used by an Exchange Server 2007. You should use a standard Windows backup utility, such as NTBackup, to back up the following items:

- File systems on hard disks connected to the Exchange server
- Windows registry
- Windows Active Directory
- Internet Information Service (IIS) metabase
- System state

Note

You can use NTBackup to back up to a file, instead of using tape, and write or store that file directly on a storage system.

In addition, you need to back up the following:

- Mailbox Servers Data Offline Address Book distributed that uses Web distribution
- Hub Transport Server Data Message Tracking and Protocol logs
- Edge Transport Data ADAM (Config Clone for backup and restore)
- Content Filter ESE Database (Config Clone for backup and restore) Message Tracking and Protocol logs
- Client Access Server Data
  - Microsoft Office Outlook Web Access Web site, and Web.config file
  - IMAP4 and POP3 protocol settings
  - IIS metabase
  - Exchange ActiveSync
  - Outlook Web Access virtual directories
- Unified Messaging Server Data
  - Custom audio prompts
  - Incoming calls

What is new in Exchange Server 2007

This topic describes briefly about the new Exchange Server 2007 roles and the database architecture changes. See the following topics for more information:

- New Exchange Server Roles
- New Database functionality

New Exchange server roles: Following are the new server roles that is introduced with Exchange Server 2007:

- Client Access server role
- Mailbox server role
- Hub Transport server role
- Edge Transport server role
- Unified Messaging server role

  For more details about each server role, see, "*Microsoft Exchange Server 2007"* guide.

New database functionality: Microsoft Exchange Server 2007 introduces many new improvements to the database architecture. Following are the improvements:

- Volume Shadow Copy Service

  Exchange Server 2007 includes an Exchange VSS writer that includes the ability to restore the databases to an alternate location.
- Database architecture changes

  The significant changes to the database architecture in Exchange Server 2007 are:
  - The streaming database (.stm) file is removed.
  - Longer log file names are used, thereby enabling each storage group to generate as many as 2 billion log files before log files generation must be reset.
  - Transaction log file size is reduced from 5 MB to 1 MB to support the new continuous replication features.
  - Database page size has increased from 4 KB to 8 KB.

Preparing to Install SnapManager 2

This section describes tasks you need to perform before installing SnapManager 4.0 for Microsoft Exchange or upgrading from a previous version. The following topics are covered in this section:

- "Backing up system resources and data" on page 20
- "Understanding SnapManager license options" on page 21
- "Understanding SnapManager COM server identity account requirements" on page 22
- "Understanding storage system requirements" on page 24
- "Understanding Windows host system requirements" on page 26

Note

For the most current list of system requirements, see the SnapManager 4.0 for Microsoft Exchange Product Description Page.

Note

For information about compatible versions of SnapManager, SnapDrive, and Data ONTAP, see the *SnapManager and SnapDrive Compatibility Matrix*.

Related topics:

- Chapter 1, "Understanding SnapManager," on page 1
- Chapter 3, "Installing SnapManager," on page 31

Backing up system resources and data

Before you install SnapManager, you are strongly advised to back up your system resources and data using NTBackup or another industry standard backup utility.

To back up your system resources and data, complete the following steps.

Step	Action
1	Back up the operating system installation on the Exchange server, including the system state.
2	Back up the data on the local drives on the Exchange server.
3	Back up the boot and system drives, and the registry.
4	Use your backup utility to create and maintain a current emergency repair disk (ERD).

Understanding SnapManager license options

SnapManager 4.0 for Microsoft Exchange supports storage system licensing option.

Storage system licensing

If a SnapManager license is not enabled on the Exchange server, a seven-character SnapManager license code must be enabled directly on the storage system, using the storage system `license add` command.

If no server license is detected, SnapManager checks the storage system for a SnapManager license whenever a SnapManager operation is initiated. If the SnapManager license is not enabled on the storage system either, the SnapManager operation fails and an error is written to the Windows event log.

Note

With storage system SnapManager licensing, if you use the StoreVault Replication software in conjunction with SnapManager, both StoreVault Replication and SnapManager must be licensed on both the source and target storage systems.

Understanding SnapManager COM server identity account requirements

The COM server identity account used by SnapManager must have proper Exchange permissions for SnapManager to function properly.

Note
SnapManager uses a Windows service for fractional space reservation monitoring that runs under the local system account.

About the predetermined permission levels for Exchange

There are three predetermined permission levels for Exchange:

- Exchange View Only
- Exchange Administrator
- Exchange Full Administrator

The minimum level required for SnapManager is Exchange Administrator. This requirement can be satisfied using one of these methods:

- Assign Exchange Administrator permissions to the organization object.
- Create an Exchange administrative group and assign the correct permissions to that group.

Note
In Exchange Server 2003, right-clicking an object in the Exchange System Manager and selecting Delegate Control opens the Exchange Administration Delegation wizard, which enables you to change that object's permissions.

Note
In Exchange Server 2007, select "organization node" in the Exchange Management Console and then click the Add Exchange Administrator wizard in the Actions pane to change the object's permissions.

About Exchange-specific permission levels

If you require a greater granularity of control for the SnapManager COM server identity account, you can apply Exchange-specific permissions to the object. The minimum Exchange-specific permissions required for SnapManager are as follows:

- Read
- Execute
- Read Permissions
- List Contents
- Read Properties
- Administer Information Store
- View Information Store Status

Note

To launch or access the COM server from a different domain, the user account or group you are configuring must also be a member of the Exchange server's local Administrators group. The local administrator group permissions enable you to launch the COM server without modifying the DCOM configuration. Ensure that there are no firewall restrictions between the remote and local servers.

Understanding storage system requirements

This topic describes the following information:

- "Storage system requirements" on page 24
- "About storage systems that have multiple IP addresses" on page 25

Storage system requirements

To be used with SnapManager, your storage system must meet the following requirements.

Storage system component	Requirements
Data ONTAP	See the SnapDrive software requirements described in the *StoreVault Manager 3.2 User's Guide* for your version of SnapDrive.
iSCSI or FCP protocols	The appropriate LUN access protocol software must be installed on the storage system that stores the Exchange databases.
SnapManager licenses	If SnapManager is licensed per storage system, a SnapManager license is required on the storage system. For more information, see "Understanding SnapManager license options" on page 21. **Note** With storage system SnapManager licensing, if you use StoreVault Replication in conjunction with SnapManager, SnapManager must be licensed on both the source and target storage systems.
SnapRestore license	For SnapManager restore operations to work properly, the SnapRestore® feature of SnapDrive must be licensed on the storage system that stores the Exchange databases.

Storage system component	Requirements
StoreVault Replication license	If you plan to use the StoreVault Replication software in conjunction with SnapManager, a StoreVault Replication license is required on both the source and target storage systems. For more information, see the *StoreVault R3.0 User's Guide* for your version of SnapDrive.

About storage systems that have multiple IP addresses

If your storage system has multiple IP addresses, configure the SnapDrive preferred IP address. See the *SnapDrive Installation and Administration Guide* for your version of SnapDrive.

If you do not configure a SnapDrive preferred IP address for a storage system that has multiple IP addresses, SnapDrive times out when attempting to create Snapshot copies simultaneously for more than one LUN on a storage system.

Understanding Windows host system requirements

In the most basic configuration, SnapManager is installed on the same Windows host system as Microsoft Exchange. In addition to this, you can install SnapManager on one or more remote Windows hosts for remote administration of the Exchange computer or for remote verification of the databases contained in SnapManager backup sets.

Note

Starting with SnapManager 4.0, SnapManager does not support Windows 2000 Server. If you try to install SnapManager 4.0 for Exchange on a computer that is running Windows 2000 Server, the installation process will not proceed. SnapManager will display a message that states the minimum operating system requirements.

The following topics are covered in this section:

- "Windows host system requirements" on page 26
- "Requirements for a remote administration server" on page 29
- "Requirements for a remote verification server" on page 29

Windows host system requirements

To run SnapManager, your system must meet the following requirements.

Windows host component	Requirement if the host system is running Windows Server 2003
Operating system	One of the following: ◆ Windows Server 2003 Standard Edition with SP1 ◆ Windows Server 2003 Enterprise Edition with SP1 ◆ Windows Server 2003 Standard Edition R2 ◆ Windows Server 2003 Enterprise Edition R2
Microsoft Windows hotfixes	See the SnapDrive software system requirements.

Windows host component	Requirement if the host system is running Windows Server 2003
Microsoft Exchange Server	One of the following versions of Microsoft Exchange (Standard or Enterprise Edition): ◆ Exchange Server 2003 with SP2 or higher ◆ Exchange Server 2007 RTM **Note** This requirement does not apply to a remote administration server. **Note** By default, Exchange Server 2007 uses ChkSgFiles for the integrity verification of databases and transaction logs. The option to throttle Eseutil.exe database checksum verification (described in "Configuring verification throttling for database verification" on page 360) requires Exchange Server 2003 with SP2 or higher.
FCP and iSCSI Multipath I/O for Windows	See SnapDrive requirements.
SnapDrive	SnapDrive 5.0 If you need to install or upgrade SnapDrive, see the *SnapDrive Installation and Administration Guide* for detailed instructions. **Note** For a remote *administration* server, SnapDrive is optional unless you intend to use the remote administration server to remotely administer SnapDrive. For a remote *verification* server, SnapDrive is required.

Windows host component	Requirement if the host system is running Windows Server 2003
SnapDrive preferred IP address	If your storage system has multiple IP addresses, configure the SnapDrive preferred IP address. See the *SnapDrive Installation and Administration Guide* for your version of SnapDrive. If you do not configure a SnapDrive preferred IP address for a storage system that has multiple IP addresses, SnapDrive times out when attempting to create Snapshot copies simultaneously for more than one LUN on a storage system.
iSCSI and/or FCP protocols	The appropriate LUN access protocol software must be installed on the Windows host that runs the Exchange server. See your SnapDrive documentation for complete details about the system requirements: **Note** This requirement does not apply to a remote administration server.
SnapManager license	If SnapManager is licensed per Exchange server, a SnapManager license is required on the Windows host system.
Microsoft .NET 2.0 framework	SnapManager installation package installs Microsoft .NET framework if it is not present in the host system.
Microsoft Management Console (MMC)	Microsoft Management Console 3.0 framework to launch the SnapManger snap-in console. This is a prerequisite before you start the SnapManager installation.
Windows PowerShell	Windows PowerShell 1.0 (x86 or x64) version. This is a prerequisite before you run the SnapManager installation.

Note

SnapManager 3.2 for Microsoft Exchange has fractional space reserve monitoring enabled by default. When upgrading from SnapManager 3.2 for Microsoft Exchange to this version of SnapManager, fractional space reservation remains enabled. Otherwise, it is disabled by default. If you are not using fractional space reservation on the storage system volumes that contain LUNs that are used for Exchange, the monitoring can be disabled. Doing so will improve backup completion times. For details on how to enable and disable monitoring, see "Managing the event notification options" on page 373.

Requirements for a remote administration server

An Exchange server that is running SnapManager can be remotely administered from another Windows system that is configured as a remote administration server:

- You do not need to install an iSCSI driver or an HBA driver on this system.
- SnapDrive does not need to be installed unless you want to use the remote administration server to remotely administer SnapDrive.
- SnapManager must be installed.

Requirements for a remote verification server

Remote verification is performed using the same mechanisms used for local verification, except that the verification is performed on a host that is different from the Exchange server that initiated the backup. This is the reason that you need SnapDrive and SnapManager installed on your remote verification server, as well as connectivity to the storage system (through FCP or iSCSI).

To run remote verification, your remote Windows system must meet the following requirements:

- SnapDrive must be installed.

  Attention

  Do not try to connect the Exchange server's LUNs to the remote verification server.

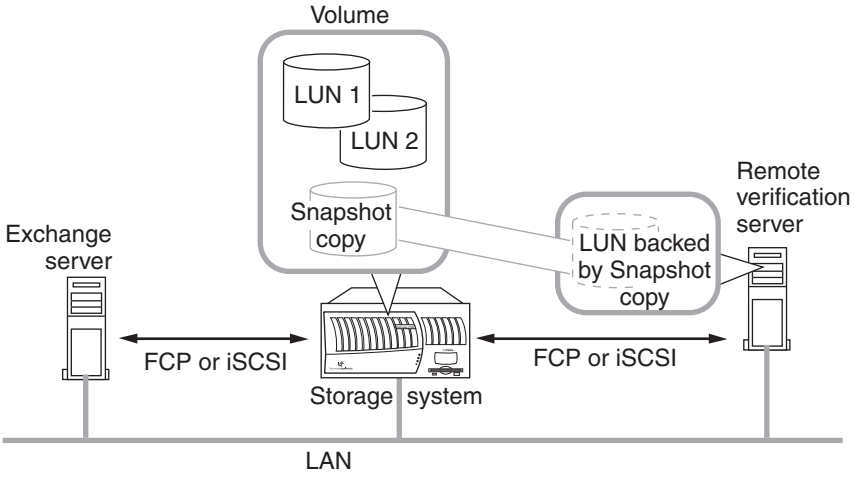
- The appropriate LUN driver (iSCSI or FCP) must be installed.
- The remote Windows system must have connectivity (iSCSI or FCP) to the storage system.

Note

If you are using iSCSI to connect to the storage system on the remote verification server, an iSCSI connection must be created.

- SnapManager must be installed, but it does not need to be configured. You must specify the user account that you use for the production Exchange server.
- Exchange Management Tools must be installed on the Server (whether remote or local) for SnapManager to perform integrity verification.

The connectivity required to perform remote verification is shown in the following illustration.



Installing SnapManager 3

This chapter contains the procedures for installing SnapManager 4.0 for Microsoft Exchange as well as procedures for other tasks you might need to use at some point after SnapManager has been installed.

Installing SnapManager 4.0 for Exchange: "Installing SnapManager on a stand-alone Windows host system" on page 32

After you install SnapManager 4.0, start the application for the first time as described in Chapter 4, "Starting SnapManager for the First Time," on page 47.

After SnapManager 4.0 for Exchange has been installed: Unless it is specified for a particular upgrade path or for a particular troubleshooting situation, you do not need to uninstall SnapManager before reinstalling it or upgrading to a newer version. However, if you need to remove all components of SnapManager, use the procedure in the following topic:

- "Uninstalling SnapManager" on page 39

Attention

If you plan to reinstall SnapManager later, be sure to record the drive letter and path of your current SnapInfo directories. After you reinstall SnapManager, be sure to reconfigure SnapManager to use those same SnapInfo directory locations. This preserves SnapManager's records of backups taken before you uninstalled and reinstalled SnapManager.

If you need to reinstall SnapManager (to fix missing or corrupt files, shortcuts, and registry entries), use the procedure in the following topic:

- "Reinstalling SnapManager" on page 46

Related topics:

- Chapter 1, "Understanding SnapManager," on page 1
- Chapter 2, "Preparing to Install SnapManager," on page 19
- Chapter 4, "Starting SnapManager for the First Time," on page 47

Installing SnapManager on a stand-alone Windows host system

This section describes how to install SnapManager on a stand-alone Windows host system used for any of the following purposes:

- The production Exchange server
- A remote administration server
- A remote verification server

See the following subtopics for more information:

- "Installing SnapManager" on page 34
- "Availability of SnapManager" on page 33

Note

Other topics in this section that describe how to install SnapManager for various configurations refer to this topic for some of the detailed installation steps.

Related topics:

- "Uninstalling SnapManager" on page 39
- "Reinstalling SnapManager" on page 46

Availability of SnapManager

SnapManager 4.0 for Microsoft Exchange is available in x86 and x64 builds. The x86 SnapManager build is compatible with Windows Server 2003 x86 edition and the x64 SnapManager build is compatible with Windows Server 2003 x64 "Installing SnapManager on a stand-alone Windows host system" on page 32. The x86 SnapManager build is not supported for use in WOW64 on Windows Server 2003 x64 edition.

Your SnapManager media kit contains two CD-ROMs. One CD-ROM contains the SnapManager x86 build and the other CD-ROM contains SnapManager x64 build.

Note

Ensure that MMC 3.0 and Windows PowerShell 1.0 (x86 or x64) is installed on the Windows system prior to installing SnapManager. The SnapManager 4.0 for Microsoft Exchange installation program does not allow you to proceed, if MMC 3.0 and Windows PowerShell 1.0 (x86 or x64) are not installed on the system.

Installing SnapManager

To install SnapManager using the software installation utility in interactive mode, complete the following steps.

Step	Action	
1	Either install the software from the CD-ROM that came packaged with your media kit or download the software. **Attention** Do not use Terminal Services for any type of SnapManager administration, because you might miss critical information that is displayed only in pop-up boxes at the system console. **Note** You do not need to stop Exchange services while you install SnapManager 4.0 for Microsoft Exchange. Exchange can continue to run while you install SnapManager and afterward.	
	If...	**Then...**
	You are obtaining the software from the network	Download the SnapManager package from the network, save it on the Windows host system, and then launch the SnapManager installation package by double-clicking it in your Windows Explorer. **Result:** The SnapManager Welcome window appears. **Note** The SnapManager software installation program does not allow you to continue with the install process if Microsoft .NET 2.0 is not installed. If .NET is not installed on a 32-bit system, the installation setup automatically installs it; on a 64-bit system, it prompts you to install.

1	You are installing the software from CD-ROM **Note** The CD-ROM installation is the same as the network installation. The only difference is the name of the installation executable and the distribution media.	Browse to the SnapManager installation package and double-click `setup.exe`. **Result:** The software installation utility starts and opens the Welcome window.
Welcome		
2	In the Welcome window, click Next. **Result:** The License Agreement window appears.	
License agreement		
3	Read the license agreement. If you accept the terms of the agreement, select the “I accept....” option and then click Next. **Result:** The Customer Information window appears.	

Customer information	
4	In the "Customer Information" window, specify the user name, the organization name, and the SnapManager license type, as follows: **a.** In the User Name box, enter your user name. **b.** In the Organization box, enter your organization name. **c.** In the License Type option, select your SnapManager license type. If you have a *storage-system-side license* for SnapManager, select Per Filer, and be sure that the SnapManager system-side license is enabled on the storage system. If you have an *Exchange-server-side license* for SnapManager, select Per Server. **d.** If you selected the Per Server license type, use the License Key box to enter the license key for your server-side license. If you do not have a license key, you can leave the License Key box empty for now and enter your server-side license key later from the SnapManager interface. To do this, first go to the menu bar and select Help > About to open the About SnapManager dialog box. From that dialog box, click Update License to open the Update Server-Side License dialog box and specify your license key.
5	Click Next. **Result:** The Destination Folder window appears.
Destination folder	
6	Note the full path of the folder in which SnapManager will be installed. The default installation directory for SnapManager 4.0 for Microsoft Exchange is as follows: `C:\Program Files\\SnapManager for Exchange\`

7	Optional. If you want to install SnapManager in a directory other than the default installation directory, do the following: **a.** Click the Change to open the Change Current Destination Folder dialog box. **b.** Browse to an alternate installation directory. **c.** Click OK to close the dialog box. The Destination Folder window displays the newly specified installation directory path. **d.** Record the newly specified installation directory path.
8	Click Next. **Result:** The SnapManager Server Identity window appears.
SnapManager server identity	
9	In the Account box of the "SnapManager Server Identity" window, specify the user account you want to use to run SnapManager. This account must meet the following requirements: ◆ The account must have administrator privileges on the Exchange server. ◆ The account must also have system administrator server privileges. **Note** This account must have the required permissions. It is recommended to see "Understanding SnapManager COM server identity account requirements" on page 22. If SnapDrive is installed and configured, the text box is prepopulated with the account that SnapDrive is configured for. Otherwise, browse to locate and select the account name. The user account name is specified in either of the following formats: ◆ *DomainName\UserName* ◆ *UserName@DomainName*
10	In the Password box and in the Confirm Password box, enter the user password.

11	Click Next. **Result:** The Ready to Install the Program window appears. All of the installation specifications are complete.
Ready to install the program	
12	Optional. Review or change your current installation specifications before proceeding by clicking Back.
13	To proceed with the installation using your current specifications, click Install. **Result:** The installation process begins, and the Installing SnapManager for Exchange window appears. This window displays the progress of the installation process.
Installing SnapManager for Exchange	
14	Wait until the InstallShield Wizard Completed window appears; then click Finish to exit the software installation utility.
15	Proceed to Chapter 4, "Starting SnapManager for the First Time," on page 47.

Uninstalling SnapManager

This topic describes how to uninstall the SnapManager software. See the following topics for more information:

- "Before you uninstall SnapManager" on page 39
- "Uninstalling SnapManager in interactive mode" on page 41

Attention

Do not attempt to remove a currently installed version of SnapManager using a method other than the approach described here. To do so could cause system problems resulting from unknown remaining files.

Note

Unless it is specified for a particular upgrade path or for a particular troubleshooting situation, you do not need to uninstall SnapManager before reinstalling it or upgrading to a newer version.

Related topics:

- "Installing SnapManager on a stand-alone Windows host system" on page 32
- "Reinstalling SnapManager" on page 46

Before you uninstall SnapManager

If you have used SnapManager to manage your Exchange databases and **you plan to reinstall** SnapManager later, be sure to **record the drive letter and path** of the SnapInfo directory locations **before you uninstall** SnapManager.

Single SnapInfo directory: If you have set up a single SnapInfo directory for all databases on this host, then record the drive letter and path of the LUN that contains a single SnapInfo directory for all Exchange servers and their associated databases.

Multiple SnapInfo directories: If you have set up multiple SnapInfo directories, then record the drive letter and path of each LUN that contains a SnapInfo directory.

SnapManager Reports records the current SnapInfo directory locations in the most recent logs contained in the *Backup folder* and in the *Config folder*.

After you reinstall SnapManager, be sure to reconfigure SnapManager with *the same* SnapInfo directory locations that were used by SnapManager previously.

Attention

If you configure SnapManager with *different* SnapInfo directory locations than used previously, then SnapManager will no longer have records of any backups taken before the reinstallation of SnapManager occurred. As a result, your prior backup sets could be invalidated or deleted the next time you perform a backup operation.

Optional. Move Exchange data to a local disk: If you want to move your Exchange data store from the storage system back to a local disk, complete the following steps.

Step	Action
1	Use Exchange System Manager to move your databases, transaction logs, and system files from the LUNs onto a local disk with enough space to hold them.
2	Confirm that the data was moved correctly and that your Exchange server is functioning normally.
3	Disconnect or delete your LUNs from your SnapManager host. For information about disconnecting or deleting LUNs, see your SnapDrive documentation.

Comparison of the two uninstallation modes

The software installation utility for SnapManager can be run in either interactive mode or unattended mode. These two modes are described in the following table.

Comparison	SnapManager uninstallation mode	
	Interactive	**Unattended**
Access	Require user interaction and access to the graphical user interface	Allows automated uninstallation by executing a script or command line command
Method used	The Windows utility Add or Remove Programs (in the Control Panel)	The software installation utility for SnapManager for Microsoft Exchange
Options	You can also remove the Report directory.	

Uninstalling SnapManager in interactive mode

To uninstall SnapManager for Microsoft Exchange and all its components by using the Windows Add or Remove Programs utility, complete the following steps.

Note

You can also uninstall SnapManager in unattended mode, as described in "Uninstalling SnapManager in unattended mode" on page 43. For a comparison of the two uninstallation modes, see "Comparison of the two uninstallation modes" on page 41.

Step	Action
1	If SnapManager is running, close it. **Note** You do not need to stop the Exchange service or remove the Exchange databases from the LUNs before you uninstall SnapManager for Exchange will continue to run during the uninstallation process and after the uninstallation is completed.

<table>
<tr><th>Step</th><th colspan="2">Action</th></tr>
<tr><td>2</td><td colspan="2">In the Windows Server 2003 Control Panel, select Add or Remove Programs, and then select the entry for SnapManager for Microsoft Exchange.

Result: Both a Change button and a Remove button appear in that entry.</td></tr>
<tr><td rowspan="3">3</td><td colspan="2">Click one of the buttons, depending to what you want to remove.</td></tr>
<tr><td>If...</td><td>Then...</td></tr>
<tr><td>You want to remove only the SnapManager software and leave the Report directory</td><td>Click Remove.</td></tr>
<tr><td>You want to remove both the SnapManager software and the Report directory</td><td>Do not click Remove. Instead, do the following:

a. Click Change.

b. Select the “Remove Reports” option.

c. Click Remove.</td></tr>
<tr><td>4</td><td colspan="2">At the prompt, click Yes to proceed with removing the SnapManager software.</td></tr>
<tr><td>5</td><td colspan="2">After the utility finishes removing SnapManager from your computer, close the “Add or Remove Programs” utility and then close the Control Panel.</td></tr>
</table>

Uninstalling SnapManager in unattended mode

This topic describes how to uninstall SnapManager using the software installation utility in unattended mode. This enables you to uninstall SnapManager under the control of a script for an unattended uninstallation.

Note

You can also uninstall SnapManager in unattended mode, as described in "Uninstalling SnapManager in interactive mode" on page 41. For a comparison of the two uninstallation modes, see "Comparison of the two uninstallation modes" on page 41.

How to invoke the software installation utility: The command name you specify depends on the SnapManager installation media you will be accessing.

SnapManager installation media	Application name to be run
Software CD	`setup.exe` (located on the CD-ROM)
Software package downloaded from the network	`SME4.0.exe` (the name of the software package itself)

What to specify in the command line: To install SnapManager in unattended mode, enter the following command either directly at the command line or through a script:

CommandName `/v"REMOVE=ALL [REMOVEREPORTFOLDER=1] [/L*` *TempDirPath\LogFileName*`] /qb"`

The following table describes each of the parameters.

Command or parameter	Description
CommandName	Either `setup.exe` or `SME4.0.exe`, depending on the SnapManager installation media being used.
`REMOVE=ALL`	Causes the software installation utility to remove SnapManager (as if you selected the Remove option in the Program Maintenance window).

Command or parameter	Description
`REMOVEREPORTFOLDER=1`	Optional. Causes the software installation utility to remove the Report directory (as if you selected the Remove Report Folder option in the Remove the Program window).
`/L*` *TempDirPath\LogFileName*	Optional. If you specify this option, detailed information about the installation will be written to the specified log file. This information can be used to investigate details about how a particular instance of SnapManager for Microsoft Exchange is installed. The asterisk ("*") is a wildcard character that specifies that all of the installation information (such as status messages, nonfatal warnings, and error messages) should be logged. *TempDirPath* is the fully qualified name of the directory in which the installation log will be created or overwritten. *LogFileName* is the name of the file to which the installation information will be written.

Examples: Consider the following two scenarios.

Installation details	Scenario 1	Scenario 2
Installation media to be used	CD inserted into the CD-ROM drive on `E:\`	Installation package downloaded to `C:\\downloads\`
SnapManager license	Filer-sidelicense	Server-side license (key `ABCDEFGHJIJKLMN`)

For scenario 1, enter the following at the command line:

```
E:\setup.exe /v"REMOVE=ALL /qb"
```

For scenario 2, enter the following at the command line:

```
C:\\downloads\SME4.0.exe /v"REMOVE=ALL REMOVEREPORTFOLDER=1
/qb"
```

General procedure: To install SnapManager using the software installation utility in unattended mode, complete the following steps.

Step	Action
1	Access the command line of the target host system.
2	At the command line, either enter the command string or enter the name of the script that executes the command string. **Result:** The software installation utility upgrades the SnapManager for Microsoft Exchange software.
3	Proceed to Chapter 4, "Starting SnapManager for the First Time," on page 47.

Reinstalling SnapManager

You can reinstall the same version of SnapManager on a Windows host system. This option repairs missing or corrupt files, shortcuts, and registry entries.

Note

You do not need to stop Exchange services before or during the SnapManager software reinstallation process.

Unless it is specified for a particular upgrade path or for a particular troubleshooting situation, you do not need to uninstall SnapManager before reinstalling it.

If you uninstalled SnapManager: If you uninstalled SnapManager, then the reinstallation procedure is identical to a new installation of the software. For installation instructions, see "Installing SnapManager on a stand-alone Windows host system" on page 32

If you had used SnapManager to manage your Exchange databases before you uninstalled the SnapManager application, then be sure to configure SnapManager with *the same* SnapInfo directory location or locations that were used by SnapManager prior to the reinstallation.

Attention

If you configure SnapManager with *different* SnapInfo directory locations than used previously, then SnapManager will no longer have records of any backups taken before the reinstallation of SnapManager occurred.

For more information, see "Uninstalling SnapManager" on page 39.

If you did not uninstall SnapManager:

Starting SnapManager for the First Time 4

After you have installed or upgraded to SnapManager 4.0, start the application for the first time, as described in this section:

- "Starting SnapManager and connecting to the default server" on page 48
- "Starting SnapManager and connecting to the CCR server" on page 53
- "What to do next" on page 55

Attention

You must run SnapManager from the system console, not from a Terminal Services client. Do not use Terminal Services for any type of SnapManager administration, because you might miss critical information that is displayed only in pop-up boxes at the system console.

Related topics:

- Chapter 6, "Determining the Number of LUNs Required," on page 69
- Chapter 7, "Creating Storage System Volumes and LUNs," on page 89
- Chapter 8, "Configuring the Exchange Data for SnapManager," on page 111

Starting SnapManager and connecting to the default server

To start SnapManager for the first time, complete the following steps.

Step	Action
1	Start SnapManager 4.0 for Microsoft Exchange. To do this, go to the Start menu and select Program Files > > SnapManager for Exchange Management Console. **Result:** The SnapManager 4.0 for Exchange console appears. ◆ If you have just installed SnapManager for the first time, go to Step 2. ◆ If this is an upgrade, go to Step 10.
2	Click SnapManager for Exchange. **Result:** SnapManager prompts you to specify an Exchange server that you want to manage.
3	Click OK. **Result:** Add Exchange Servers to be Managed window appears.
4	Select an Exchange Server from the list.
5	Use the Browse button to select an Exchange server from the network.
6	Click Add. **Result:** SnapManager prompts you to specify the computer that you want to use for database integerity verification.
7	Click OK. **Result:** The Database Verification Settings window appears.
8	Specify the verification server for integrity verification. **Result:** SnapManager prompts you to specify the default mount point path.
9	In the Access LUN in Snapshot window, specify mount point directory and click OK.

Step	Action
10	Wait until SnapManager verifies the software versions on the default Exchange server and then prompts you to start the Configuration Wizard. SnapManager performs the following verification activities: **a.** First, SnapManager checks the Microsoft Exchange version. If SnapManager detects that the Microsoft Exchange Server 2007, or 2003 software does not have the minimum service pack level required by SnapManager, an error message appears. If this occurs, see the table of "Windows host system requirements" on page 26 and note the requirements for Microsoft Exchange. If you have a different Exchange server that has the minimum service pack required by SnapManager, you can connect to that instance instead. Otherwise, close the SnapManager application, upgrade Microsoft Exchange as needed, and then restart SnapManager. **b.** Next, SnapManager checks the SnapDrive version. If SnapManager detects that SnapDrive is installed but that it is a version not supported with this version of SnapManager, a warning dialog box appears. If this occurs, see the table of "Windows host system requirements" on page 26 and note the requirements for SnapDrive. Close the SnapManager application, upgrade SnapDrive as needed, and then restart SnapManager. **c.** Finally, if SnapManager detects that no databases have been configured for use with SnapManager, a message appears and prompts you to run the Configuration Wizard.

<table>
<tr><th>Step</th><th colspan="2">Action</th></tr>
<tr><td>11</td><td>If...</td><td>Then...</td></tr>
<tr><td></td><td>You do not want to perform SnapManager configuration</td><td>Go to Step 12.</td></tr>
<tr><td></td><td>You want to perform SnapManager configuration</td><td>Go to Step 13.</td></tr>
<tr><td>12</td><td colspan="2">Click Cancel to exit the Configuration wizard without specifying any database or LUN configuration information yet.

Result: The Configuration wizard closes, leaving only the SnapManager main window open.

Note
If you are running SnapManager on a Windows Server 2003 machine with the Windows XP theme enabled, SnapManager is displayed with the Windows XP theme also.</td></tr>
</table>

Step	Action
13	Follow the instructions in the Configuration wizard and complete the SnapManager configuration. **Result:** SnapManager connects to the specified Exchange server and then creates a share for remote access to the Report directory. The first time SnapManager is launched, it creates a Report directory share, `SMEReportFolder`, to allow for remote administration. The following accounts are granted *Full Control* on this share: ◆ The logged-on user on the local machine ◆ The `Administrators` group on the local machine If SnapManager was recently upgraded to SnapManager 4.0, there might be other existing accounts with permissions on the share: ◆ If only the existing group `Everyone` has permissions on the Report directory share, SnapManager removes the Full Control permissions to the Report directory for that group. If multiple existing accounts (including `Everyone`) have permissions on the Report directory share, SnapManager does not modify those accounts.
14	Click the Exchange Server that you added to the SnapManager console. **Result:** The Database Verification Settings window appears and SnapManager prompts you to specify the database verification server.
15	Use the Browse button to select a verification server.
16	Click OK. **Result:** SnapManager prompts you to specify the mount point directory path.

Step	Action
17	Specify the mount point directory path. **Note** You can also select “Automatically assign available drive letter” option. **Result:** SnapManager prompts you to specify the override verification settings.
18	Check the database override verification settings, if you want to override the existing database verification. **Result:** SnapManager prompts you to specify the Verification Throttling.
19	Select the “Throttle Eseutil database checksum verification” check box.
20	Select OK to save the database verification settings.

Starting SnapManager and connecting to the CCR server

To start a CCR copy-enabled SnapManager for the first time, complete the following steps.

Step	Action
1	Start SnapManager 4.0 for Microsoft Exchange. To do this, go to the Start menu and select Program Files > SnapManager for Exchange. **Result:** The SnapManager 4.0 for Microsoft Exchange console appears.
2	Click “Add Servers to be managed” in the Actions pane.
3	Select a CCR-enabled Exchange server from the list. **Note** You can use the Browse button to select a different CCR-enabled Exchange server from the network.

<table>
<tr><th>Step</th><th colspan="2">Action</th></tr>
<tr><td>4</td><td colspan="2">Click Add.

Result: SnapManager connects to the CCR-enabled Exchange server and prompts you to configure it.</td></tr>
<tr><td></td><td>If...</td><td>Then...</td></tr>
<tr><td></td><td>You want to proceed with the configuring the CCR-enabled Exchange server</td><td>Go to Step 13 in “Starting SnapManager and connecting to the default server” on page 48.

Note
You need to run the Configuration wizard only once for a CCR-enabled Exchange server from either the active or the passive node. SnapManager internally performs the configuration tasks on both the CCR nodes.</td></tr>
<tr><td></td><td>You do not want to proceed with the configuration</td><td>Click Cancel to exit the Configuration Wizard.</td></tr>
</table>

What to do next

Before you run the Configuration Wizard, you must plan your database migration. Database migration planning is covered in the following sections:

- Chapter 6, "Determining the Number of LUNs Required," on page 69
- Chapter 7, "Creating Storage System Volumes and LUNs," on page 89

Note

Only after you have completed your database migration plan should you proceed to Chapter 8, "Configuring the Exchange Data for SnapManager," on page 111. The information in that section instructs you to start the Configuration Wizard manually and then describes how to specify your database and LUN configuration details.

Understanding the SnapManager GUI 5

SnapManager 4.0 for Exchange provides an enhanced, easy- to-use graphical user interface (GUI) that is integrated seamlessly with the Microsoft Exchange System Manager GUI. The SnapManager 4.0 for Microsoft Exchange GUI is based on Microsoft Management Console (MMC) 3.0.

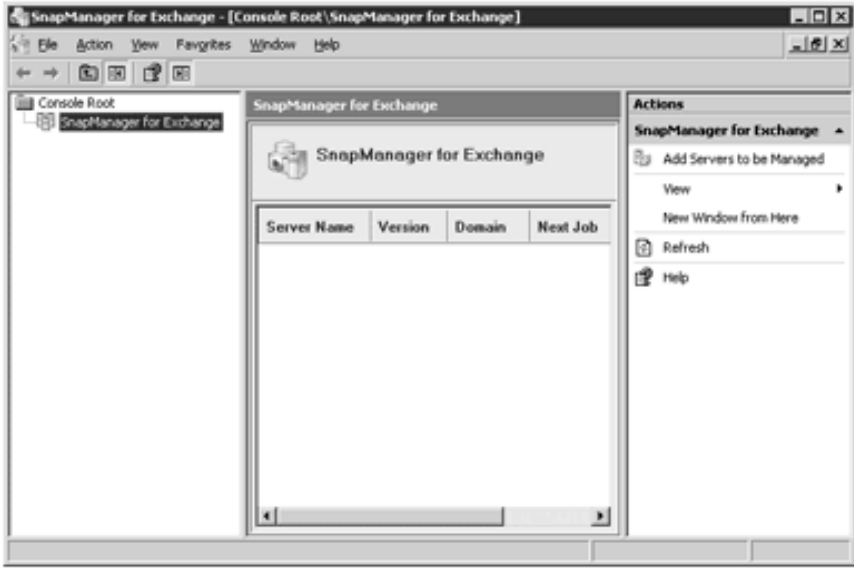
This section describes the different SnapManager components that you need to use frequently when you work with SnapManager for Exchange. The following topics are covered in this section:

- "SnapManager snap-in" on page 57
- "SnapManager Dashboard view" on page 62
- "SnapManager Configuration Wizard" on page 65
- "SnapManager Backup" on page 65
- "SnapManager Restore" on page 65
- "SnapManager Scheduler" on page 65
- "Connecting to a CCR-enabled Exchange server" on page 65
- "Verification on destination volumes" on page 65
- "Icons used in SnapManager" on page 66

SnapManager snap-in

The SnapManager snap-in is based on Microsoft Management Console 3.0 (MMC 3.0). MMC is a framework that hosts the graphical interface and programming platform to create, open, and save the snap-ins.

The SnapManager snap-in allows you to manage the SnapManager application from Microsoft Management Console.



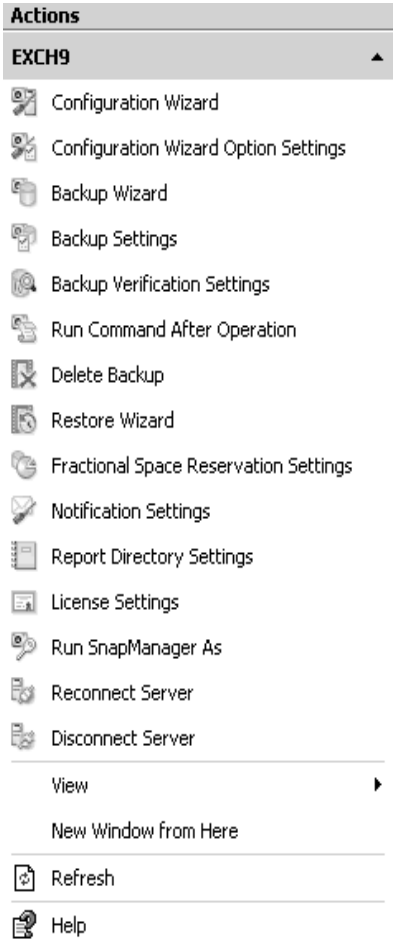
The user interface consists of three panes.

Scope pane: This is the left pane in the SnapManager graphical user interface. It lists SnapManager for Exchange instances.

- If you select SnapManager for Exchange in the Scope pane, all of the actions pertaining to it are displayed in the Actions pane.
- If you select a specific Exchange server in the Scope pane, all of the actions pertaining to it are displayed in the Actions pane.
- If you select Backup in the Scope pane, all of the actions pertaining to backup operations are displayed in the Actions pane.
- If you select Restore in the Scope pane, all of the actions pertaining to the restore operations are displayed in the Actions pane.
- If you select Scheduled Jobs in the Scope pane, all of the actions pertaining to the scheduled jobs are displayed in the Actions pane.
- If you select Reports in the Scope pane, all of the actions pertaining to reports are displayed in the Actions pane.

Result pane: This is the center pane in the SnapManager graphical user interface. It displays details of the type of instance that you select in the Scope pane.

Actions pane: This is the right pane in the SnapManager graphical user interface. It displays all of the actions that you can perform, based on the instance that you select in the Scope pane. The Actions pane appears as follows in the SnapManager 4.0 for Microsoft Exchange graphical user interface:



Possible actions in the Actions pane include the following:

- Select the Exchange server and then click Configuration Wizard in the Actions pane.

  Use this wizard to configure SnapManager Exchange databases, transaction logs, and SnapInfo directories.

- Select the Exchange server and then click Backup Wizard in the Actions pane.

  Use this wizard to back up SnapManager databases and transaction logs.

- Select the Exchange server and then click Restore Wizard in the Actions pane.

  Use this wizard to restore from backups created on same Exchange server, on a different Exchange server, or from archived backup.
- Click “Delete backup” in the Actions pane and select the backups that you want to delete.

  Use this feature to delete SnapManager backups that you do not want to restore.
- Click Backup Verification Settings in the Actions pane to access the Database Verification Settings dialog box. The Database Verification Settings dialog box allows you to perform the following:
  - Specify the name of the Exchange server in the Verification Server tab.
  - Enable throttling in the Throttling Verification tab.
  - Enable the override database verification requirements for restore operation in Override Verification tab.
  - Assign a drive letter path to access a mounted LUN in a Snapshot copy in the Access LUN in Snapshot tab.
- Select an Exchange Server and then click the Backup Verification Settings in the Actions pane. The Database Verification Settings dialog box is displayed. Click the Verification Server tab in the Database Verification Settings dialog box and then click “Verification on destination volumes” button.

  Use this feature to perform integrity verification on the destination volumes.
- Click Backup Settings in the Action pane.

  Use this feature to select a backup naming convention for the newly created backup.
- Click Default Run Command After Operation in the Actions pane.

  Use this feature to run SnapManager commands.
- Click Configuration Wizard Options settings in the Actions pane.

  Use this option to enable database migration options.
- Click Notification Settings in the Actions pane.

  Use this feature to configure SMTP e-mail, storage system syslog, and AutoSupport for event notification.
- Select an Exchange server and then click Disconnect Server in the Actions pane.

  Use this feature to delete the Exchange Server from the SnapManager snap-in console.
- Select an Exchange Server and then click Reconnect in the Actions pane.

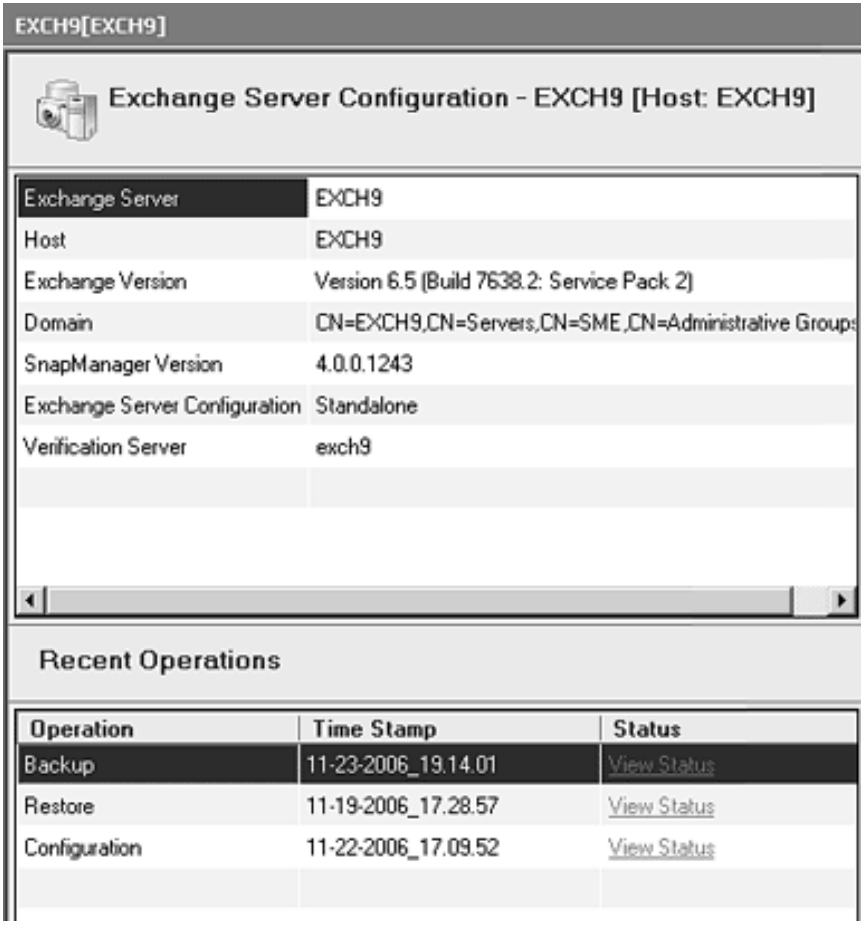
Use this feature to reestablish the connection to the Exchange server.

SnapManager Dashboard view

The Dashboard view enables you to view the status of different SnapManager for Exchange servers connected to the SnapManager for Exchange network. This is a dynamic view that gets refreshed frequently. Dashboard allows you to:

- View the Exchange server configuration
- Add new Exchange servers

View the Exchange server configuration: Click Exchange server in the Scope pane to view Exchange Server Configuration details. The following Exchange Server Configuration screen appears.



The following details are displayed in the Result pane:

- Name of the Exchange server
- Name of the host
- Exchange server version

- SnapManager version
- Exchange server configuration
- Verification server
- Next job that is scheduled
- Last backup operation, including a time stamp and a hyperlink to the corresponding report
- Last restore operation, including a time stamp and a hyperlink to the corresponding report
- Last configuration operation, including a time stamp and a hyperlink to the corresponding report

Add new Exchange servers: You can add a new Exchange server from the Action pane and manage it through SnapManager. To add a new Exchange server, use the following steps.

Step	Action
1	In the Actions pane, click Add Servers to be Managed. **Result:** The "Add Exchange Servers to be managed" window appears.
2	In the "Add Exchange Servers to be managed" window, select a server from the list and click the Add button. **Note** If you want to select an Exchange server that is not listed in the "Add Exchange Servers to be managed" window, click Browse to add another Exchange server.

SnapManager Configuration Wizard

SnapManager Configuration Wizard ensures that Exchange data is migrated correctly for SnapManager to perform backup and restore operations. It dismounts the databases in an Exchange storage group and moves the database and transaction log files from the Exchange server to the selected LUNs. It then remounts the databases and creates a SnapInfo directory for storing information about backed-up data sets and transaction logs.

For more information, see Chapter 8, "Configuring the Exchange Data for SnapManager," on page 111.

SnapManager Backup

SnapManager Backup enables you to perform and schedule frequent, automatic online full backups. Each SnapManager backup consists of Snapshot copies of the Exchange databases, transaction log files, and the SnapInfo directory.

For more information, see Chapter 10, "Backing Up Databases with SnapManager," on page 165.

SnapManager Restore

SnapManager enables rapid recovery of an Exchange storage group or database. You can select a particular backup set and then restore your Exchange database using that backup.

For more information, see Chapter 11, "Restoring Databases Using SnapManager," on page 203.

SnapManager Scheduler

The Scheduler view enables you to filter the SnapManager scheduled jobs based on the job name, Next Job Run time, and Last Run status. You can view, edit, and delete the scheduled jobs.

Connecting to a CCR-enabled Exchange server

When you launch the Exchange server that is CCR enabled, SnapManager connects to both active and passive nodes. SnapManager provides a simple and easy-to-use graphical user interface to accomplish this task.

Verification on destination volumes

With SnapManager 4.0 for Exchange, you can perform integrity verification on the destination StoreVault Replication volumes. For more information on choosing the StoreVault Replication relation for integrity verification, see "" on page 266.

Icons used in SnapManager

The following table displays some icons frequently used by the SnapManager 4.0 for Microsoft Exchange, and a brief description of each.

Icon	Description
	◆ Add servers to be managed ◆ Reconnect server
	Backup settings
	Backup verification settings
	◆ Backup Wizard ◆ Backup and verify
	Configuration Wizard
	Configuration wizard option settings
	Delete backup
	Disconnect server
	Fractional space reservation settings
	License settings
	Notification settings
	Report directory settings

	Restore Wizard
	Run command after operation
	Run SnapManager as
	SnapManager for Exchange restore
	Storage groups selected for backup
	Unverified backup
	Verified backup

Determining the Number of LUNs Required 6

For SnapManager backup and restore to function, the Exchange data store must be located properly on one or more LUNs, and those LUNs need to be sized appropriately. The ability to restore individual databases imposes additional data configuration requirements.

This section contains background information about Exchange, SnapManager, and SnapManager support for NTFS volume mount points. This information enables you to plan your SnapManager Exchange data store LUN and storage system volume requirements, based on your space and functionality requirements. The following topics are covered in this section:

- "Understanding Exchange configuration rules" on page 70
- "Understanding SnapManager configuration rules for Exchange" on page 72
- "Understanding NTFS volume mount points" on page 75
- "Understanding SnapManager support for volume mount points" on page 76
- "Understanding transaction log archiving using NTFS hard links" on page 80
- "Sample Exchange configurations supported with SnapManager" on page 83

Note

For faster backups and restores, use the minimum number of LUNs required for your business and service level commitments. Unless individual database restoration is a requirement in your environment, group your databases together.

After you determine how many LUNs you need for your SnapManager configuration and what data those LUNs will hold, proceed to Chapter 7, "Creating Storage System Volumes and LUNs," on page 89 to calculate required sizes for those LUNs as well as the sizes of the volumes that contain those LUNs.

Related topics:

- Chapter 4, "Starting SnapManager for the First Time," on page 47
- Chapter 7, "Creating Storage System Volumes and LUNs," on page 89
- Chapter 8, "Configuring the Exchange Data for SnapManager," on page 111

Understanding Exchange configuration rules

This topic describes the data configuration requirements inherent to Microsoft Exchange Server 2007 and Exchange Server 2003.

The following topics are covered in this section:

- "Storage groups per server" on page 70
- "Databases per storage group" on page 70
- "Recovery storage group" on page 70
- "Maximum configuration supported by Exchange Server" on page 71
- "Maximum configuration supported by Exchange Server" on page 71

Related topics:

- "Understanding SnapManager configuration rules for Exchange" on page 72
- "Understanding NTFS volume mount points" on page 75
- "Understanding SnapManager support for volume mount points" on page 76
- "Sample Exchange configurations supported with SnapManager" on page 83

Storage groups per server

In Exchange Server 2003, there can be between one and four storage groups.

In Exchange Server 2007, there can be between one and 50 storage groups.

Databases per storage group

In Exchange Server 2003, a storage group contains from one to five databases.

In Exchange Server 2007, you can mix the storage group and database configuration based on your requirements. You can have either two storage groups that contain 25 databases each, or 50 storage groups that contain one database each.

Recovery storage group

For Exchange Server 2003, there can be a fifth storage group, called the recovery storage group. SnapManager supports backing up or restoring to this special storage group.

In Exchange Server 2007, recovery storage groups can be created and managed using the Exchange Management Shell, or by using the Exchange Server Disaster Recovery Analyzer tool.

Maximum configuration supported by Exchange Server

The following table describes the maximum storage groups and databases, including recovery storage group that are supported by Exchange Server 2003 and Exchange Server 2007.

Microsoft Exchange	Features supported for each edition			
	Standard Edition		Enterprise Edition	
	Storage group support	Number of databases per storage group	Storage group support	Number of databases per storage group
Exchange Server 2003	1	1 Mailbox store and 1 public folder store	4	5
Exchange Server 2007	5	5	50	50

Understanding SnapManager configuration rules for Exchange

This topic contains SnapManager configuration rules for Exchange data stores:

- "Exchange data store configurations enforced" on page 72
- "Exchange data store configurations to avoid" on page 73
- "Exchange data store configurations recommended" on page 73

Related topics:

- "Understanding Exchange configuration rules" on page 70
- "Understanding NTFS volume mount points" on page 75
- "Understanding SnapManager support for volume mount points" on page 76
- "Sample Exchange configurations supported with SnapManager" on page 83

Exchange data store configurations enforced

The Configuration Wizard enforces the following rules when you are configuring your Exchange data store for SnapManager 4.0 for Microsoft Exchange.

Exchange databases: Exchange databases cannot share a LUN with databases from different storage groups, and they cannot share a LUN with transaction logs (even if they are from the same storage groups).

Note

All databases on a LUN are restored together. To be able to restore an individual database without restoring the rest of its storage group, that database must have its own LUN.

Exchange transaction logs: Transaction logs from different storage groups can share a LUN.

SnapManager SnapInfo directory: A SnapInfo directory can have its own LUN, or it can share a LUN with transaction logs. If you want to take advantage of NTFS hard links (described in "Understanding transaction log archiving using NTFS hard links" on page 80), the SnapInfo directory cannot share a LUN with Exchange databases.

SAN boot LUN: You cannot place database files, transaction log files, or a SnapInfo directory on a SAN boot LUN (a LUN configured as a boot device for a SAN host).

Exchange storage group system files: The Exchange storage group system files must be on a LUN containing the **transaction log files** for that storage group.

The Configuration Wizard in this version of SnapManager automatically moves storage group system files to the same LUN as the transaction logs if you modify the database or transaction log location for that storage group.

Exchange data store configurations to avoid

Nothing should be stored on the Exchange LUNs except what SnapManager puts there. If you add more databases or move databases to different LUNs without using the Configuration Wizard, you can create an invalid configuration that could cause SnapManager backup or restore operations to fail.

Note

After adding or moving Exchange data stores, always run the Configuration Wizard. This ensures that the Exchange data stores are stored in valid locations so that SnapManager backup and restore operations can finish successfully.

Before you migrate your Exchange database and transaction log files to LUNs, note the following recommendations against certain invalid configurations that could be created outside of the SnapManager Configuration Wizard.

No other files on LUNs used by any database files: Do not manually store any directories or files (including system paging files) on the LUNs used for by the Exchange data store files (database files and transaction log files).

No other files on the LUN used by the SnapInfo directory: Do not manually store any directories or files on the LUN used by the SnapInfo directory.

No Exchange database files on a LUN that hosts mount points: Do not manually store Exchange database files on a LUN that hosts NTFS volume mount points. For more information, see "Understanding SnapManager support for volume mount points" on page 76.

Exchange data store configurations recommended

For best results, consider the following Exchange data store recommendations:

- Use dedicated volumes for your Exchange data.
- Do not place LUNs containing data from different Exchange servers in the same volume. This recommendation helps you to avoid the following problems:

- SnapManager backups created for another Exchange server on the same volume use up Snapshot copies for that volume but are only restorable for the Exchange server they were taken for.
- Conflicting backup schedules between the two Exchange servers can lead to creating “busy Snapshot copies”.

- Do not place LUNs in the storage system’s root volume. The root volume is reserved for use by Data ONTAP.
- For faster backups and restore processes, use the minimum number of LUNs required for your business and service level commitments. Unless individual database restoration is a requirement in your environment, group your databases.

Understanding NTFS volume mount points

This topic contains highlights about NTFS mount points as they relate to Microsoft Exchange:

- "About NTFS volume mount points" on page 75
- "Volume mount point limitations" on page 75

Related topics:

- "Understanding Exchange configuration rules" on page 70
- "Understanding SnapManager configuration rules for Exchange" on page 72
- "Understanding SnapManager support for volume mount points" on page 76
- "Sample Exchange configurations supported with SnapManager" on page 83

About NTFS volume mount points

A volume mount point is a drive or volume in Windows that is mounted to a folder that uses the NTFS file system. A mounted drive is assigned a drive path instead of a drive letter. Volume mount points enable you to exceed the 26-drive-letter limitation. By using volume mount points, you can graft, or mount, a target partition into a folder on another physical disk. For more information about volume mount points, see the Microsoft Web site.

Volume mount point limitations

- With the NTFS volume mount points feature, you can create volume mount points on a dedicated disk.
- Volume mount points are not supported when they are used as a storage location for the Exchange Server 2003 binaries.

Understanding SnapManager support for volume mount points

This topic describes SnapManager support of NTFS volume mount points, which is new in this version of SnapManager:

- "Drive letter limitations and individual database restoration" on page 76
- "Mounted volume restrictions with SnapManager" on page 77
- "Mounted volume restrictions with SnapManager" on page 77
- "Mounted volume naming conventions with SnapManager" on page 77
- "Using mounted volumes in SnapManager" on page 77

Related topics:

- "Understanding Exchange configuration rules" on page 70
- "Understanding SnapManager configuration rules for Exchange" on page 72
- "Understanding NTFS volume mount points" on page 75
- "Sample Exchange configurations supported with SnapManager" on page 83

Drive letter limitations and individual database restoration

Windows supports up to 26 drive letters. Because SnapManager needs one LUN and therefore one available drive letter to perform backups, verifications, or restores, you can allocate a maximum of 25 drive letters. In addition, certain SnapManager operations require that additional drive letters be available:

- Databases that need to be restored individually each require their own LUN and drive letter. If you have a large number of databases to be individually restored, you might run out of drive letters.
- Performing a remote verification of more than one backup set requires a second LUN and therefore another available drive letter or mount point.

With previous releases of SnapManager for Exchange, you can avoid running out of available drive letters by determining which databases must be restored individually, and which can be combined on a LUN with one or two other databases (all of which are restored together). With this approach, you must still reserve at least one free drive letter for SnapManager.

With SnapManager for Exchange, your configuration is not limited to the 26 drive letters supported by Windows. By using the NTFS volume mount point support that is part of SnapDrive, SnapManager can manage Exchange databases that are stored on mounted volumes as well as those stored on standard Windows volumes.

Mounted volume restrictions with SnapManager

In addition to the limitations inherent to the NTFS volume mount point feature of Windows (described in "Understanding NTFS volume mount points" on page 75), SnapManager imposes the following additional restrictions.

No Exchange database files on a mount point root: An NTFS volume that hosts mount points cannot also store Exchange database files. However, transaction log files can reside on such a volume.

- The SnapManager Configuration Wizard does not allow you to place Exchange database files on an NTFS volume that has mount points.
- SnapManager Backup does not allow you to back up a database on an NTFS volume that has mount points.

Note

If Exchange databases reside on a LUN, do not add mount points to that LUN, even after you finish a SnapManager backup operation. A subsequent LUN-level SnapManager restore operation would remove those volume mount points, disrupting access to the data on the mounted volumes referenced by these volume mount points.

Mounted volume naming conventions with SnapManager

A mounted volume is a volume that is mapped to a folder and referenced by a mount point that is created in an empty directory. The SnapManager user interface represents a mounted volume based on the path of a volume mount point that references that mounted volume, as follows:

DriveLetter:*MountPointName*

where

- *DriveLetter* represents the drive letter to which the mounted volume is assigned
- *MountPointName* represents the mount point name assigned to the empty directory used to reference the mounted volume

Example:

```
F:\ My_Mount_Point
```

Using mounted volumes in SnapManager

The path-style representation of a mounted volume can appear in any part of the SnapManager user interface that refers to LUNs accessed by SnapManager:

- The Configuration Wizard displays *Disk List selection* in:
  - Select Storage group or database to move to a LUN
  - Select a set of logs from one or more storage groups to move to a LUN

- Select directories to store the backup information

LUns that are referenced more than once: If the storage system is configured with multiple references to the same LUN, each such LUN reference is listed with a label that lists any other references to the same LUN. For example, suppose the *drive letter* `H:` and the *mount point* `G:\DB\` reference the same LUN. In this case, the Disk List selection contains two entries for the one LUN:

```
LUN H:  <G:\DB\>
LUN G:\DB\  <H>
```

LUNs that have mounted volumes: If SnapManager accesses a LUN with an NTFS volume that is referenced by a mount point, that LUN is listed with a label that indicates this. For example, suppose the drive letter `F:` references a LUN that hosts a mount point. In this case, the Disk List selection lists that LUN as follows:

```
LUN F:  (MPRoot)
```

The Configuration Wizard does not allow you to store Exchange database files on LUNs that host NTFS volume mount points.

- The location of the storage group components listed in the left navigation pane of the Backup and Verification Backup tab and the SnapManager Backup Wizard:
  - SnapInfo directory
  - EDB path
  - Storage group log path
- The location of the storage group components listed in the right display pane of the SnapManager Restore tab and the SnapManager Restore Wizard:
  - SnapInfo directory
  - EDB path
  - Storage group log path
- To specify which method is to be used to access database backup Snapshot copies during database integrity verification, use the Access LUN in Snapshot tab to assign either a drive letter or directory path to access the backup Snapshot copy as a mounted LUN. You can access this setting from the following locations within the SnapManager user interface:
  - Configuration Wizard
  - Actions pane
  - Backup Wizard
  - Restore Wizard

For more information, see “Selecting the Snapshot copy access method for database verification” on page 358.

Understanding transaction log archiving using NTFS hard links

During a SnapManager backup operation, SnapManager archives transaction log files on the live file system to the SnapInfo directory. To optimize backup operations in which the storage group transaction log files and the associated SnapInfo directory are located on the same NTFS volume, SnapManager archives transaction log files to the SnapInfo directory by creating NTFS hard links instead of *performing a file copy* operation. This conserves storage system disk space and improves system performance during the transaction log archival phase of the backup operation.

See the following topics for more information:

- "About NTFS hard links" on page 80
- "About transaction log archiving using NTFS hard links" on page 81
- "About multiple SnapInfo directories" on page 82

About NTFS hard links

A hard link is a directory entry for a file, and it serves as a file system-level shortcut to the file. An application can use a hard link like any other file name. Unlike an application-level link, all changes made to a file accessed using a hard link are applied automatically and transparently; any updates to the file contents are seen by all applications that access the file using a hard link. Unlike a symbolic link, a hard link cannot cross file systems; that is, a hard link created on one NTFS volume cannot point to a file in a different NTFS volume.

About multiple NTFS hard links: Every file can be considered to have at least one hard link. Within a given NTFS volume, a single file can have multiple hard links. This enables a single file to appear in multiple directories or to appear multiple times (under different names) within the same directory. Because all of the links reference the same file, multiple applications can open any of the hard links and modify the same file.

Note

The NTFS file system will not delete a file until all hard links to the file have been deleted.

The benefits of using multiple NTFS hard links: When a hard link is created for an *existing* file on an NTFS volume, NTFS simply adds hard link information and a reference count to the file's directory entry at the NTFS level. Neither the original file nor the file-based reference (the application-level link) are duplicated. While the physical file remains intact in its original location, the

same content can be accessed by two or more names. Because the file system is responsible for managing the various path names to a single physical content, using a hard link can conserve system resources and storage system disk space as compared to performing a standard file copy operation.

About transaction log archiving using NTFS hard links

During a SnapManager backup operation, SnapManager archives transaction log files on the live file system to the SnapInfo directory. The transaction log files are needed for SnapManager restore operations at the later time.

Transaction log archiving using file copy: When SnapManager uses a file copy operation to copy the transaction log files from the live file system to the SnapInfo directory, this method of transaction log archiving has the following effects:

- Management of path names and the copy operation incurs file system overhead and storage system overhead, resulting in slower host and storage system performance.
- Each additional copy of a transaction log file not only consumes storage system disk space but also increases the use of overwrite reserve for the LUN.

Transaction log archiving using NTFS hard links: SnapManager 4.0 supports an optimization feature for cases in which the backup operation archives transaction log files to a SnapInfo directory that resides on the same volume. To achieve this optimization, SnapManager archives transaction log files to the SnapInfo directory by creating NTFS hard links to the live transaction log files, without physically copying the log file.

After the SnapManager backup operation completes, Exchange truncates the transaction log files. However, the physical log files on the original location are not deleted, because the NTFS file system detects that other hard links to the files still exist. Instead, the original NTFS hard links to the live transaction log files are removed, and the links to the SnapInfo directory remain intact and available for access during SnapManager restore operations.

SnapManager automatically uses NTFS hard links to archive transaction logs if they reside on the same LUN as the SnapInfo directory.

Entries in the backup report: Transaction log archival is logged differently in the SnapManager backup report, depending on which archival method is used.

If a transaction log file is archived by performing a file copy operation, the backup report entry is similar to the following:

```
Log file copying from:
L:\Program Files\Exchsrvr\mdbdata\E000000A.log
Log file copying to:
S:\SME_SnapInfo\EXCH__CLPUBS-WINSRVR3\SG__First Storage
Group\CLPUBS-WINSRVR3__recent\Logs\E000000A.log
```

If the same transaction log file is archived by *creating an NTFS hard link* instead of performing a file copy operation, the backup report entry is similar to the following:

```
Log file:
L:\Program Files\Exchsrvr\mdbdata\E000000A.log
Archived to:
S:\SME_SnapInfo\EXCH__CLPUBS-WINSRVR3\SG__First Storage
Group\CLPUBS-WINSRVR3__recent\Logs\E000000A.log
```

About multiple SnapInfo directories

The primary reason that SnapManager supports multiple SnapInfo directories is to facilitate the use of NTFS hard links for archiving transaction logs, thereby conserving system resources and storage system disk space. The use of multiple SnapInfo directories also has the additional benefit of minimizing your exposure to the loss of backups in case the SnapInfo directory is lost.

The following paragraphs describe both of the benefits of configuring your Exchange data to use multiple SnapInfo directories.

Broader application of copy-less transaction log archiving: The use of NTFS hard links to archive transaction logs can only be applied to backup operations in which the transaction logs reside on the same NTFS volume as the SnapInfo directory. If your SnapManager environment is configured with a single SnapInfo directory for all Exchange storage groups, SnapManager can still use NTFS hard links to archive transaction logs, but only if all transaction logs for all storage groups are located on a single LUN on the same volume as the SnapInfo directory.

In most SnapManager environments, however, the Exchange transaction log files are stored on multiple LUNs in multiple storage system volumes. In this configuration, the use of NTFS hard links to archive transaction logs requires a separate SnapInfo directory for each Exchange storage group, with each SnapInfo directory placed on the same NTFS volume as the Exchange transaction logs for that storage group.

Sample Exchange configurations supported with SnapManager

This topic contains sample configurations that illustrate possible ways to satisfy the configuration rules for SnapManager 3.2 for Exchange:

- "Single storage group and individual database restoration not required" on page 84
- "Single storage group and individual database restoration required" on page 85
- "Multiple storage groups and individual database restoration not required" on page 86
- "Multiple storage groups and individual database restoration required" on page 87

Related topics:

- "Understanding Exchange configuration rules" on page 70
- "Understanding SnapManager configuration rules for Exchange" on page 72
- "Understanding NTFS volume mount points" on page 75
- "Understanding SnapManager support for volume mount points" on page 76

For more information about SnapManager for Exchange data store configuration, see the *SnapManager for Microsoft Exchange Best Practices Guide*.

Note

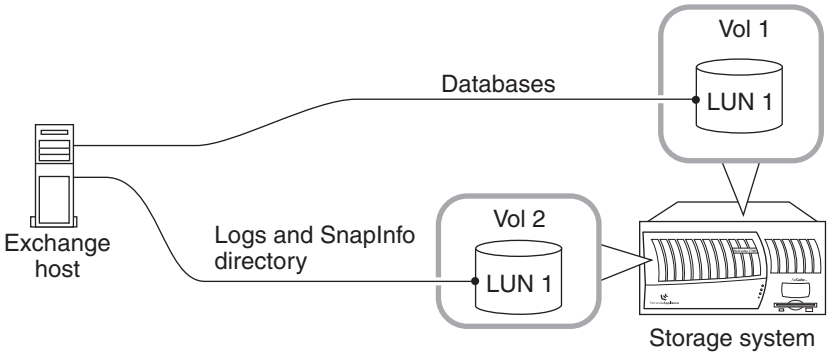
The LUN numbers are for illustration only; they do not correspond to any configuration setting on your host system. In addition, your configuration will vary based on your sizing and capability requirements.

Single storage group and individual database restoration not required

This example configuration has the following characteristics:

- One storage group with up to five databases
- Individual database restoration not required

Because this Exchange server has only one storage group, only one LUN is required for the databases. A total of two LUNs are required for this configuration, as shown in the following diagram.



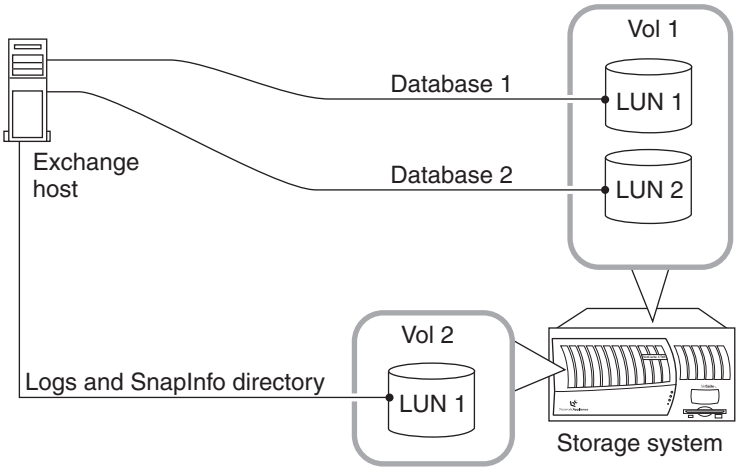
Sample configuration 1

Single storage group and individual database restoration required

This example configuration has the following characteristics:

- One storage group with two databases
- Individual database restoration required

Because the ability to restore either of the databases individually is required, each database must be placed on its own LUN. Therefore, three LUNs are required for this configuration, as shown in the following diagram.



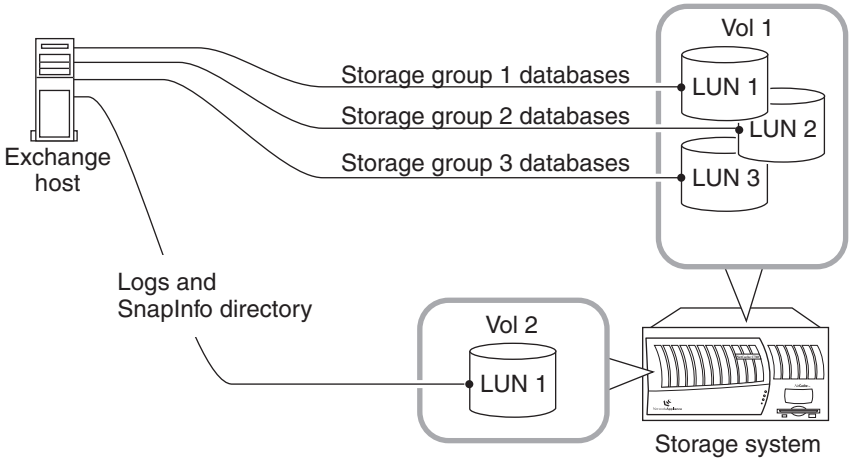
Sample configuration 2

Multiple storage groups and individual database restoration not required

This example configuration has the following characteristics:

- Three storage groups with up to five databases each
- Individual database restoration not required

Four LUNs are required for this configuration, as shown in the following diagram.



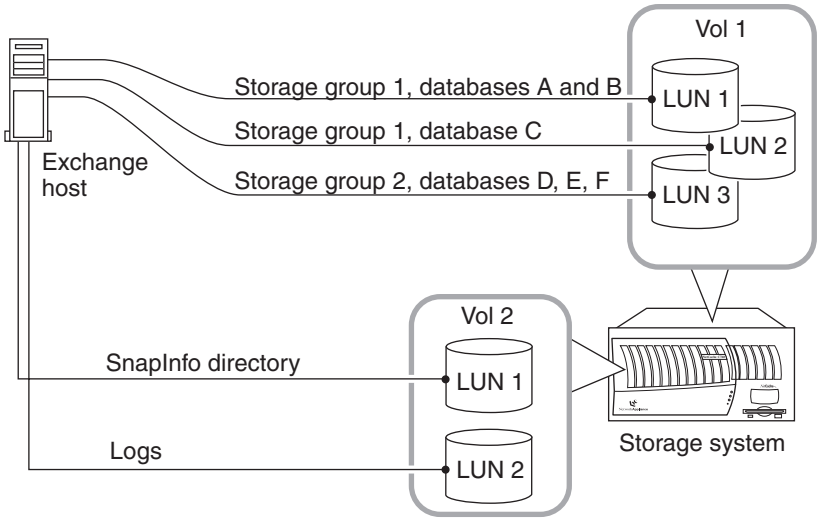
Sample configuration 3

Multiple storage groups and individual database restoration required

This example configuration has the following characteristics:

- Two storage groups with three databases each
- Individual database restoration required for database C in the first storage group

With this configuration, database C in storage group 1 can be restored without restoring any of the other databases in its storage group. However, databases A and B have to be restored at the same time. A total of five LUNs are used for this configuration, as shown in the following diagram.



Sample configuration 4

Note

Configuring many databases on their own LUNs for individual restoration can cause you to run out of drive letters.

For more information about drive letter limitations, see "Drive letter limitations and individual database restoration" on page 76.

Creating Storage System Volumes and LUNs 7

After you determine how many LUNs you need for your SnapManager configuration and what data those LUNs will hold, use the information in this section to develop your SnapManager data configuration plan and prepare storage system volumes and LUNs for use with SnapManager. This entails calculating and recording the required sizes for the LUNs, which also determines the sizes of the volumes that contain the LUNs. Use the information you record in your SnapManager data configuration plan to create or modify the storage system volumes and LUNs on your storage system.

The following topics are covered in this section:

- "Developing your SnapManager data configuration plan" on page 90
- "Calculating LUN size for Exchange databases" on page 92
- "Calculating single-instance sharing ratio for a database LUN" on page 94
- "Calculating deleted-item cache size for a database LUN" on page 96
- "Calculating LUN size for transaction logs and SnapInfo directory" on page 97
- "Calculating volume size" on page 101
- "Effect of SnapManager features on volume sizing" on page 105
- "Preparing storage system volumes and LUNs for SnapManager" on page 109

Related topics:

- Chapter 4, "Starting SnapManager for the First Time," on page 47
- Chapter 6, "Determining the Number of LUNs Required," on page 69
- Chapter 8, "Configuring the Exchange Data for SnapManager," on page 111

Developing your SnapManager data configuration plan

As you calculate the required sizes of the storage system volumes and LUNs required for your Exchange configuration, you need to record this information in one place; this composes your SnapManager data configuration plan. This information is used to create or upgrade your volumes and LUNs during the SnapManager configuration procedure.

The information you record in your SnapManager data configuration plan could also be invaluable if problems arise later with your Exchange system. Knowing the volume and drive for each of your LUNs can aid the diagnosis and resolution of many potential issues.

To create your SnapManager data configuration plan, complete the following steps.

Step	Action
1	For each LUN you need, record the following information: ◆ Purpose ◆ Size ◆ Volume and qtree ◆ Assigned drive letter or mount point For details about calculating LUN size for an Exchange database, see the following topics: ◆ "Calculating LUN size for Exchange databases" on page 92 ◆ "Calculating single-instance sharing ratio for a database LUN" on page 94 ◆ "Calculating deleted-item cache size for a database LUN" on page 96 For details about calculating LUN size for transaction log files and the SnapInfo directory or directories, see "Calculating LUN size for transaction logs and SnapInfo directory" on page 97

Step	Action
2	For each volume you need to store LUNs, record the following information: ◆ Location (storage system name) ◆ Purpose ◆ Type (traditional or flexible) ◆ Fractional reserve (%) ◆ Automatic Snapshot copy deletion setting (enabled or disabled) ◆ LUNs contained ◆ Volume autogrow (enabled or disabled) For details about calculating volume size, see “Calculating volume size” on page 101.

Calculating LUN size for Exchange databases

This topic describes how to calculate the required size for the LUNs to hold your Exchange databases. The size of the LUN to hold Exchange databases must be at least as big as the sum of the expected maximum sizes of all databases on that LUN.

- "Estimated database values" on page 92
- "Calculation formula" on page 92
- "Example" on page 92

Estimated database values

To calculate the expected maximum size for an Exchange database LUN, you need the following values (or estimates) for each database on the LUN:

- Number of mailboxes in the database
- Mailbox quota
- Single-instance sharing ratio

  For more information about calculating the single-instance sharing ratio, see "Calculating single-instance sharing ratio for a database LUN" on page 94.
- Size of the deleted item cache (expressed as a percentage of the overall size of the data)

  For more information about calculating the deleted-item cache size, see "Calculating deleted-item cache size for a database LUN" on page 96.

Calculation formula

The following formula calculates the expected Exchange database size:

```
database size = ((number of mailboxes * mailbox quota) / single
instance sharing ratio) + deleted item cache
```

The sum of the maximum expected database size for each database in your LUN provides the maximum expected database LUN size.

Example

The following facts and assumptions represent a sample Exchange installation:

- There is one storage group, with one database.
- There are 1,000 mailboxes with 100-MB quotas in the database.
- The single-instance sharing ratio is equal to 1.5.
- The deleted-item cache is 20% of the database.

For this example, the database size requirement calculation would be as follows:

```
database size = (((1,000 * 100 MB)/1.5) * 1.2) = 80,000 MB (~80 GB)
```

Note

In this calculation, the addition of 20% of the database size (to allow for the size of the deleted item cache in this example) is expressed by multiplying the estimated storage group size by a factor of 1.2 (or 120%).

The calculated maximum LUN size for this database is approximately 80 GB. If you want to allow for 10 GB of free space, increase the LUN size from 80 GB to 90 GB.

Calculating single-instance sharing ratio for a database LUN

This topic describes how to calculate the single-instance sharing ratio used to calculate the expected maximum size for an Exchange database LUN.

Single-instance sharing ratio for a new Exchange installation

For a new installation of Microsoft Exchange, use the value 1.5 for your single-instance sharing ratio.

Note
After you have a more mature installation, recalculate the ratio using the procedure below.

Single-instance sharing ratio for an existing Exchange installation

Use the following procedure to calculate the single-instance sharing ratio for your installation.

Calculation guidelines: Use these guidelines when calculating the single instance ratio:

- Track the ratio over time during peak production times; then select the lowest ratio value recorded.
- If you obtain different ratio values for different databases within a storage group, select the lowest value for that storage group in your calculation.

Calculating the single-instance ratio: To calculate the single-instance sharing ratio for your installation, complete the following steps.

Step	Action
1	Run the Windows Performance Monitor utility (also known as "Perfmon").
2	Right-click the graph and select Add Counters. **Result:** The Add Counters dialog box appears.
3	In the Performance Object list, select the performance object MSExchangeIS Mailbox.
4	In the Select Counter From List option, select Single Instance Ratio.

Step	Action
5	Select all databases in the instances list for the storage group you are measuring.
6	Click Add.

Calculating deleted-item cache size for a database LUN

To calculate the deleted-item cache size for your installation, complete the following steps.

Step	Action
1	Run the Windows Performance Monitor utility (also known as "Perfmon").
2	Right-click the graph and select Add Counters. **Result:** The Add Counters dialog box appears.
3	In the Performance Object list, select the performance object MSExchangeIS Mailbox.
4	In the Select Counter From List option, select Total Size of Recoverable Items.
5	Select all databases in the instances list for the storage group you are measuring.
6	Click Add. **Result:** PerfMon provides the total size of recoverable items (in the selected storage group) in kilobytes.
7	To calculate the deleted-item cache size as a percentage value for use in the LUN size "Calculation formula" on page 92, divide the total size of recoverable items (in kilobytes) by the total size of the database (in kilobytes).

Calculating LUN size for transaction logs and SnapInfo directory

This topic describes how to calculate the required size for the LUNs to hold your transaction logs and SnapInfo directory or directories. A SnapInfo directory can reside on the same LUN as the transaction logs, or it can be placed on a separate LUN. Use the following calculations as they apply to your planned configuration of SnapManager for Exchange:

- "Transaction log and SnapInfo directory LUN size calculation" on page 97
- "SnapInfo directory LUN size calculation" on page 98
- "Transaction logs LUN size calculation" on page 99

Note

For information about using multiple SnapInfo directories, see "About transaction log archiving using NTFS hard links" on page 81 and "About multiple SnapInfo directories" on page 82.

Transaction log and SnapInfo directory LUN size calculation

The size of the LUN containing the transaction logs and SnapInfo directory depends on how much message traffic your Exchange server gets and your backup usage. The size calculation is performed per storage group.

Estimated transaction log values: The following values (or estimates) are required for each storage group whose transaction logs will be stored on this LUN:

- How many transaction log files are generated between backups
- How many backups will be retained online

Note

You can estimate how many transaction log files are generated by noting the maximum number of transaction logs that accumulate in the transaction log directory immediately before a backup over a period of several days.

Calculation formula for Exchange Server 2003: The following formula calculates the LUN size required for a LUN containing transaction logs and the SnapInfo directory:

```
transaction log & SnapInfo LUN size = ((number of transaction logs
generated * 5 MB) * (number of backups to keep online + 1 for the
active file system))
```

Example: Given the following parameters, at least 6 GB of LUN drive is required to accommodate the transaction logs and SnapInfo directory for the example Exchange databases. This is expressed by the formula following the parameters.

- The server generates, at most, 200 transaction logs between backups.
- Each transaction log is 5 MB for Exchange Server 2003.
- The plan is to keep five SnapManager backups online at the same time.

```
transaction log & SnapInfo LUN size = ((200 * 5 MB)*(5+1)) = 6,000
MB (~6 GB)
```

Calculation formula for Exchange Server 2007: The following formula calculates the LUN size required for a LUN containing transaction logs and the SnapInfo directory:

```
transaction log & SnapInfo LUN size = ((number of transaction logs
generated * 1 MB) * (number of backups to keep online + 1 for the
active file system))
```

Example: Given the following parameters, at least 1.2 GB of LUN drive is required to accommodate the transaction logs and SnapInfo directory for the example Exchange databases. This is expressed by the formula following the parameters.

- The server generates, at most, 200 transaction logs between backups.
- Each transaction log is 1 MB for Exchange Server 2007.
- The plan is to keep five SnapManager backups online at the same time.

```
transaction log & SnapInfo LUN size = ((200 * 1 MB)*(5+1)) = 1,200
MB (~1.2 GB)
```

SnapInfo directory LUN size calculation

The SnapInfo directory contains the logs for all backups currently retained online. Therefore, if your SnapInfo directory is on a separate LUN from your transaction logs, the LUN size calculation is similar to the calculation for a combined transaction log and SnapInfo LUN, except that you do not have to include space for the current logs.

Calculation formula for Exchange Server 2003: The following formula calculates the LUN size required for a LUN containing only the SnapInfo directory:

```
SnapInfo LUN size = ((number of transaction logs generated * 5 MB)
* (number of backups to keep online))
```

Example: Given the following parameters, at least 5 GB of LUN drive is required to accommodate the SnapInfo directory for the example Exchange databases. This is expressed by the formula following the parameters.

- The server generates, at most, 200 transaction logs between backups.
- Each transaction log is 5 MB for Exchange Server 2003.
- The plan is to keep five SnapManager backups online at the same time.

```
transaction log & SnapInfo LUN size = ((200 * 5 MB)*5) = 5,000 MB
(~5 GB)
```

Calculation formula for Exchange Server 2007: The following formula calculates the LUN size required for a LUN containing only the SnapInfo directory:

```
SnapInfo LUN size = ((number of transaction logs generated * 1 MB)
* (number of backups to keep online))
```

Example: Given the following parameters, at least 1 GB of LUN drive is required to accommodate the SnapInfo directory for the example Exchange databases. This is expressed by the formula following the parameters.

- The server generates, at most, 200 transaction logs between backups.
- Each transaction log is 1 MB for Exchange Server 2007.
- The plan is to keep five SnapManager backups online at the same time.

```
transaction log & SnapInfo LUN size = ((200 * 1 MB)*5) = 1,000 MB
(~1 GB)
```

Transaction logs LUN size calculation

If the SnapInfo directory is on a separate LUN from your transaction logs, the LUN size calculation for the transaction log LUN has to take into account only how many logs accumulate between backups.

Calculation formula for Exchange Server 2003: The following formula calculates the LUN size required for a LUN containing only the transaction logs:

```
transaction log LUN size = number of transaction logs generated * 5
MB
```

Example: Given the following parameters, at least 1 GB of LUN drive is required to accommodate the transaction logs for the example Exchange databases. This is expressed by the formula following the parameters.

- The server generates, at most, 200 transaction logs between backups.
- Each transaction log is 5 MB for Exchange Server 2003.

```
transaction log LUN size = 200 * 5 MB = 1,000 MB (~1 GB)
```

Calculation formula for Exchange Server 2007: The following formula calculates the LUN size required for a LUN containing only the transaction logs:

```
transaction log LUN size = number of transaction logs generated * 1
MB
```

Example: Given the following parameters, at least 200 MB of LUN drive is required to accommodate the transaction logs for the example Exchange databases. This is expressed by the formula following the parameters.

- The server generates, at most, 200 transaction logs between backups.
- Each transaction log is 5 MB for Exchange Server 2007.

```
transaction log LUN size = 200 * 1 MB = 200 MB
```

Calculating volume size

This topic describes how to calculate the required size for the volumes to contain your LUNs:

- "Considerations for converting to individual database restoration" on page 101
- "Database volume size calculation" on page 101
- "Transaction log volume size calculation" on page 102
- "Volume size calculation for multiple Exchange LUNs" on page 103

Considerations for converting to individual database restoration

If you are upgrading an existing SnapManager implementation and you are creating new LUNs to use individual database restore, your space requirements increase. This is because the database must be copied from its current location to the new location; in effect, it exists in both places until the move is complete. Depending on the size of the volume containing both LUNs, you might need to increase the volume size.

For more information about sizing your volumes, see "Calculating volume size" on page 101. Remember to include both the old and new LUNs when calculating the volume size.

Database volume size calculation

The calculation for the Exchange database volume size depends on the size of the databases in the volume, the rate of change of your data, and your backup usage.

Estimated database volume values: To calculate the volume size requirement for a LUN holding Exchange databases, you need the following values or estimates for your installation:

- The size of the LUNs (as calculated using the database LUN formula)
- The approximate percentage of the databases that you expect to change between backups
- How many backups you plan to retain online

Calculation formula: The following formula calculates the minimum volume size requirement for the Exchange database LUNs:

```
minDatabaseVolumeSize = (2 * LUN size) + (number of online backups
* percentage data change * max database size)
```

Example: For the example, assume the following facts:

- Approximately 10% of the database changes between backups.
- Five backups will be retained online.

The minimum volume size for the database LUN is calculated as follows:

```
(2 * 90 GB) + (5 * 10% * 80 GB) = 220 GB
```

Transaction log volume size calculation

The size of the transaction log volume depends on how much traffic your Exchange server gets, and your backup usage.

Estimated transaction log values: The following values or estimates are required for the entire volume where the transaction logs are stored:

- How many transaction log files are generated between backups
- How many backups will be retained online

Calculation formula for Exchange Server 2003: The following formula calculates the transaction log volume size:

```
transaction log volume size = (transaction log LUN size in MB * 2)
+ (2 * number of transaction logs generated * 5 MB * number of
backups to keep online)
```

This is always less than four times the size of the transaction log LUN. Therefore, if disk capacity is not constrained, you can use this simplified formula:

```
transaction log volume size = 4 * transaction log LUN size
```

Example: For the example, the transaction log volume size could be calculated using the full formula, as follows:

```
transaction log volume size = (6,000 MB * 2) + (2 * 200 * 5 MB * 5)
= 12,000 + 10,000 MB = 22,000 MB (~22 GB)
```

Alternatively, you could calculate the volume using the simplified formula, as follows:

```
transaction log volume size = (6,000 MB * 4) = 24,000 MB (~24 GB)
```

Calculation formula for Exchange Server 2007: The following formula calculates the transaction log volume size:

```
transaction log volume size = (transaction log LUN size in MB * 2)
+ (2 * number of transaction logs generated * 1 MB * number of
backups to keep online)
```

Example: For the example, the transaction log volume size could be calculated using the full formula, as follows:

```
transaction log volume size = (6,000 MB * 2) + (2 * 200 * 1 MB * 5)
= 12,000 + 2,000 MB = 14,000 MB (~14 GB)
```

Volume size calculation for multiple Exchange LUNs

If you plan to use a single storage system volume for storing multiple LUNs to hold Exchange or SnapManager data, the volume sizing requirements of all the components must be summed to calculate the size requirement for the volume.

Note

Microsoft recommends that Exchange databases and transaction logs be kept on separate volumes. This example is for illustration only.

Example for Exchange Server 2003: Assume now that you want to create one volume for an Exchange installation with the following characteristics:

- Four storage groups, each with 1,000 mailboxes and 100-MB quotas
- Single instance sharing ratio of 1.5
- Deleted item cache is 20% of the data
- A combined maximum of 800 transaction logs generated between backups
- 10% database change between backups
- Five online backups retained

LUN size requirements	Resulting volume size requirement
Each storage group requires a 90-GB LUN, as calculated previously.	4 LUNs * 220 GB = 880 GB
The transaction log and SnapInfo LUN requires the following LUN size: (800 * 5 MB) * (5+1) = 24,000 MB or about 24 GB.	(2 * 24,000 MB) + (2 * 800 * 5 MB * 5) = 88,000 MB or approximately 88 GB

LUN size requirements	Resulting volume size requirement
Result: The five LUNs must reside in a volume whose size is approximately 880 + 88 = 968 GB.	

Example for Exchange Server 2007: Assume now that you want to create one volume for an Exchange installation with the following characteristics:

- Four storage groups, each with 1,000 mailboxes and 100-MB quotas
- Single instance sharing ratio of 1.5
- Deleted item cache is 20% of the data
- A combined maximum of 800 transaction logs generated between backups
- 10% database change between backups
- Five online backups retained

LUN size requirements	Resulting volume size requirement
Each storage group requires a 90-GB LUN, as calculated previously.	4 LUNs * 220 GB = 880 GB
The transaction log and SnapInfo LUN requires the following LUN size: (800 * 1 MB) * (5+1) = 4,800 MB or about 4.8 GB.	(2 * 24,000 MB) + (2 * 800 * 1 MB * 5) = 56,000 MB or approximately 56 GB
Result: The five LUNs must reside in a volume whose size is approximately 880 + 56 = 936 GB.	

Effect of SnapManager features on volume sizing

Several features in SnapManager are designed to reduce the amount of disk space required to run SnapManager.

The following topics are covered in this section:

- "Transaction log archiving using NTFS hard links" on page 105

  For more information, see "About transaction log archiving using NTFS hard links" on page 81.
- "Option to back up transaction logs that Exchange will truncate" on page 108

  For more information, see page "Ways to manage the backup and deletion of transaction logs" on page 156.
- "Sizing for an Exchange Server 2007 LCR-enabled and a CCR-enabled databases" on page 108

These features will have an affect on some of the sizing formulas discussed in this chapter. Following are the updated formulas.

Transaction log archiving using NTFS hard links

Configurations in which the transaction logs reside on the same NTFS volume and LUN can take advantage of the new NTFS hard link support in SnapManager. During a backup, SnapManager copies the transaction log files to the SnapInfo directory for safe keeping. However, in supported configurations that can take advantage of NTFS hard links, a link is created to the file rather than copying the file itself. Since there are fewer blocks changed on the storage system volume as a result of this feature, the formula to calculate the size of the storage system volume for the Exchange transaction logs needs to be slightly modified. The difference in this case is that the `number of transaction logs generated` does not need to be multiplied by a factor of two as with the original formula. In the following updated formula, the `number of transaction logs generated` is only accounted for once, so the "`2 *`" is removed from the original formula.

The following formula calculates the transaction log volume size for *Exchange Server 2003*:

```
TransactionLogVolumeSize = (transaction log LUN size in MB * 2)
+ (number of transaction logs generated * 5 MB * number of
backups to keep online)
```

As an example, the transaction log volume size could be calculated using the full formula, as follows for Exchange Server 2003:

```
TransactionLogVolumeSize = (6,000 MB * 2) + (200 * 5 MB * 5) =
12,000 + 5,000 MB = 17,000 MB (~17 GB)
```

The following formula calculates the transaction log volume size for **Exchange Server 2007**:

```
TransactionLogVolumeSize = (transaction log LUN size in MB * 2)
+ (number of transaction logs generated * 1 MB * number of
backups to keep online)
```

As an example, the transaction log volume size could be calculated using the full formula, as follows for Exchange Server 2007:

```
TransactionLogVolumeSize = (6,000 MB * 2) + (200 * 1 MB * 5) =
12,000 + 1,000 MB = 13,000 MB (~13 GB)
```

Fractional space reservation

Prior to the support for fractional space reservation in SnapManager, there was a requirement that the volume size on the storage system be at least twice the size of the LUN that it contains plus allow extra volume space to store SnapManager backups as well as accommodate changes in the Exchange data. With the new fractional space reservation support in SnapManager enabled, this factor of 2 can been relaxed to a factor that is greater than 1 and less than or equal to 2.

This change affects two storage system volume size calculation formulas:

- Volume size for Exchange databases
- Volume size for Exchange transaction logs and SnapManager SnapInfo directory

Only the `transaction log LUN size in MB * 2` portion of the formulas are updated from the original formulas. The updated portion of the formula can be expressed as `transaction log LUN size in MB * (1+n)`, where `n` is a number greater than 0 and less than or equal to 1.

Volume size for Exchange databases: The following formula calculates the volume size for the Exchange database LUNs:

```
DatabaseVolumeSize = ((1+n) * LUN size) + (number of online backups
* percentage data change * max database size)
```

As an example, assume the following facts:

- Approximately 10% of the database changes between backups.
- Five backups will be retained online.

- Fractional space reservations are in use with a setting of 65 (or enough space reservation to accommodate 65% of the size of the LUN)

In this case, the minimum volume size for the database LUN is calculated as follows:

```
((1 + 0.65) * 90 GB) + (5 * 10% * 80 GB) = 188 GB
```

Volume size for transaction logs and SnapInfo directory for Exchange Server 2003: The following formula calculates the volume size for the transaction log and SnapInfo LUNs for Exchange Server 2003:

```
TransactionLogVolumeSize = (transaction log LUN size in MB * (1
+ n)) + (2 * number of transaction logs generated * 5 MB *
number of backups to keep online)
```

As an example, assume the following facts:

- Approximately 10% of the database changes between backups.
- Five backups will be retained online.
- Fractional space reservations are in use with a setting of 65 (or enough space reservation to accommodate 65% of the size of the LUN)

In this case, the minimum volume size for the transaction log and SnapInfo LUNs is calculated as follows:

```
TransactionLogVolumeSize = (6,000 MB * 1.65) + (2 * 200 * 5 MB *
5) = 9,900 + 10,000 MB = 19,900 MB (~20 GB)
```

Volume size for transaction logs and SnapInfo directory for Exchange Server 2007: The following formula calculates the volume size for the transaction log and SnapInfo LUNs for Exchange Server 2007:

```
TransactionLogVolumeSize = (transaction log LUN size in MB * (1
+ n)) + (2 * number of transaction logs generated * 1 MB *
number of backups to keep online)
```

As an example, assume the following facts:

- Approximately 10% of the database changes between backups.
- Five backups will be retained online.
- Fractional space reservations are in use with a setting of 65 (or enough space reservation to accommodate 65% of the size of the LUN)

In this case, the minimum volume size for the transaction log and SnapInfo LUNs is calculated as follows for Exchange Server 2007:

```
TransactionLogVolumeSize = (6,000 MB * 1.65) + (2 * 200 * 1 MB *
5) = 9,900 + 2,000 MB = 11,900 MB (~11.9 GB)
```

Option to back up transaction logs that Exchange will truncate

This is another feature that can be used to save on amount storage system volume space consumed. However, since you cannot predict the number of transaction logs Exchange will truncate or when it will truncate them, you cannot accurately calculate the amount of disk space that can be saved by using this configuration.

Sizing for an Exchange Server 2007 LCR-enabled and a CCR-enabled databases

Exchange Server 2007 introduces support for replicated copies of its databases. These databases are replica of the production databases, the size will be the same as production database. It is recommended to use the results that you get using the formulas for the production database to determine the LUN and volume size for an LCR-enabled and a CCR-enabled databases.

Preparing storage system volumes and LUNs for SnapManager

To prepare storage system volumes and LUNs to be used with SnapManager, complete the following steps.

<table>
<tr><th>Step</th><th colspan="2">Action</th></tr>
<tr><td rowspan="4">1</td><td colspan="2">Create or update storage system volumes and LUNs for use with SnapManager.</td></tr>
<tr><td>If...</td><td>Then do this...</td></tr>
<tr><td>This is a new installation of SnapManager</td><td>Use your storage system administration tools and SnapDrive to create the storage system volumes and LUNs required for your new installation of SnapManager.</td></tr>
<tr><td>This is an upgraded installation of SnapManager</td><td>Update your existing storage system volumes and LUNs as needed:
a. Review your existing storage system volumes and LUNs against the requirements for your upgraded installation of SnapManager.
b. Use your storage system administration tools and SnapDrive to make any necessary changes to the storage system volumes and LUNs.</td></tr>
<tr><td colspan="2">New or updated storage system requirements are outlined in your SnapManager data configuration plan, described in “Developing your SnapManager data configuration plan” on page 90.</td></tr>
</table>

Step	Action
2	If your configuration plan includes Exchange *database LUNs* that reside in volumes that have overwrite reserve configured to less than 100 percent, do the following: **a.** Ensure that the Data ONTAP Snapshot copy autodeletion policy is disabled on each of these fractional space-reserved volumes. **b.** Verify the SnapManager fractional space reservation policy settings for each fractional space-reserved storage system volume. The two trigger points are set to default values and might need to be modified to meet your organization's service level agreements and business continuance plans. For detailed information, see "Managing the event notification options" on page 373.
3	Proceed to Chapter 8, "Configuring the Exchange Data for SnapManager," on page 111. **Note** For a CCR, it is recommended that both CCR nodes have similar storage system volume layout and LUN layout. For an LCR, it is recommended that database replica and log directory does not share the same storage system volume with production database.

Configuring the Exchange Data for SnapManager 8

SnapManager for Exchange Configuration feature enables you to select the database verification servers, move the Exchange databases and transaction logs to Data ONTAP LUNs and configure automatic event notification.

This section describes:

- How to plan your storage system layout.
- How to configure your Microsoft Exchange data using SnapManager.
- How to migrate Exchange data with Local Continuous Replication LCR-enabled using SnapManager.

The following topics are covered in this section:

- "Planning your storage system layout" on page 112
- "Understanding the SnapManager Configuration Wizard" on page 113
- "Using the Configuration wizard to configure your data store" on page 118
- "Understanding the migration of LCR-enabled databases" on page 129
- "Migrating an existing SnapManager for Exchange configuration from using drive letters to using mount points" on page 132

Attention

You must run SnapManager from the system console, not from a Terminal Services client. Do not use Terminal Services for any type of SnapManager administration, because you might miss critical information that is displayed only in pop-up boxes at the system console.

Related topics:

- Chapter 4, "Starting SnapManager for the First Time," on page 47
- Chapter 6, "Determining the Number of LUNs Required," on page 69
- Chapter 7, "Creating Storage System Volumes and LUNs," on page 89

Planning your storage system layout

On Windows Server 2003, VSS is limited to containing 64 Windows volumes within a single snapshot set. Exchange databases and transaction logs that belong to the same storage group are aggregated into the same VSS Snapshot set. In an effort to use Snapshot copies more efficiently on the storage system, SnapManager adds all components of a storage group (database and transaction logs) that share one or more storage system volumes to the same VSS snapshot set. One way to avoid exceeding the 64 volume limit is to make sure that the total number of LUNs that store components for a particular storage group and that share a storage system volume does not exceed the 64 LUN limit. The following error will be logged in the SnapManager backup report when this limit is exceeded:

Error in calling VSS API: Error code = 0x80042312

Error description:VSS_E_MAXIMUM_NUMBER_OF_VOLUMES_REACHED

In addition, NetApp recommends designing your database and LUN layout such that a single VSS Snapshot set does not involve more than two storage system volumes.

Understanding the SnapManager Configuration Wizard

The primary function of the Configuration wizard is to migrate Exchange databases to Data ONTAP LUNs so that the databases can be backed up and restored using SnapManager. For more information, go to any of the following topics:

- "What the Configuration wizard does" on page 113
- "When to use the Configuration wizard" on page 114
- "When to rerun the Configuration Wizard" on page 114
- "Viewing the placement of Exchange and SnapManager components" on page 116
- "Viewing the placement of Exchange and SnapManager components" on page 116
- "Settings configurable only with the Configuration wizard" on page 116

Note

Ensure that all databases in a storage group are migrated to NetApp LUNs from local disk. SnapManager does not support heterogeneous configuration like storage groups with some databases residing on LUNs and some on a local disk. Exchange databases must reside on NetApp LUNs in order for SnapManager to be able to back them up.

What the Configuration wizard does

The Configuration wizard enables you to move your Exchange data in the following ways.

From local disk to LUN: To enable management by SnapManager.

- If Exchange databases need to be moved, the wizard dismounts the databases in a storage group, moves the Exchange database and transaction log files to the selected LUN, and remounts the databases.

  Note

  SnapManager takes Exchange databases offline during the move operation.

- The wizard creates a SnapInfo directory that SnapManager uses to store information about the backup sets and the backed-up transaction logs.
- The wizard disables circular logging for all storage groups that are moved to a LUN, to enable up-to-the-minute recovery of those storage groups.
- The wizard also guides you through several application settings. These settings include enabling notification of SnapManager events using e-mail,

and enabling notification of SnapManager events using the storage system Syslog or the AutoSupport feature.

From LUN to LUN: If resource management issues require this. For example, consolidating Exchange on another storage system.

From LUN to local disk: If no longer managed using SnapManager. However, this is not supported in MSCS configurations.

When to use the Configuration wizard

You can use the Configuration wizard in the following situations.

For initial configuration: Before you can use SnapManager to back up and restore an Exchange data store, you must use the SnapManager Configuration wizard to migrate the databases and transaction logs from your Exchange servers to the LUNs you configured on your storage system with SnapDrive.

To view or change the database configuration: After the initial configuration, you can rerun the Configuration wizard at any time to review or make changes to your Exchange data store configuration.

To validate the database configuration: If you add databases or move databases to different LUNs without using SnapManager, run the Configuration wizard to ensure that the databases are stored in valid locations and to create a mapping between those databases and their respective SnapInfo subdirectories.

Attention

Use the SnapManager Configuration wizard to move Exchange databases, transaction logs, or storage group system files. SnapManager ensures that these files are place in locations that meet SnapManager configuration requirements. Incorrectly located Exchange database, transaction logs, or storage group system files impairs SnapManager operation. If Exchange System Manager is used to move Exchange database, transaction logs, or storage group system files, run the SnapManager Configuration wizard after the operation to ensure that these files are in correct locations.

When to rerun the Configuration Wizard

Whenever you change the Exchange configuration manually using SnapDrive or the Exchange System Manager, you need to rerun the Configuration wizard to inform SnapManager that Exchange configuration has been modified. For example, when you manually change the SnapManager configuration from using volume mount points to drive letters, or from using drive letters to volume mount

points, you need to run the Configuration wizard again for the changes to take effect. Another example of when the Configuration wizard needs to be run is when a new database is added using the Exchange System Manager.

About the Exchange and SnapManager components

When you use the Configuration wizard, you are specifying the placement of several components of Exchange and SnapManager.

Storage group system path: Path to the directory that contains the Exchange storage group system files. SnapManager places storage group system files on the same LUN that stores the transaction logs for that storage group. The storage group system files must remain where the Configuration wizard places them.

Storage group databases: The databases in a storage group or store.

Database: The paths for the `.edb` for the Exchange database. The `.edb` file stores message and attachment content generated by MAPI clients, and message properties such as author, recipients, subject, and priority. The `.stm` file holds native Internet content (for example, MIME).

Note
The .stm file is supported only in Exchange Server 2003.

Transaction log files: The location of the Exchange transaction logs. The transaction logs contain changes made to the Exchange databases since the last backup, enabling an up-to-the-minute restore.

SMTP queue path: The directories used by the SMTP queue.

MTA queue path: The directories used by the MTA queue.

Note
The MTA queue path is applicable only for Exchange Server 2003. Exchange Server 2007 uses the SMTP queue path for its Hub Transport server role. SnapManager copies the queue database and updates the database path in a configuration file to move the queue databases.

SnapInfo directory: Contains SnapManager backup information, copies of transaction log files, and other data critical to the backup set.

Viewing the placement of Exchange and SnapManager components

To view the current placement of the Exchange and SnapManager components, you can use the Configuration wizard or the Backup window.

Configuration wizard: To see more information about the databases listed in the Configuration wizard, highlight the database name (in any of the following windows), and then click Details:

- Select a Storage group or database to move to a LUN
- Select a set of logs from one or more storage groups to move to a LUN
- Select directories to store the backup information
- Where to Move SMTP and MTA System File

Note

Exchange Server 2003 supports both SMTP and MTA system file, whereas Exchange Server 2007 supports only SMTP data files.

Backup tab: To see more information about the components listed in the Result pane of the Backup tab, click the component. SnapManager displays the Exchange component properties at the bottom of the Result pane.

Settings configurable only with the Configuration wizard

The following table lists SnapManager database management settings that can be configured or changed only through the Configuration wizard. For each setting, the table lists the name of the corresponding window in the Configuration wizard.

SnapManager setting	Configuration wizard window
Database-LUN mappings	Select a Storage group or database to move to a LUN
Transaction log file-LUN mappings	Select a set of logs from one or more storage groups to move to a LUN

SnapManager setting	Configuration wizard window
SMTP and MTA file-LUN mappings	Where to Move SMTP and MTA System File ◆ SMTP and MTA system files are applicable for Exchange Server 2003. ◆ The Hub Transport server role in Exchange Server 2007 uses the SMTP system file alone.
SnapInfo directory location	Select directories to store the backup information
Microsoft iSCSI Service as a dependency	Add Microsoft iSCSI Service Dependency
SnapManager event notification enabling for SMTP email, storage system syslog, and AutoSupport	Configure Automatic Event Notification

Using the Configuration wizard to configure your data store

This topic describes how to use the Configuration wizard to configure basic SnapManager settings and migrate your Exchange databases to Data ONTAP LUNs so that they can be backed up and restored using SnapManager. See the following procedures for details:

- "Configuring the Exchange data store" on page 118
- "Moving databases using the Configuration wizard" on page 124
- "Moving transaction logs using the Configuration wizard" on page 127

Configuring the Exchange data store

This topic describes how to configure and migrate the Exchange data store.

About the SMTP and MTA queue location: The SMTP and MTA queues are used by Exchange. In general, the location of these files does not matter, as long as they do not reside on the same LUN as the Exchange databases.

For stand-alone systems, the SMTP and MTA system files can be placed on any disk or LUN that does not contain Exchange databases (the default location of the original local installation disk is acceptable).

Note

In Exchange Server 2007, the SMTP queue is valid only if the bridgehead or the Hub Transport server role is installed. MTA queue is not applicable for Exchange Server 2007.

Data store migration procedure: To configure your Exchange data store for SnapManager 4.0 for Microsoft Exchange, complete the following steps.

Step	Action
1	If you have not already done so, start the SnapManager for Exchange application. To do this, go to the Windows Start menu and select Program Files > SnapManager for Exchange Management Console. **Result:** The SnapManager for Exchange Management Console appears. **Note** Any time you use the Configuration wizard to move data from one drive to another, backups performed prior to the move become invalid. After you migrate your databases to a new LUN, always perform an immediate backup.
2	If you want to view or change the Exchange server managed by SnapManager, do this using the "Add Servers to be managed" window. To open this, select the "Add Servers to be managed" in the Actions pane. For more information, see "Managing a different Exchange server" on page 350. **Note** To access the reports on another Exchange server, you must connect using an Exchange server user account that belongs to the Administrators group on that machine. "Starting SnapManager and connecting to the default server" on page 48.
3	If the Configuration wizard is not already started, click Configuration Wizard in the Actions pane to start it now. **Result:** The Configuration wizard launches and the Welcome window appears.
Welcome	
4	To begin the SnapManager configuration, click Next. **Result:** The Database Verification Server window appears.

Step	Action
Database Verification Server	
5	Use the Database Verification Server window to specify the Exchange server to be used to perform Exchange database verification. ◆ If you want to specify the database verification server now, type the name of an Exchange server, or browse to an Exchange server in the Verification Server window. **Note** If the computer used for database verification does not have Exchange installed, you must put the necessary files on it. For details, see "Understanding Windows host system requirements" on page 26. ◆ If you want to specify the database verification server later, select the option labeled "Select a verification server later." **Note** You do not need to specify a verification server now. To do so later, when you are ready to select a database verification server, select Options > Database Verification Settings (to open the Verification Settings dialog box). For more information, see "Selecting the database verification server" on page 353.
6	Click Next. **Result:** The Exchange Server to Configure window appears.
Exchange Server to Configure	
7	Click Next to confirm the specified Exchange Server to configure. **Result:** The "Select Storage group or database to move to a LUN" window appears.

Step	Action
Select a Storage group or database to move to a LUN	
8	In the "Select a Storage group or database to move to a LUN" window, associate your Exchange storage groups (Stores) or databases with the correct LUNs, according to your SnapManager data configuration plan. For more information about using this window, see "Moving databases using the Configuration wizard" on page 124. **Example:** In the following example, the SG2 storage group has already been associated with LUN S. When you click the move (<=>) button, the First Storage Group is associated with LUN T, and you can proceed to the next window.
9	After you associate all databases with a LUN, click Next. **Result:** The "Select a set of logs from one or more storage groups to move to a LUN" window appears.
Select a set of logs from one or more storage groups to move to a LUN	
10	In the "Select a set of logs from one or more storage groups to move to a LUN" window, associate your transaction logs with the correct LUNs, according to your SnapManager data configuration plan. For more information about using this window, see "Moving transaction logs using the Configuration wizard" on page 127. **Example:** In the following example, the transaction logs for the First Storage Group have been associated with LUN L. When you click the move (<=>) button, the transaction logs for SG2 will be associated with LUN L also, and you can proceed to the next window.
11	After you associate all transaction logs with a LUN, click Next. **Result:** The Select directories to store the backup information window appears.

Step	Action
Select directories to store the backup information	
12	In the "Select directories to store the backup information" window, select the SnapInfo files and the LUN to which you want to move them, and then click the move (<=>) button. For information about using multiple SnapInfo directories, see "About transaction log archiving using NTFS hard links" on page 81 and "About multiple SnapInfo directories" on page 82.
13	Click Next. **Result:** The "Add Microsoft iSCSI Service Dependency" window appears.
Add Microsoft iSCSI Service Dependency	
14	If you are installing SnapManager on a stand-alone system that has the Microsoft iSCSI initiator installed, select whether you want to configure your Microsoft iSCSI service as a dependency for the Microsoft Exchange System Attendant. **Note** You are advised to select Yes so that Microsoft Exchange cannot start before the Microsoft iSCSI service is ready to accept connections.
15	Click Next. **Result:** The "Configure Automatic Event Notification" window appears.

Step	Action
Configure Automatic Event Notification	
16	Use the Configure Automatic Event Notification window to configure the automatic event notification options for SnapManager: ◆ Configure automatic SMTP e-mail notification for event notification. ◆ Enable Syslog (storage system event log) support. ◆ Enable AutoSupport for SnapManager. ◆ Limit event logging to failure events After you complete the Configuration wizard, you can also view or change these settings by selecting the Notification Settings from the Actions pane to access the Auto Notification Settings dialog box. For more detailed information, see "Using the Auto Notification Settings dialog box" on page 374. **Note** You are advised to enable all of the automatic event notification options; this ensures that, if any problems with your SnapManager backups occur, you are alerted and can take corrective action in a timely manner.
17	Click Next. **Result:** The "Completing the Configuration Wizard" window appears.
Completing the Configuration Wizard	
18	Review the configuration summary in the "Completing the Configuration Wizard" window. If the configuration summary is satisfactory, click Finish to display a list of tasks the Configuration wizard performs, based on the configuration information you specified. **Result:** The SnapManager Configuration wizard displays the task list to be used.

Step	Action
Configurator Status	
19	To migrate your databases and their transaction logs and SnapInfo files to the LUNs you specified, click Start Now. **Result:** The SnapManager Configuration wizard moves the databases and transaction logs to their specified LUNs and displays a task check-off list. **Note** If you are moving the location of Exchange databases in this step, it could take some time to complete. When the migration finishes successfully, SnapManager displays a message. This message also reminds you to make a backup immediately.
20	Click OK to close the message.
21	Create a SnapManager backup immediately. Any time you use the Configuration wizard to move data from one drive to another, backups performed prior to the move become invalid. After you migrate your databases to a new LUN, always perform an immediate backup. For information about creating a SnapManager backup, see "Backing Up Databases with SnapManager" on page 165.

Moving databases using the Configuration wizard

The SnapManager 4.0 for Microsoft Exchange Configuration Wizard enables you to select which LUNs will store your Exchange databases when you complete the wizard. You use the Where to Move Databases window to perform these tasks:

- Moving a storage group to a LUN
  For details, see "Moving storage groups to a LUN" on page 125.
- Moving an individual database to a LUN
  For details, see "Moving individual databases to a LUN" on page 126.
- Changing the location of a storage group or database

For details, see “Changing the location of a storage group or database” on page 126.

- Viewing the full path for your storage groups or databases

  For details, see “Viewing the full path for your database files” on page 127.

Note

The list of available drives changes as you make choices that rule out other choices.

Moving storage groups to a LUN: To put an entire storage group on a single LUN, complete the following steps.

Step	Action
1	In the storage group list at the top of the left pane, select the storage group you want to move.
2	In the Disk List, select the drive letter for the LUN or local disk you want to move the storage group to.
3	Click move (<=>). **Result:** The selected storage group and disk are now associated, and the storage group files will be moved to that disk when the Configuration wizard moves your data.

Moving individual databases to a LUN: To move an individual database to a LUN, complete the following steps.

Step	Action
1	In the upper storage group list, select the storage group containing the database you want to move and select the database you want to move.
2	In the Disk List, select the drive letter for the disk you want to move the database to.
3	Click move (<=>). **Result:** The selected database and disk are now associated, and the database file will be moved to that disk when the Configuration wizard moves your data.

Changing the location of a storage group or database: To change the location of a storage group you already associated with a LUN or local disk, complete the following step.

Step	Action
1	In the Database Location Results, highlight the storage group you want to move and click Reconfigure. **Result:** The selected storage group or database is returned to the list of unconfigured databases and you can reassociate it with any available disk. **Note** If the Exchange system file path for a storage group is currently on the database LUN (placed there for a previous version of SnapManager) and then you use the Configuration wizard to reconfigure a storage group database path or transaction log file path, then the Configuration wizard automatically moves the system file path to the same LUN as the transaction log file path.

Viewing the full path for your database files: To view the full path for your database or storage group files, complete the following steps.

Step	Action
1	Highlight a storage group or database in the Database Location Results and click Details. **Result:** The Storage Group Properties window is displayed for the selected storage group.
2	To see the file path for the databases in this storage group, highlight the database and click Details. **Result:** The current paths and file names for the selected database are displayed, along with the new paths and file names if the location of the selected database has changed.

Moving transaction logs using the Configuration wizard

The SnapManager for Microsoft Exchange Configuration Wizard enables you to select which LUNs will store your Exchange transaction logs when you complete the wizard. You use the Where to Move Transaction Logs window to perform these tasks:

- Moving a transaction log file to a LUN

  For details, see "Moving transaction logs to a LUN" on page 128.
- Changing the location of a transaction log file

  For details, see "Changing the location of a transaction log files" on page 128.
- Viewing the full path for your transaction logs

  For details, see "Viewing the full path for your transaction log files" on page 128.

Note

The list of available drives changes as you make choices that rule out other choices.

Moving transaction logs to a LUN: To put the transaction logs for a storage group on a disk, complete the following steps.

Step	Action
1	In the upper storage group list, select the storage group whose transaction logs you want to move.
2	In the Disk List, select the drive letter for the LUN or local disk you want to move the transaction logs to.
3	Click move (<=>). **Result:** The transaction logs for the selected storage group and LUN are now associated, and the transaction log files will be moved to that LUN when the Configuration wizard moves your data.

Changing the location of a transaction log files: To change the location of transaction log files you already associated with a LUN, complete the following step.

Step	Action
1	In the Transaction Logs Location Results, highlight the storage group for the transaction files you want to move and click Reconfigure. **Result:** The selected storage group is returned to the list of unconfigured transaction logs and you can reassociate it with any available LUN or local disk.

Viewing the full path for your transaction log files: To view the full path for your transaction log files, complete the following step.

Step	Action
1	Highlight a storage group in the Transaction Logs Location Results and click Details. **Result:** The Properties window is displayed for the selected storage group. The current paths and file names for the transaction logs for the selected database are displayed, along with the new paths and file names if the location of the transaction log files has changed.

Understanding the migration of LCR-enabled databases

This section describes the requirements to configure an LCR, and explains how you can configure, and move the Exchange replica databases using SnapManager. The following topics are covered:

- "Prerequisites to configure an LCR- enabled Exchange server" on page 129.
- "Configuring replica databases using SnapManager" on page 129.
- "Moving LCR-enabled databases and transaction logs using SnapManager" on page 130.
- "Understanding database seeding in an LCR" on page 131.

Prerequisites to configure an LCR-enabled Exchange server

Before you plan to configure an LCR-enabled Exchange server using SnapManager, ensure that the following requirements are met:

- The Exchange server on which you want to perform SnapManager configuration is LCR-enabled.

  Note
  Use the Microsoft Exchange cmdlet or the Exchange Management Console to enable LCR on a storage group. SnapManager will not enable LCR on a storage group, if it is not enabled already.

- The databases in the storage groups are seeded.

  Note
  If the replica database in an LCR is not seeded or broken, SnapManager seeds it during migration.

- In an LCR environment, you should put the database, and transaction log files of the production database, and replica database on a different storage system volume.

Configuring replica databases using SnapManager

The SnapManager configuration rule for an LCR-enabled database is same for the production Exchange database. SnapManager uses a special naming convention to represent the replica storage group in the Configuration wizard.

Example: The replica Storage Group1 is represented as *Storage Group1(LCR).*

You should follow the same procedure as the production storage group to configure an LCR-enabled storage group. For information on how to configure databases using SnapManager, see "Configuring the Exchange data store" on page 118.

Moving LCR-enabled databases and transaction logs using SnapManager

You can move the databases, transaction log, and system files with LCR replicas to the Data ONTAP LUNs just as you would a normal database.

Note

The main difference between the production storage group and an LCR replica storage group is the way it is represented on the SnapManager user interface. A storage group with an LCR replica appears as *Storage Group (LCR)*.

Once you know the difference between a production storage group and an LCR replica storage group, you can follow the same procedure as you used for the production storage group for migrating the databases, transaction logs, and system files. This list provides the source of information, on how to perform the following actions using SnapManager:

- Move storage groups to LUN, see "Moving storage groups to a LUN" on page 125
- Move databases to LUN, see "Moving individual databases to a LUN" on page 126
- Change the location of storage group or database, see "Changing the location of a storage group or database" on page 126
- View the full path of the database files, see "Viewing the full path for your database files" on page 127
- Change the location of a transaction log files, see "Changing the location of a transaction log files" on page 128
- View the full path of transaction log files, see "Viewing the full path for your transaction log files" on page 128
- Seed the databases in an LCR copy, see your version of Microsoft Exchange Server 2007 Installation Guide.

Related Topics:

- "Backing up an LCR-enabled database" on page 178
- "Restoring from an LCR-enabled storage group" on page 218

Understanding database seeding in an LCR

Seeding is the process by which a database, either a blank database or a copy of the production database, is added to the storage group copy. This becomes the baseline database for the copy. When seeding is complete, the copy is given a status of *healthy*. In an Exchange Server 2007 environment, once the LCR is enabled on the storage group, the LCR database copy is automatically seeded.

This topic analyzes when and how SnapManager performs database seeding in an LCR.

When SnapManager performs database seeding: SnapManager performs database seeding in an LCR copy during a SnapManager migration operation, if a storage group is configured for LCR, and SnapManager detects that a replica database is not seeded.

How SnapManager performs database seeding: SnapManager uses the Exchange cmdlet `Update-StorageGroupCopy` to seed the LCR copy of the database. The `Update-StorageGroupCopy` cmdlet initiates or resynchronize the replication for a specified Exchange Server 2007 local continuous replication (LCR).

Note

To reduce the I/O burden on the active storage group volumes, seed the database during an off-peak time. The existing database needs to be deleted before the seeding process.

Migrating an existing SnapManager for Exchange configuration from using drive letters to using mount points

If you have an existing SnapManager for Exchange configuration that uses **drive letters** to map to Data ONTAP LUNs, you can easily migrate that configuration to a new configuration that uses **volume mount points** instead of drive letters to map to the Data ONTAP LUNs.

Overview

The migration process described in this topic uses both SnapDrive and SnapManager. Although this method will cause any affected storage groups to be taken offline briefly (due to the paths being changed), you will not need to copy the databases themselves from one LUN to another. This saves time and, as a result, minimizes the amount of time that the storage groups are off line.

Note

Not all drive letters are eliminated. A drive letter is used for the mount point root volume.

Configuration guidelines

The following paragraphs describe configuration guidelines for migrating an existing SnapManager for Exchange configuration that uses drive letters to map to Data ONTAP LUNs to a new configuration that uses volume mount points instead of drive letters to map to the Data ONTAP LUNs.

Mount point root: The mount point root can be any of the following:

- The local `C:\` drive
- The LUN that stores the transaction log files
- A separate dedicated LUN

The best practice is to use the LUN that stores the transaction log files, as in the example that follows. Using a separate LUN as the mount point root adds an additional point of failure to the Exchange server.

Environments that use more than one storage group: For configurations using more than one storage group, consider using one LUN with a drive letter for the transaction logs of each storage group.

Example

scenario: The migration process is described in a procedure that uses the following sample configuration:

- A single storage group.
- A single database is located on LUN `I:\`.
- The Exchange transaction logs, MTA and SMTP system files, and the SnapManager SnapInfo directory are collocated on LUN `L:\`.
- The mount point root LUN will require a drive letter, and the LUN containing the transaction logs will be used as the mount point root.

procedure: To migrate an existing SnapManager for Exchange configuration from using drive letters to using mount points, complete the following steps:

Step	Action
1	Launch the Windows Explorer, and then browse to the root of the transaction logs LUN (`L:\`).
2	Using the Windows Explorer, create a folder under the root of `L:\`. In this example, we use a directory name of `database`.
3	Launch the SnapDrive MMC, right click on the database LUN `I:\`, and then select Change Drive Letter and Paths.
4	In Change Drive Letter and Paths, click Add.
5	When prompted, enter the path to the appropriate directory on your mount point root LUN. In this example, we use the directory `L:\database`.

Step	Action
6	To verify that the additional LUN mappings have been successfully created, do one of the following: ◆ Verify that the multiple mappings are reflected in the SnapDrive MMC. In this example, the LUNs show drive letters of `L:\` and `L:\database\`. ◆ Browse to the root of the mount point root LUN, drive `L:\`. The icon for the folder `database` changes from the standard Windows folder icon to the Windows icon representing a mount point. Double-clicking the mount point (directory) name takes you to the root of the mounted LUN rather than to an empty directory on the mount point root LUN. **Note** Do not remove the original drive letter mapping `I:\` yet. For the Configuration wizard to function properly, SnapManager requires that the original drive letter mappings be in place along with the newly added mount points. Unneeded mappings are removed in a later step.
7	Launch SnapManager for Exchange, and then run the Configuration Wizard.
8	In the Welcome window, click Next.
9	In the Database Verification Server window, click Next. **Note** Although changes can be made here if desired, doing so is not part of this example.
10	In the Exchange Server to Configure window, verify that you are about to configure the correct server, and then click Next.

Step	Action
11	In the Select a Storage group or database to move to a LUN window, do the following: **a.** Select a storage group listed in the Database Location Results field, and then click the Reconfigure button. The storage group appears in the list of unconfigured databases, and you can reassociate it with any available disk. **b.** Select `LUN L:\database\`, and then click the move (<=>) button to associate the database with the new path. The storage group appears in the Database Location Results field again. The old drive letter `LUN I` appears under the From column. The new mount point path `L:\database\:` appears under the To column. **c.** Click Next.
12	In the "Select a set of logs from one or more storage groups to move to a LUN" window, click Next.
13	In the "Select directories to store the backup information" window, click Next.
14	Keep clicking Next to proceed through the next few windows, making additional configurations if desired. At the final window, click Finish. **Result:** The Configurator Status window appears.
15	When you are ready to proceed, click Start Now. **Result:** The databases are taken off line, and the migration proceeds.
16	After the SnapManager Configuration wizard completes successfully, return to the SnapDrive MMC.
17	Using the SnapDrive MMC, right-click the database LUN `I:\`, and then select Change Drive Letter and Paths.

Step	Action
18	In Change Drive Letter and Paths, highlight the original drive letter for the database LUN (`I:\`) and click Remove. **Result:** The SnapDrive MMC displays the two LUNs `L:\` and `L:\database`.

Understanding SnapManager Backup 9

This section provides background information about SnapManager Backup and SnapManager backup sets. The following topics are covered in this section:

- "How SnapManager Backup works" on page 138
- "How SnapManager backup data is organized" on page 142
- "How SnapManager checks database integrity in backup sets" on page 146
- "Ways to manage the number of backup sets kept online" on page 152
- "Ways to manage the backup and deletion of transaction logs" on page 156
- "When to run a SnapManager backup" on page 159
- "About Exchange options and Exchange System Manager" on page 161

Attention

You must run SnapManager from the system console, not from a Terminal Services client. Do not use Terminal Services for any type of SnapManager administration, because you might miss critical information that is displayed only in pop-up boxes at the system console.

Related topics:

- Chapter 10, "Backing Up Databases with SnapManager," on page 165
- Chapter 11, "Restoring Databases Using SnapManager," on page 203
- Chapter 12, "Managing Backup and Restore Snapshot Copies," on page 243

How SnapManager Backup works

SnapManager Backup uses Snapshot copy functionality to create online, read-only copies of Exchange databases. After the selected storage groups are backed up, the transaction logs that are already committed to the databases captured in the backup are deleted. See the following topics for more information:

- "About Exchange storage group sets" on page 138
- "SnapManager minimum unit of backup" on page 138
- "Types of backups SnapManager can perform" on page 139
- "Backup tasks in a Windows Server 2003 environment" on page 139
- "Transaction log backups can contain two Snapshot copies per backup" on page 140

About Exchange storage group sets

Exchange storage groups (Stores) stored on a single volume that belong to the same Exchange server are referred to collectively as a "storage group set". When you select an Exchange storage group for backup, all storage groups composing its storage group set are automatically selected for backup.

SnapManager Backup backs up the complete set of storage groups—all of which constitute the storage group set—in parallel. (Thus, these storage groups share the same backup name and date-time stamp.)

Note

Even though the backup includes all storage groups in the storage group set, you can still restore the storage groups individually.

SnapManager minimum unit of backup

Although SnapManager supports individual database restore, the minimum unit of backup, or the smallest object you can back up, is an individual *Exchange storage group*.

Note

For easiest administration, it is best to back up all the storage groups in the same Exchange server at the same time.

Types of backups SnapManager can perform

SnapManager Backup performs backups at the volume level:

Volume-wide backup: When a Snapshot copy is taken of a LUN for a SnapManager backup, the entire storage system volume is captured in that Snapshot copy. However, that backup is valid only for that Exchange server. If data from other Exchange servers resides on the same volume, it is not restorable from that Snapshot copy.

Multiple-volume backups: SnapManager performs backups in parallel on all LUNs that belong to the same Exchange server and share a single storage system volume. When a storage group set spans multiple volumes, the resulting backup set contains multiple database Snapshot copies but is still restorable as a single entity.

Partial backups: If the backup of some of the storage groups or databases in the storage group set fails, those in the set that were backed up successfully can still be restored. Because each database constitutes its own backup, or file, it is restored discretely, independent of backups of the others in its storage group set, even though the backup of all databases and storage groups in the set was performed by the backup job.

Backup tasks in a Windows Server 2003 environment

In a Windows Server 2003 environment, SnapManager Backup performs the following tasks when creating a backup. The list of tasks is performed in its entirety for each volume that contains files for the storage groups to be backed up. For example, if two separate volumes are involved, the task list is performed once for the first volume, then again for the second volume.

1. Check SnapManager license.
2. Rename most recent SnapInfo directory, if required.
3. Rename most recent Snapshot copy, if naming is set to “generic”.
4. Create SnapInfo directory for this backup.
5. Initiate VSS backup.

Note

When backing up the data from an LCR or a CCR location, SnapManager for Exchange uses VSS replication writer to back up the database.

6. Gather Exchange metadata and start VSS Snapshot copy set.
7. Add all required volumes to VSS Snapshot copy set.

8. Create volume shadow copy.

   The transaction logs are backed up and truncated during this step.

9. Verify physical integrity of the Exchange database files.
10. Create SnapInfo Snapshot copy.
11. Delete SnapInfo Snapshot copies for the deleted backups.
12. Delete any specified older backups.

Transaction log backups can contain two Snapshot copies per backup

When SnapManager for Exchange is used in conjunction with Microsoft Exchange Server 2003 on a Windows Server 2003, it uses the Microsoft Volume Shadow Copy Service (VSS) subsystem to provide backup and restore functionality. If, in this environment, the SnapInfo directory has been configured on the same volume as the transaction log, then a single SnapManager backup will create two Snapshot copies on that volume instead of just one:

1. A VSS Snapshot copy in the transaction log. This `exchsnap__*` Snapshot copy is created at the same time as the corresponding database Snapshot copy of the same name.
2. The SnapInfo backup Snapshot copy for protecting the SnapInfo directory. This is the `eloginfo__*` Snapshot copy created at the end of the SnapManager backup. This Snapshot copy is used for transaction log verification and for backup protection. If the backup set was archived, this Snapshot copy, along with the Exchange Snapshot copy, can be used for a SnapManager restore operation.

   Note

   For VSS backups, the Snapshot copy of the transaction log LUN is used instead of the Snapshot copy of the Snapinfo directory LUN to verify the integrity of the transaction logs in the backup during remote database verification.

When SnapManager uses VSS for backup and restore functionality and SnapInfo is on the same volume as the transaction log, this is expected behavior.

Suppose the SnapInfo directory is on the same LUN as the transaction log in an Exchange Server 2003 environment with Windows Server 2003. The console output shows that the transaction log volume contains Snapshot copies with the same name as that of the Exchange database Snapshot copy.

```
Volume nj1_logs
    working...
    date         name
    ____________ ________
    Jan 30 01:04 eloginfo__mailnj1__recent
    Jan 30 01:00 exchsnap__mailnj1__recent
    Jan 29 13:03 eloginfo__mailnj1_08-29-2006_13.00.00__daily
    Jan 29 13:00 exchsnap__mailnj1_08-29-2006_13.00.00__daily
    Jan 29 01:04 eloginfo__mailnj1_08-29-2006_01.00.00
    Jan 29 01:00 exchsnap__mailnj1_08-29-2006_01.00.00
    Jan 28 13:03 eloginfo__mailnj1_08-28-2006_13.00.00__daily
    Jan 28 13:00 exchsnap__mailnj1_08-28-2006_13.00.00__daily
    Jan 28 01:04 eloginfo__mailnj1_08-28-2006_01.00.00
    Jan 28 01:00 exchsnap__mailnj1_08-28-2006_01.00.00
    Jan 27 15:36 eloginfo__mailnj1_08-27-2006_15.30.15
    Jan 27 15:30 exchsnap__mailnj1_08-27-2006_15.30.15
    Jan 20 15:35 eloginfo__mailnj1_08-20-2006_15.27.35
    Jan 20 15:27 exchsnap__mailnj1_08-20-2006_15.27.35
```

If you are not aware of the configuration details, you might expect to see only the `eloginfo__` Snapshot copies and not the `exchsnap__` Snapshot copies.

Note

Volume size is unchanged, because the backup set still captures the same total number of changed blocks on the storage system, even though two Snapshot copies are used instead of one.

How SnapManager backup data is organized

SnapManager stores Exchange backup data in backup sets. See the following topics for more information:

- "SnapManager backup sets" on page 142
- "SnapInfo directory" on page 142
- "SnapInfo subdirectory names" on page 143
- "SnapManager backup set names" on page 143
- "SnapManager Snapshot copy naming conventions" on page 143
- "Exchange database Snapshot copy names" on page 145
- "SnapInfo directory Snapshot copy names" on page 145

SnapManager backup sets

A SnapManager backup set, sometimes called just the "backup set", consists of all data that you would need to be able to perform a restore process, regardless of whether this data exists on the same LUNs or volumes. A backup set contains the following items from the same backup set:

- Exchange databases
- Exchange transaction logs
- SnapInfo directory

SnapInfo directory

The SnapInfo directory stores information about each storage group set created by SnapManager Backup, copies of transaction log files, and other data critical to the backup set. The location of this directory is specified when you run the Configuration Wizard. By default, the directory name is `SME_SnapInfo`. However, you can specify a different directory name.

By default, the SnapInfo directory is on the LUN that stores the Exchange transaction log files, but this is not a requirement. The SnapInfo directory cannot reside on the same LUN that stores the Exchange database files.

Every time a SnapManager backup set is created, SnapManager creates a new backup set subdirectory under the SnapInfo directory. SnapManager populates this subdirectory with the transaction logs backed up as part of that backup set, as well as the recovery information for that specific Snapshot copy. A complete backup set consists of this SnapInfo subdirectory and the corresponding Snapshot copies of the LUNs that store the Exchange databases and transaction logs.

SnapInfo subdirectory names

The SnapInfo directory name is `EXCH__` followed by the Exchange server host name:

`EXCH__`*ExchServerName*

For example, the subdirectory for databases belonging to the Exchange server on the Windows host system `CLPUBS-WINSRVR3` would be named as follows:

`EXCH__CLPUBS-WINSRVR3`

SnapManager backup set names

SnapManager backup set names are displayed in the SnapManager Restore tab and in the SnapManager Restore Wizard. These names include the following information about the backed-up databases:

- Server name
- Management group
- Time stamp

SnapManager Snapshot copy naming conventions

The Snapshot copies created by SnapManager backup operations are automatically named by Data ONTAP. The name of each Snapshot copy created during a SnapManager backup operation includes information that identifies the Snapshot copy contents.

Exchange server name: Database Snapshot copy names and SnapInfo directory Snapshot copy names include the name of the Exchange server for which the backup was taken (indicated in this document by the variable *ExchServerName*).

Backup management group: Database Snapshot copy names and SnapInfo directory Snapshot copy names include the backup management group to which you assigned the full database backup. SnapManager provides backup management groups for designating various levels of backup retention: Standard, Daily, and Weekly.

- If you assign a full database backup to the *Standard* backup management group, the Snapshot copy names for the databases and SnapInfo directory do not include a backup management group name.
- If you assign a full database backup to the *Daily* or *Weekly* management groups, the Snapshot copy names for the databases and SnapInfo directory include the name of the backup management group (indicated in this document by the variable *BkpMgmtGrp*).

For more information about using backup management groups, see “Using backup management groups in backup and verification” on page 198.

Most recent backup: Older versions of SnapManager for Exchange (before 3.0) always appended the string `recent` to the name of the most recently created Snapshot copy. This was to allow external scripts, for example archive scripts, to be able to identify and operate on the most recent Snapshot copy.

With the addition of the Run Command After Operation feature in SnapManager 3.0 for Microsoft Exchange, appending `recent` is no longer necessary because the scripts can be integrated into the backup process. For more information about the Run Command After Operation feature, see “Using Run Command After Operation to archive automatically” on page 309.

SnapManager offers two conventions for naming backup Snapshot copies:

- **Unique backup naming.** The most recent Snapshot copy name contains the Snapshot copy creation date and time (indicated by the variable *date_time*) instead of the string `recent`. The most recent backup is identified by the Snapshot copy name with the most recent date and time. This removes the need for the rename of the Snapshot copy when the next backup is created.
- **Generic backup naming.** The most recent Snapshot copy name contains the string `recent` instead of a date and timestamp. The most recent backup is identified by the Snapshot copy name that includes the string `recent`. This is the Snapshot copy naming convention used by older versions of SnapManager and is the default setting.

The backup naming convention is selected in the Backup Setting dialog box. For information about using this dialog box, see “Managing the backup setting” on page 370.

Note

You are advised to select the unique naming convention option unless you have legacy scripts that require the presence of a backup with “recent” in its name. You need select the unique naming convention explicitly (using the Options > Backup Setting menu or the Backup Naming Convention screen of the Backup Wizard) because, for backward compatibility purposes, the generic naming convention is selected by default.

Exchange database Snapshot copy names

For Exchange database backups, Snapshot copy names begin with the string `exchsnap__`.

Backup management group	Format of the Exchange database Snapshot copy name
Standard	Depending on the naming convention selected: ◆ `exchsnap__`*ExchServerName_date_time* ◆ `exchsnap__`*ExchServerName*`__recent`
Daily or Weekly	Depending on the naming convention selected: ◆ `exchsnap__`*ExchServerName_date_time__BkpMgmtGrp* ◆ `exchsnap__`*ExchServerName*`__recent`

SnapInfo directory Snapshot copy names

For SnapInfo directory backups, Snapshot copy names begin with the string `eloginfo__`.

Backup management group	Format of the SnapInfo directory Snapshot copy name
Standard	Depending on the naming convention selected: ◆ `eloginfo__`*ExchServerName_date_time* ◆ `eloginfo__`*ExchServerName*`__recent`
Daily or Weekly	Depending on the naming convention selected: ◆ `eloginfo__`*ExchServerName_date_time__BkpMgmtGrp* ◆ `eloginfo__`*ExchServerName*`__recent`

How SnapManager checks database integrity in backup sets

SnapManager uses `ChkSgFiles.dll`, an integrity verification library, to verify the Exchange Server 2007 databases and transaction logs in a backup set. SnapManager uses `Eseutil`, a Microsoft Exchange utility, to verify the Exchange Server 2003 database files in a backup set. This utility is installed automatically with those binaries. Depending on the Exchange configuration, SnapManager uses either `ChkSgFiles` or `Eseutil` to verify the *page-level integrity* of the databases in a backup and the transaction logs associated with that backup have not incurred *physical-level* corruption. For more information about physical level corruption, see your Microsoft Exchange documentation.

For more information about how SnapManager checks database integrity in backup sets, see the following topics for more information:

- "Database file integrity verification using Exchange Server 2007 integrity verification library" on page 146
- "LUN requirements for verifying the databases in a backup set" on page 147
- "Managing database verification load" on page 148
- "Options for when to verify the databases in a backup set" on page 150
- "Options for where to run database and transaction log integrity verification" on page 150
- "Viewing backup verification status" on page 151

Attention

You are strongly advised to restore only from backups whose databases have been verified. By default SnapManager Restore requires that you restore only from verified backups. However, you can override this requirement. For details, see "Overriding database verification during restore" on page 367.

Database file integrity verification using Exchange Server 2007 integrity verification library

SnapManager uses the integrity verification library (Microsoft ChkSgFiles.dll) to perform integrity verification on Exchange Server 2007 systems. This library checks the databases and transaction log files for physical and logical corruption, using checksum verification. Exchange Server 2007 Management Tools must be installed on the server that performs integrity verification.

LUN requirements for verifying the databases in a backup set

When you verify the databases in a backup set, SnapManager requires that all of the databases files are mounted. At a more granular level this means that SnapManager, using SnapDrive commands, mounts the LUNs that contain the backup sets selected for database verification. Each LUN that will be mounted requires one available drive letter or mount point. Hence, the SnapManager server that performs the verification (whether local or remote) must have a sufficient number of drive letters or mount points available to mount the LUNs that store the database backup sets that you are verifying.

Verifying database backups stored on a single LUN or across multiple LUNs: To run database verification against backup sets that are stored on a single LUN or across multiple LUNs, the Exchange server that is used as the verification server must have at least one drive letter or mount point available.

Verifying multiple backup sets using a remote verification server:

To run SnapManager remote verification for more than one backup set in a single job, two unassigned drive letters or mount points must be available. In all other situations, only one unassigned drive letter or mount point is required.

The extra drive letter or mount point is for mounting the LUN in a Snapshot copy that stores the transaction log directory for multiple storage groups for the purpose of transaction log verification. After SnapManager verifies the transaction logs for the first backup set, it does not dismount LUN or release the assigned drive letter for this LUN. This saves an extra, unnecessary LUN mounting operation for the verification of the transaction log for the second backup set.

Before you perform remote verification for more than one storage group in a single job, check that a second drive letter or mount point is available. If this is not possible, you must schedule the backup or verification jobs to verify one backup set at a time.

Note

If you are planning to run verification on the destination volumes that contains more than one storage group sharing the same LUN for the transaction logs, ensure that a second drive letter or mount point is available for the Exchange server.

Managing database verification load

Running database verification on a production Exchange server (the Windows host system running the Exchange virtual server used to create the databases) can place a significant load on both the Exchange server and the Data ONTAP storage system. For this reason, verification can degrade Exchange response, particularly during peak work hours.

There are four methods to manage database verification load. The first two methods involve separating the database verification and database backup operations, thereby distributing the load; you can defer database verification, or you can run database verification from another Exchange server. A third method, available only if you are running SnapManager with Microsoft Exchange Server 2003 SP2, or higher, or Microsoft Exchange Server 2007 is to slow down the database integrity verification process to decrease the load on the Windows host and the storage system. The fourth method is database integrity verification on the destination StoreVault Replication volume.

The following paragraphs describe each method of managing database verification load.

Deferred database verification: By default, a SnapManager full database backup operation runs integrity verification immediately after the backup is finished. Instead of allowing a database backup to automatically verify the databases when the operation is finished, you can disable that feature. You can then run a separate database verification operation any time after the full database backup operation is finished. To perform a deferred verification, select the "Verify databases and transaction logs in the most recent unverified backups" operation in the SnapManager Backup Wizard or the Backup and Verification tab. For details, see "Backing up databases" on page 166.

Remote database verification: To prevent database verification from affecting the performance of your production Exchange server, you can run verification on another Exchange server. For details, see "Requirements for a remote verification server" on page 29 and "Selecting the database verification server" on page 353.

Verification throttling: With integrity verification throttling, SnapManager provides an option for managing database verification that you can combine with all of the existing options, to reduce the load even further.

When installed with Microsoft Exchange Server 2003 Service Pack 2 or Exchange Server 2007, SnapManager supports the ability to throttle the database integrity verification (the Microsoft Exchange consistency checker utility) in database checksum verification mode to reduce the load on the host CPU, as well as on the storage subsystem. This .dll file checks the databases and transaction log files for the physical integrity verification.

For details, see “Configuring verification throttling for database verification” on page 360.

For more information, see “Database file integrity verification using Exchange Server 2007 integrity verification library” on page 146.

Options for when to verify the databases in a backup set

You can verify the databases in your SnapManager backup sets at various times.

Automatically verify full database backup sets upon creation: By default, SnapManager verifies the databases in a backup set at the time the backup is created. This is simple and ensures that each database in the backup set is verified. However, this method significantly increases the time required to complete the backup. For a description of how to start or schedule database backup with automatic database verification, see "Backing up databases" on page 166.

Explicitly start or schedule database verification only: With this method, a single operation can be initiated to verify the databases contained in one or more backup sets that have already been created. You can start the verification immediately, or you can schedule the verification to occur later, when it does not affect performance or delay later backups. For a description of how to start or schedule database verification, see "Verifying backup databases" on page 194.

Defer verification until you restore from the backup set: If you attempt to restore from a backup set on which a database consistency check has not been run successfully, SnapManager prompts (but does not require) you to first verify the databases in that backup set. See "Importance of verifying databases to be restored" on page 206.

Note

When database verification is performed on a LUN clone and a Snapshot copy of a volume is made while a LUN clone exists, a "busy Snapshot copy" will be created, which might cause problems when you attempt to delete Snapshot copies. To avoid this, do not schedule backups while a verification is in progress to enable the use of Flexclones for Snapshot copy access.

Options for where to run database and transaction log integrity verification

Regardless of when you verify the databases in a backup set, the verification can be done on the production Exchange server or on a remote verification system.

From the production Exchange server: In the simplest SnapManager configuration, verification is run from the production Exchange server. However, because the verification is CPU and disk I/O intensive, performing the verification on the production Exchange server host system during peak usage could affect Exchange performance.

From a remote verification server: Performing the verification on a remote system minimizes the impact of verification on Exchange system resources and backup schedule. To prevent verification from affecting the performance of your production Exchange server, you can run verification on another computer.

Viewing backup verification status

SnapManager Restore shows you a list of the backups that have been taken. For each backup, the date and time of the backup is displayed, as well as one of these symbols:

- Green check-mark

  The databases in backups shown with this symbol are verified.
- Yellow question mark

  The databases in backups shown with this symbol are not verified.
- Red exclamation mark

  The databases in backups shown with this symbol failed verification and cannot be restored.
- File with a red exclamation mark

  The databases in backups shown with this symbol are verified, but the transaction logs for the backup failed verification. If you need to restore from backups with this symbol, contact technical support.

Note

You can also determine whether the transaction logs for a specific backup have been verified by opening the Restore tab and selecting that backup. The transaction log verification status is displayed as part of the backup information in the Result pane.

Ways to manage the number of backup sets kept online

When planning your SnapManager backup schedules, you also need to manage the number of Snapshot copy-based backup sets that are stored online. See the following topics for more information:

- "Maximum number of Snapshot copies per volume" on page 152
- "Criteria used to delete backups" on page 153
- "Automatic deletion of backups in a management group" on page 153
- "Explicit deletion of backup Snapshot copies" on page 155

Maximum number of Snapshot copies per volume

The Data ONTAP software used with SnapManager 4.0 for Microsoft Exchange supports a maximum of 255 Snapshot copies per storage system volume.

Note

Snapshot copies not created by SnapManager also count toward this total.

Because each SnapManager backup operation creates Snapshot copies, a SnapManager backup operation will fail if the storage system volume that contains the database LUN exceeds the 255 Snapshot copy capacity.

To avoid reaching the limit of 255 Snapshot copies per volume, delete your old SnapManager backups when they are no longer needed. SnapManager provides two ways to delete backups:

Automatic deletion of older backups in the management group: This is a SnapManager Backup option that you can select when you start or schedule a backup operation. This is the recommended method for managing the number of Snapshot copies you store on your system.

Explicit deletion of backups or SnapInfo Snapshot copies only: This is an action you can take, independent of the backup operation, to delete individual or multiple backup Snapshot copies. You can use the explicit deletion facility to delete any of the following items:

- Entire backup sets that are assigned to a specific backup management group
- Only the SnapInfo directory Snapshot copies that are assigned to a specific backup management group
- Snapshot copies of LUNs created during a restore operation

Criteria used to delete backups

You can delete backups using an age-based criteria or a quantity-based criteria.

Age-based Snapshot copy deletion: You can automatically or explicitly delete backups that are assigned to a particular backup management group and that are older than a specified number of days. This deletion criteria is specified by selecting the "Delete backups older than" box and then entering the number of days for which you want to keep the most recent backups for the backup management group.

- Procedural details for specifying this criteria for automatic deletion are included in "Backing up databases" on page 166.
- Procedural details for specifying this criteria for explicit deletion are included in "Managing Backup and Restore Snapshot Copies" on page 243.

Quantity-based Snapshot copy deletion: You can automatically or explicitly delete backups that are assigned to a particular backup management group so that only a specified number of backups remain for that backup management group. This deletion criteria is specified by selecting the "Delete (oldest) backups in excess of" box and then entering *the number of the most recent backups you want to keep* for the backup management group.

- Procedural details for specifying this criteria for automatic deletion are included in "Backing up databases" on page 166.
- Procedural details for specifying this criteria for explicit deletion are included in "Managing Backup and Restore Snapshot Copies" on page 243.

Note

It is possible for the total number of Snapshot copies on a volume to exceed the number of SnapManager backups being retained. For example, if a single volume contains both the SnapInfo directory and the Exchange databases, each SnapManager backup generates two Snapshot copies on that volume.

Automatic deletion of backups in a management group

When you start or schedule a database backup job, you can specify a backup deletion criteria (based on Snapshot copy age or quantity) that SnapManager uses to automatically delete the oldest backups for that *storage group* and *backup management group* after the backup is finished. If you select one of the automatic deletion criteria, SnapManager retains only the backups created within a certain number of days or only the number of backups you specify.

Note

Automatic deletion of older backups in a management group is the recommended method for managing the number of Snapshot copies stored on your system.

For more information about backup management groups, see “How backup management groups are used” on page 198.

Attention

Do not use SnapDrive or the storage system administration tools to delete Snapshot copies created by SnapManager. Doing so will leave behind unwanted data that cannot be removed.

What is deleted by automatic deletion: Automatic deletion deletes only backups with the following characteristics:

- Its backup management group is the same as the type just created.
- It has the prefix `exchsnap__` (database backup) or `eloginfo__` (transaction logs backup).
- It is the oldest backup for this storage group of this type.
- If it is not deleted, there would be more backups of this backup retention level than you specified in the “Delete backups older than” box or the “Delete backups in excess of” box.

What is preserved by automatic deletion: SnapManager does not count backups that failed verification when counting the number of stored backups. Therefore, more backups might be preserved than you specify in the “Delete backups older than” or “Delete backups in excess of” box. For example, suppose you are backing up storage groups A and B, that reside on the same volume and which contain the following backup sets.

SnapManager backup set	Description
Storage Group A on volume 1	
`exchsnap__orbit3_01-23-2006_16.21.07`	Old backup—good
`exchsnap__orbit3__recent`	Recent backup—good
Storage Group B on volume 1	
`exchsnap__orbit3_01-23-2006_16.21.07`	Old backup—good
`exchsnap__orbit3__recent`	Recent backup—inconsistent

Also suppose you have set the “Delete backups in excess of” box to `2` to preserve the most recent two backup sets.

In order to preserve two good backups for Storage Group B, SnapManager will not delete the Snapshot copy `exchsnap__orbit3_01-23-2006_16.21.07`. Therefore, because both storage groups reside on the same volume, three backups for Storage Group A remain instead of two.

What else can be protected from automatic deletion: For any backup job in which you use automatic deletion, you can also select to ensure that the deletion is limited so as not to create a break in the continuity of transaction logs between the previous backup and the present time. Doing so allows you to retain up-to-the-minute restore ability for older backups from other management groups. See "Option to retain up-to-the-minute restore ability" on page 157.

Explicit deletion of backup Snapshot copies

You can explicitly delete, by selection, any backups or Snapshot copies of LUNs created during a restore operation. When you select to delete backups, you can also select to ensure that the deletion is limited so as not to create a break in the continuity of transaction logs between the previous backup and the present time. Doing so allows you to retain up-to-the-minute restore ability for older backups from other management groups. See "Option to retain up-to-the-minute restore ability" on page 157.

Explicit deletion of an individual backup: With this method, you delete individual selected Snapshot copies for either full database backups or transaction logs. The procedures are described in "Explicitly deleting an individual backup" on page 252.

Explicit deletion of multiple backups: With this method, you select a database to be deleted, the types of backup set components to be deleted (full database backups or SnapInfo directory backups), and the type of backup management group to be deleted. The procedure is described in "Explicitly deleting storage group backups" on page 244.

Note

You can also explicitly delete the LUN Snapshot copies that were created during a restore operation. For a description of *restore Snapshot copies*, see "Understanding SnapManager Restore" on page 204. For a description of how to view and delete these Snapshot copies, see "Explicitly deleting Snapshot copies created by SnapManager Restore" on page 249.

Ways to manage the backup and deletion of transaction logs

SnapManager provides advanced options that allow you to manage the *transaction logs* associated with the backup management group.

- For any backup job, you can select to skip the *backup* of transaction logs that Exchange will truncate after the SnapManager Backup operation finishes.

  See "Option to back up transaction logs that Exchange will truncate" on page 156.
- When you delete backup Snapshot copies (whether automatically or explicitly), you can select to skip the *deletion* of Snapshot copies of LUNs that contain transaction logs related to the selected backup management group, if deleting those logs would that break the continuity of transaction logs between the previous backup and the present time.

  See "Option to retain up-to-the-minute restore ability" on page 157.
- When you explicitly delete backup sets (or related SnapInfo Snapshot copies) that contain selected storage groups, you can expand the scope of the deletion to include backups that contain *only some* of the selected storage groups (in addition to backups that contain *all* of the selected storage groups).

  See "Explicitly deleting backups and SnapInfo Snapshot copies" on page 244.

Option to back up transaction logs that Exchange will truncate

By default, SnapManager Backup jobs back up selected database files and all associated transaction logs. This part of the backup process also entails creating a database Snapshot copy, truncating transaction logs (by removing any entries already committed to the database), and creating a SnapInfo Snapshot copy.

If you do not need to retain up-to-the-minute restore ability from a backup that is not the most recent, you can reduce the amount of disk space that is consumed by transaction log backups by choosing to skip the backup of transaction logs that Exchange will truncate after the SnapManager Backup operation finishes.

This feature is managed using the "Back up transaction logs that will be truncated by Exchange at the end of the backup" option in the Advanced Options dialog box.

- The option to back up all transaction logs (including those that Exchange will truncate after the backup operation finishes) is selected by default.

- When this option is deselected (so that you do not back up transaction logs that Exchange will truncate after the SnapManager Backup operation finishes), database and transaction log verification cannot be deferred.

This option is automatically selected the next time SnapManager is started.

Option to retain up-to-the-minute restore ability

If you delete backups that are not the oldest backups in your backup list, and the corresponding transaction logs are also deleted, this makes the older remaining backups no longer available for an up-to-the-minute restore. The reason is that the transaction logs are no longer contiguous from the time when the older backup was taken to the present time. This can happen when you are deleting backups of a particular backup management group.

When you automatically or explicitly delete backups for a backup management group (whether based on Snapshot copy age or quantity), you also have the option to ensure that this is done without creating a break in the continuity of transaction logs between the previous backup and the present time. Limiting the backup deletion in this way allows you retain the ability to use the older backups in an up-to-the-minute restore.

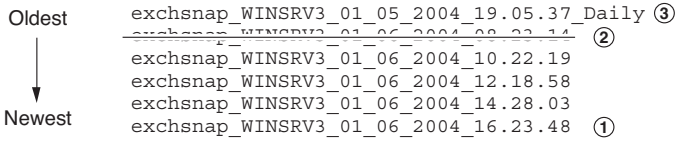
- To enable this safeguard, use the "Retain up-to-the-minute restore ability for older backups in other backup management groups" option in the Advanced Options dialog box, at the cost of using more space on your storage system for the logs that are not deleted. This option is selected by default.
- If you know you will not need to perform an up-to-the-minute restore from the older backups, then you should allow the logs to be deleted in order to free up more space on the storage system holding the backups. This option is automatically selected the next time SnapManager is started.

Example: As an example, suppose that you have the following backups stored:




```
exchsnap_WINSRV3_01_05_2004_19.05.37_Daily
exchsnap_WINSRV3_01_06_2004_08.23.14
exchsnap_WINSRV3_01_06_2004_10.22.19
exchsnap_WINSRV3_01_06_2004_12.18.58
exchsnap_WINSRV3_01_06_2004_14.28.03
```

Now, you perform a Standard backup, and specify that only the four most recent Standard backups be retained. After this backup is complete, the oldest Standard backup is deleted, and the daily backup becomes point-in-time only:



① New Standard backup created
② Oldest Standard backup deleted
③ Daily backup becomes point-in-time only

To avoid this situation, you can enable the “Retain up-to-the-minute restore ability for older backups in other backup management groups” option.

About using only one backup management group: If all backups have the same backup management group designation, deselecting this option has no effect. That is, the SnapInfo directories (transaction logs) will be deleted according to the “Delete backups” setting, and the “Retain up-to-the-minute restore ability” option is effectively ignored.

For more information about using backup management groups, see “Using backup management groups in backup and verification” on page 198.

When to run a SnapManager backup

You need to balance frequency of backups against any overhead incurred by the database verification process. In addition, you must ensure that no SnapManager operations overlap with each other. See the following topics for more information:

- "Backing up databases following data migration" on page 159
- "Best time to run a SnapManager backup" on page 159
- "Frequency of backups" on page 159
- "Recommendations for scheduling backups" on page 160

Backing up databases following data migration

At the end of the Exchange database and transaction log migration process, the Configuration Wizard reminds you to make an immediate backup of the Exchange databases. Making an immediate backup of the Exchange databases is critical because any previous non-SnapManager backups will no longer be valid.

Best time to run a SnapManager backup

To minimize the impact of a SnapManager backup on Exchange client response time, it is best to run the Exchange database integrity verification of a SnapManager backup operation—the most CPU-intensive part of the backup—during off-peak Exchange usage hours, or from a remote machine. Typically, off-peak times are between 6:00 p.m and 7:00 a.m.

Note

To avoid degrading the performance of your production Exchange server, run your database verification operations on a remote server.

Frequency of backups

You do not have to perform multiple SnapManager full backups every day, but the more you do, the fewer Exchange transaction logs need to be played forward at restore time. At a minimum, you should perform one SnapManager full database backup every 24 hours.

Recommendations for scheduling backups

The more often you create SnapManager backups, the fewer Exchange transaction logs there are to be played forward at restore time, resulting in a faster restore. However, for best results, observe the following recommendations for scheduling backups and verifications:

- Do not schedule any SnapManager operations to overlap each other. Only one SnapManager operation can be running on the same machine at the same time.
- Do not schedule a backup to occur while a database verification is being performed, even if the verification is performed on a remote verification machine. This can result in a backup that cannot be deleted easily. For more information about this problem, see "Problem deleting backups due to busy Snapshot copy error" on page 254.
- Do not schedule verifications on the Exchange server during peak usage hours. The verification process is CPU-intensive and could degrade Exchange performance if run on the Exchange server during peak usage hours.

One way to conform to the preceding recommendations is to schedule your backups to occur during peak usage hours, and then use the off-peak hours to perform database integrity verifications.

About Exchange options and Exchange System Manager

This topic describes considerations for using certain Exchange and Exchange System Manager features in a SnapManager environment:

- "Moving Exchange data" on page 161
- "Displaying the time of the last full backup" on page 161
- "Triggering Exchange page zeroing and deleted item retention" on page 162

Moving Exchange data

To display the time of the last full backup of a given database, use the *SnapManager Configuration Wizard* rather than Exchange System Manager.

Attention

Do not use the Exchange System Manager to move Exchange databases or transaction logs for any Exchange system that has been configured using SnapManager. Doing so prevents SnapManager from functioning correctly.

Displaying the time of the last full backup

To display the time of the last full backup of a given database, use the *SnapManager Restore* window rather than Exchange System Manager. For details, see "About Exchange System Manager" on page 162.

Using SnapManager Restore: To view the time of the last full backup using SnapManager Restore, complete the following steps.

Step	Action
1	In the SnapManager user interface, double-click the Restore in the Scope pane. **Result:** SnapManager displays the SnapManager backup sets in the Result pane.
2	In the Result pane, click the storage group name to expose the available backup sets.
3	In the Result pane, double-click the backup set name to display its properties.

Step	Action
4	Note the time stamp information included in the Result pane. **Name:** Displays the backup set name. If SnapManager is configured to use *unique* backup naming (the default setting) as opposed to *generic* naming, the backup name includes the date and time stamp. **Backup Date and Time:** Displays the date and time at which the backup was taken.

About Exchange System Manager: The version of Exchange System Manager (ESM) that ships with Exchange Server 2003 supports a new feature that allows the administrator to view the last time that a full backup of particular Exchange database took place. This time stamp information is displayed on the database Properties page in the "Time of last full backup" field. ESM 2003 can be used to manage Exchange Server 2003.

For an Exchange Server 2003 database, ESM 2003 displays a date and time stamp and whether the backup was taken with SnapManager for Microsoft Exchange (VSS Snapshot copy) or via a streaming method such as NTBackup.

Triggering Exchange page zeroing and deleted item retention

Exchange includes the following two optional features that depend on the complete read of every database page during a backup:

- *Page zeroing* is used by high-security installations. This feature provides the ability to zero out database pages that were deleted.
- *Deleted item retention* settings enables you to mark items and mailboxes for deletion after they are backed up.

Attention

If you need to ensure that deleted items are archived into at least one backup set, select the "Do not permanently delete mailboxes and items until the store has been backed up" option. However, be aware that this option overrides the "Deleted item retention" intervals for items and mailboxes. Therefore, to be able to recover deleted items without having to restore and extract Exchange data from tape, do not permanently delete mailboxes and items until the store has been backed up.

Because SnapManager uses Snapshot copy technology, and therefore does not read every page during a backup, these features are not triggered when only SnapManager is used to perform backups.

You can cause these Exchange features to be triggered by scheduling a periodic backup using a standard backup utility, such as NTBackup, and that the extra backup operation adheres to the following characteristics:

- Make sure that the backup you use for this purpose is a *copy* or *differential* backup. Performing any other type of backup causes existing SnapManager backups to become unusable for up-to-the-minute restores.
- Make sure that the extra backup operation is not performed at the same time as a SnapManager backup.

Backing Up Databases with SnapManager 10

This section describes how to back up Exchange database storage sets using SnapManager backup functionality. This section also explains how to perform backup on LCR and CCR database copies, using SnapManager.

The following topics are covered in this section:

- "Backing up databases" on page 166
- "Backing up an LCR-enabled database" on page 178
- "Backing up a CCR-enabled database" on page 180
- "What to do if your SnapManager backup fails" on page 191
- "Verifying backup databases" on page 194
- "Using backup management groups in backup and verification" on page 198

Attention

You must run SnapManager from the system console, not from a Terminal Services client. Do not use Terminal Services for any type of SnapManager administration, because you might miss critical information that is displayed only in pop-up boxes at the system console.

Related topics:

- Chapter 9, "Understanding SnapManager Backup," on page 137
- Chapter 11, "Restoring Databases Using SnapManager," on page 203
- Chapter 12, "Managing Backup and Restore Snapshot Copies," on page 243
- Chapter 13, "Using StoreVault Replication with SnapManager," on page 255

Backing up databases

You can create or schedule a SnapManager backup using the SnapManager Backup wizard or the Backup and Verification window. See the following topics for more information:

- "Information you need to specify for a backup" on page 166
- "Backing up using the SnapManager Backup wizard" on page 168.
- "Backing up using the Backup and Verify window" on page 171.

Information you need to specify for a backup

To perform a SnapManager backup, provide the following information:

- Which storage groups (Stores) you want to back up:
  - Production storage groups
  - LCR replica storage groups

    For details, see "Backing up an LCR-enabled database" on page 178.
  - CCR replica storage groups

    For details, see "Backing up a CCR-enabled database" on page 180.

Note

When a storage group is renamed, all the databases in that storage group need to be dismounted. After they are all dismounted, the databases can be remounted. At this point Exchange will recognize the new storage group name and new SnapManager backups of this storage group can be created.

- Which backup management group you want to assign to this backup

  For details, see "How backup management groups are used" on page 198.
- Whether you want to use the unique naming convention

  For details, see "Managing the backup setting" on page 370.
- Whether you want to automatically delete the oldest backups of this backup management group

  For details, see "Automatic deletion of backups in a management group" on page 153.
- Whether you want to back up transaction logs that will be truncated by Exchange at the end of the backup

  For details, see "Option to back up transaction logs that Exchange will truncate" on page 156.

- Whether you want to retain up-to-the-minute restore ability for any backups from other backup management groups that are older than backups you will be deleting

  For details, see "Option to retain up-to-the-minute restore ability" on page 157.
- Whether you want to verify the backup databases and transaction logs after the backup is created

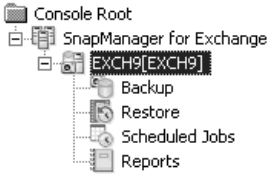
  Although it is possible to restore from an unverified backup, you are strongly advised to restore only from verified backups.
- Whether you want the mirror to be updated after the backup (if the volumes you are backing up to are StoreVault Replication sources)

  For details, see "How StoreVault Replication works" on page 259.
- Whether you want to run a command after the backup is complete

  For details, see "Using Run Command After Operation to archive automatically" on page 309.
- Whether you want to run the backup now or schedule it for later
- If you want to schedule the backup to run later, the job scheduling information

Backing up using the SnapManager Backup wizard

To back up the Exchange databases using the SnapManager Backup Wizard, complete the following steps.

Step	Action
1	In the SnapManager for Microsoft Exchange Scope pane, double-click the Exchange server node. **Result:** SnapManager displays the Backup, Restore, Scheduled jobs, and Reports directories.
2	Click Backup in the Scope pane.  **Result:** SnapManager displays the list of storage groups in the Backup view in the Result pane and the corresponding actions that you can perform for SnapManager backup in the Actions pane.
3	Click the Backup Wizard in the Actions pane. **Result:** The Welcome window appears.

Step	Action
4	Click Next. **Result:** The Databases to Back Up or Verify window appears. The Microsoft Exchange Servers navigation tree in the left panel lists the Exchange data stores that are managed from the current Exchange server. ◆ Storage groups or databases that reside on the same volume are shown with disk icons of the same color. ◆ Storage groups or databases that span multiple volumes are shown with disk icons with three colors. ◆ Storage groups or databases that cannot be backed up by SnapManager are listed with the label `Invalid` next to the LUN drive letter or mount point. ◆ Storage groups or databases that are LCR-enabled are listed using a specific naming convention. **Example:** *Storage Group (LCR)* **Note** For more information on how to back up LCR database copies, see "Backing up an LCR-enabled database" on page 178. **Note** When a storage group is renamed, all the databases in that storage group need to be dismounted. After they are all dismounted, the databases can be remounted. At this point Exchange will recognize the new storage group name and new SnapManager backups of this storage group can be created.
5	Follow the instructions in the Backup wizard to initiate a backup process. For a list of information you need to provide as you complete this step, see "Information you need to specify for a backup" on page 166.

Step	Action
6	At the Completing the Backup Wizard dialog box, click Finish after you verify that all the settings in the window are true. **Result:** The Backup Status window appears.
7	In the Backup Status Window, click Start Now to start the backup. **Result:** The backup is performed and the Snapshot copy is written to the volume. SnapManager Backup completes each task and checks it off on the list shown in the Backup Task List view. You can alternate between the task check-off list and the progress report. If the backup is successful, the Task view shows the check-off list with the tasks completed. **Note** If Notification is enabled, an e-mail message is sent and the event is posted to the Windows event log.

Backing up using the Backup and Verify window

To back up your Exchange data store using the SnapManager "Backup and Verify" window, complete the following steps.

Step	Action
1	In the Actions pane, select Backup. **Result:** The SnapManager for Exchange "Backup" window appears. The Result pane in the SnapManager console lists the Exchange data stores that are managed from the current Exchange server. ◆ Storage groups or databases that reside on the same volume are shown with disk icons of the same color. ◆ Storage groups or databases that span multiple volumes are shown with disk icons with three colors. ◆ Storage groups or databases that cannot be backed up by SnapManager are listed with the label `Invalid` next to the LUN drive letter or mount point.
2	In the Backup window, select the storage groups (Stores) you want to back up. **Note** If you choose to back up a storage group with an invalid status, SnapManager does not allow you to proceed with the backup operation. **Note** When a storage group is renamed, all the databases in that storage group need to be dismounted. After they are all dismounted, the databases can be remounted. At this point Exchange will recognize the new storage group name and new SnapManager backups of this storage group can be created.
3	In the "Backup Management Group" list, select a management group for the backup you want to create. For more information about backup management groups, see "How backup management groups are used" on page 198.

Step	Action
4	If you want to delete older backups of this backup management group automatically, select one of the “Delete backups” options in the Advanced Options dialog box. **Note** Make sure to select the one of the “Delete backups” options to manage your Snapshot copies. If you do not select automatic backup deletion, backups will be retained indefinitely. This would require manual removal of backups, or sufficient storage capacity for all backups and transaction logs. For more information, see “Automatic deletion of backups in a management group” on page 153 and “Explicit deletion of backup Snapshot copies” on page 155.

<table>
<tr><th>Step</th><th>Action</th></tr>
<tr><td>5</td><td>By default, automatic deletion of older backups within a backup management group is done selectively, in such a way that it does not cause a break in the continuity of transaction logs between the previous backup and the present time.

However, if you do not need to retain up-to-the-minute restore ability from a backup that is not the most recent, you can allow the automatic deletion feature to delete all older backups within the backup management group. This reduces storage system space consumption.

Note
If all backups have the same backup management group designation, deselecting this option has no effect.

For more information, see “Option to retain up-to-the-minute restore ability” on page 157.

To view or change this setting, click Advanced, and then select or deselect the “Retain up-to-the-minute restore ability for older backups in other management groups” option.
<table>
<tr><th>If you want to...</th><th>Then...</th></tr>
<tr><td>Avoid creating a break in the continuity of transaction logs (between the previous backup and the present time)</td><td>Select the “Retain up-to-the-minute restore ability for older backups in other management groups” option.

Result: Snapshot copies of LUNs that contain transaction logs related to this backup management group will not be deleted from the SnapInfo directory.</td></tr>
<tr><td>Reduce storage system space consumption by transaction logs (by allowing more transaction logs to be deleted)</td><td>Deselect the “Retain up-to-the-minute restore ability for older backups in other management groups” option.</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Step</th><th>Action</th></tr>
<tr><td>6</td><td>By default, SnapManager backs up selected database files and all associated transaction logs, so that up-to-the-minute restores are possible from all backups.

However, if you do not need to retain up-to-the-minute restore ability from a backup that is not the most recent, you can omit the backup of transaction logs that Exchange will truncate after the backup finishes. To do this, you disable the “Back up transaction logs that will be truncated by Exchange at the end of the backup” option. This reduces the amount of disk space consumed by transaction log backups that Exchange will truncate after the backup finishes.

For more information, see “Option to back up transaction logs that Exchange will truncate” on page 156.

To view or change this setting, click Advanced, and then select or deselect the “Back up transaction logs that will be truncated by Exchange at the end of the backup” option.

<table>
<tr><th>If you want to...</th><th>Then do this...</th></tr>
<tr><td>Retain up-to-the-minute restore ability from a backup that is not the most recent</td><td>Select the “Back up transaction logs that will be truncated by Exchange at the end of the backup” option selected.

This option is automatically selected each time you launch SnapManager.</td></tr>
<tr><td>Reduce the amount of disk space consumed by transaction log backups that Exchange will truncate after the backup finishes</td><td>Deselect the “Back up transaction logs that will be truncated by Exchange at the end of the backup” option.

The option remains disabled only until you exit SnapManager.

Note
Deselecting this option causes SnapManager Backup to also remove the option to defer database verification.</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Step</th><th colspan="2">Action</th></tr>
<tr><td rowspan="4">7</td><td colspan="2">Depending on your requirement, do either of the following:</td></tr>
<tr><td>If…</td><td>Then…</td></tr>
<tr><td>You want to verify the backup immediately after the backup is complete</td><td>Select the “Verify Backed Up Databases and Transaction Logs” check box.</td></tr>
<tr><td>You want to verify your backup later</td><td>Do not select the “Verify Backed Up Databases and Transaction Logs” check box.

See “Deferred database verification” on page 148.</td></tr>
<tr><td colspan="2">Note
Although it is possible to restore from an unverified backup, You are strongly advised to restore only from verified backups.</td></tr>
<tr><td>8</td><td colspan="2">If you want to run a command after the backup process is complete, select the “Run Command After Operation” check box.

This is usually done to archive backups. For details, see “Using Run Command After Operation to archive automatically” on page 309.</td></tr>
</table>

<table>
<tr><th>Step</th><th colspan="2">Action</th></tr>
<tr><td rowspan="3">9</td><td colspan="2">Depending on your requirement, do either of the following:</td></tr>
<tr><td>If...</td><td>Then...</td></tr>
<tr><td>Your volume is a StoreVault Replication source volume and you do not want the destination volume to be updated after this backup process is complete</td><td>Clear the “Update StoreVault Replication After Operation” check box.</td></tr>
<tr><td>Your volume is a StoreVault Replication destination volume and you want the destination volume to be updated after the backup is complete</td><td>Select the “Update StoreVault Replication After Operation” check box.</td></tr>
<tr><td rowspan="3">10</td><td colspan="2">Depending on your requirement, do either of the following:</td></tr>
<tr><td>If…</td><td>Then…</td></tr>
<tr><td>You want to run your backup process immediately</td><td>Click Backup Now, and then proceed to Step 14.

Result: The Backup Status window appears, showing the Task list.</td></tr>
<tr><td></td><td>You want to defer your backup process</td><td>Click Schedule to use the Windows Task Manager to schedule your backup process, and then proceed to the next step.</td></tr>
</table>

Step	Action
11	In the Schedule Jobs window, name your backup job, provide the user ID and password for the job, then click OK. **Note** If this name already exists as a Windows scheduled task and you want to replace it with a new job, select the Replace if it Exists check box, then click OK. **Result:** The Schedule Job window appears.
12	In the Schedule Job window, use the Schedule tab to specify the parameters of your job schedule: ◆ When the job is to run ◆ If you want the job to repeat, at what frequency
13	After you schedule your job, click OK. **Result:** The backup job runs at the times you specified in the Schedule Task view. The backup process is complete. **Note** You can use the Control Panel to modify the schedule or cancel the scheduled job.
14	In the Backup Status window, click Start Now to back up the selected storage groups. **Result:** The backup operation is performed and the Snapshot copy is written to the volume. SnapManager Backup completes each task and checks it off on the list shown in the Backup Task List view. You can alternate between the task check-off list and the progress report. If the backup process is successful, the Task view shows the check-off list with the tasks completed. **Note** If Notification is enabled, an e-mail message is sent and the event is posted to the Windows Application event log.

Backing up an LCR-enabled database

You can create or schedule a SnapManager backup from LCR-enabled storage groups, using the SnapManager Backup wizard or the Backup and Verification action window. See the following topics for more information:

- "Understanding the SnapManager capability to back up an LCR-enabled database" on page 178
- "Information you need to specify for a backup" on page 166
- "Backing up using the SnapManager Backup wizard" on page 168.

Understanding the SnapManager capability to back up an LCR-enabled database

SnapManager allows you to back up a database from either its LCR copy location or its original location. From the SnapManager backup window or Backup wizard, you can view the replica storage group simultaneously with its production storage group.

Note

It is highly recommend that you use different storage system volume to store the database files, and transaction log files of the replica storage group, and the production storage group.

The replica storage group is represented as *Storage Group (LCR)* on the SnapManager graphical user interface.

SnapManager provides the following capabilities:

- You can create or schedule a backup of an LCR replica database using the SnapManager Backup wizard.
- You can create a backup on the production database and its LCR replication simultaneously using the Backup wizard or the Backup window, but this is not a recommended process.

Creating a backup of an LCR replica database: To perform a backup on an LCR replica database using SnapManager, see the following sections:

- "Backing up using the SnapManager Backup wizard" on page 168.
- "Backing up using the Backup and Verify window" on page 171.

Note

It is not recommended to create a backup on the replica database and its production database at the same time.

When SnapManager creates backup on the production database and its replica database at the same time, SnapManager creates two successive sets of time stamps, one for each backup operation. Only one of the backup has the “recent” backup name, if the generic naming convention is selected in the Backup Settings.

Note

When you initiate a backup process on the production database and its replica at the same time, two copies of the SnapManager backup set are created. This consumes extra storage space in the LUN.

Note

SnapManager does not perform any special operation to delete the log files on a replica database after making the backup on the production database. When a backup is created on an LCR-enabled database, Exchange writer handles the truncation of the log files automatically, on both the production and the replica databases.

Backing up a CCR-enabled database

You can back up both the active and the passive nodes in a CCR environment in Exchange Server 2007.

Note

Ensure that SnapManager is installed on both nodes of CCR before starting the backup operation.

Note

Snapmanager 4.0 provides an option to create a copy backup on another CCR node before the full backup is created on the connected CCR node. For details about this option, "Creating a secondary backup on another CCR node" on page 188.

See the following topic for more information:

- "Backing up a CCR replica database and production database using SnapManager Backup" on page 181
- "Creating a secondary backup on another CCR node" on page 188

Backing up a CCR replica database and production database using SnapManager Backup

To back up your Exchange data store using the SnapManager for Exchange Backup functionality, complete the following steps.

Step	Action
1	In the SnapManager for Exchange console, select the Exchange server that is CCR-enabled and for which the database is seeded. **Result:** SnapManager for Exchange displays the CCR-enabled Exchange server active and passive nodes. The SnapManager for Exchange server's navigation tree in the Scope pane lists the Backup, Restore, Scheduled jobs, and the Reports directories for both the active and the passive nodes. **Note** Adding a CCR-enabled Exchange server adds both the active and the passive nodes together. Reconnecting to a CCR-enabled Exchange server connects to both the nodes, and removing a CCR-enabled Exchange server removes both the nodes.
2	Click Backup either in the CCR Active or passive node in the Scope pane. **Result:** SnapManager for Exchange displays the CCR-enabled Exchange data store in the Result pane, as follows: ◆ Storage groups or databases that reside on the same volume are shown with disk icons of the same color. ◆ Storage groups or databases that span multiple volumes are shown with disk icons in three colors. ◆ Storage groups or databases that cannot be backed up by SnapManager are listed with the label `Invalid` next to the LUN drive letter or mount point.
3	Click Backup Wizard in the Actions pane. **Result:** The Welcome window appears.
4	Click Next. **Result:** The "Databases to Backup or Verify" window appears.

Step	Action
5	Select the storage group that you want to back up or verify. You can choose to back up the storage group from either the active node or the passive node. **Note** If you do not select the backup advanced option “Create a copy database on another CCR node along with current backup”, then you only backup the CCR node that you are connected to, which is either an active or a passive node. **Note** You cannot connect to the active and passive nodes at the same time and perform backup operations on both the nodes simultaneously. **Note** When a storage group is renamed, all the databases in that storage group need to be dismounted. After they are all dismounted, the databases can be remounted. At this point Exchange will recognize the new storage group name and new SnapManager backups of this storage group can be created.
6	Click Next. **Result:** The “Backup or Verify Databases and Transaction Logs” window appears.

<table>
<tr><th>Step</th><th>Action</th></tr>
<tr><td>7</td><td>In the “Backup or Verify Databases and Transaction Logs” window, do either of the following:<table><tr><th>If...</th><th>Then...</th></tr><tr><td>You want to back up databases and transaction logs in the selected storage group</td><td>Select “Back up databases and transaction logs” option.</td></tr><tr><td>You want to verify the databases and transaction logs in an unverified backup</td><td>Select “Verify databases and transaction logs in the most unverified backups” option.</td></tr></table></td></tr>
<tr><td>8</td><td>Click Next.

Result: The “Backup Management Group” window appears.</td></tr>
<tr><td>9</td><td>In the “Backup Management Group” window, select the management group for this backup operation.

For more information about backup management groups, see “How backup management groups are used” on page 198.</td></tr>
<tr><td>10</td><td>Click Next.

Result: The “Select the naming convention for the newest backup” window appears.</td></tr>
<tr><td>11</td><td>In the “Select the naming convention for the newest backup” window, do either of the following:<table><tr><th>If...</th><th>Then...</th></tr><tr><td>You want the new backup to get a generic naming convention</td><td>Select the “Use generic (“_recent”) naming convention option.</td></tr><tr><td>You want the new backup to get a unique naming convention</td><td>Select the “Use unique (“time stamp”) naming convention option.</td></tr></table></td></tr>
</table>

<table>
<tr><th>Step</th><th colspan="2">Action</th></tr>
<tr><td>12</td><td colspan="2">Click Next.

Result: The “Delete Older Backups” window appears</td></tr>
<tr><td rowspan="4">13</td><td colspan="2">In the “Delete Older Backups” window, select whether to delete the oldest backups in the specified management group after this backup operation is completed successfully.</td></tr>
<tr><td>If...</td><td>Then...</td></tr>
<tr><td>You want to delete older backups</td><td>Select the “Yes, delete backups” option and select any one of the following in the “Delete Options” panel:
◆ Delete backups older than “X” days.
◆ Delete oldest backups in excess of “X” days.</td></tr>
<tr><td>You do not want to delete older backups</td><td>Select the “No, do not delete backups” option.</td></tr>
<tr><td>14</td><td colspan="2">Click Next.

Result: The “Retain Up-to-The-Minute Restore ability for Older backups” window appears.</td></tr>
<tr><td rowspan="4">15</td><td colspan="2">In the “Retain Up-to-The-Minute Restore ability for Older backups” window, do either of the following:</td></tr>
<tr><td>If...</td><td>Then...</td></tr>
<tr><td>You do not want to delete the transaction logs that are saved in the SnapInfo directory</td><td>Select the “Yes, the retain up-to-the-minute restore capability for older backups” option.</td></tr>
<tr><td>You want to delete the transaction logs that are saved in the SnapInfo directory</td><td>Select the “No, allow older backups to become point-in-time only” option.</td></tr>
</table>

<table>
<tr><th>Step</th><th colspan="2">Action</th></tr>
<tr><td>16</td><td colspan="2">Click Next.

Result: The “Truncated log backup” window appears.</td></tr>
<tr><td rowspan="3">17</td><td colspan="2">In the “Truncated log backup” window, do either of the following:</td></tr>
<tr><td>If...</td><td>Then...</td></tr>
<tr><td>You want to back up the truncated logs</td><td>Select the “Yes, backup truncated transaction logs” option.</td></tr>
<tr><td>You do not want to back up the truncated logs</td><td>Select the “No, do not backup truncated transaction logs” option.</td></tr>
<tr><td>18</td><td colspan="2">Click Next.

Result: The “Verify the Databases and Transaction Logs in this Backup” window appears.</td></tr>
<tr><td rowspan="4">19</td><td colspan="2">In the “Verify the Databases and Transaction Logs in this Backup” window, do either of the following:</td></tr>
<tr><td>If...</td><td>Then...</td></tr>
<tr><td>You want to verify the physical integrity of the databases and transaction logs</td><td>Select “Yes, I want to verify the databases and transaction logs after this backup is complete” option.

Note
Click “Verification Settings” button to launch the “Databases Verification Settings” dialog box to select the StoreVault Replication relationship for the integrity verification.</td></tr>
<tr><td>You want to verify the physical integrity of the databases and transaction logs later</td><td>Select “No, I want to verify the databases and transaction logs in this backup later” option.</td></tr>
</table>

<table>
<tr><th>Step</th><th colspan="2">Action</th></tr>
<tr><td>20</td><td colspan="2">Click Next.

Result: The “Update StoreVault Replication After Operation” window appears.</td></tr>
<tr><td>21</td><td colspan="2">In the “Update StoreVault Replication After Operation” window, do either of the following:</td></tr>
<tr><td></td><td>If...</td><td>Then...</td></tr>
<tr><td></td><td>You want to request a StoreVault Replication update</td><td>Select the “Yes, request a StoreVault Replication update after operation” option.</td></tr>
<tr><td></td><td>You do want to request a StoreVault Replication update</td><td>Select the “No at this time” option.</td></tr>
<tr><td></td><td>You want to run integrity verification on the Exchange databases and transaction logs that are stored on the destination volume</td><td>Select the “Verify on available StoreVault Replication destination volumes” check box.</td></tr>
<tr><td></td><td>You do not want to run integrity verification on the Exchange databases and transaction logs that are stored on the destination volume</td><td>Clear the “Verify on available StoreVault Replication destination volumes” check box.</td></tr>
<tr><td>22</td><td colspan="2">Click Next.

Result: The “Run Command After Operation” window appears.</td></tr>
</table>

<table>
<tr><th>Step</th><th>Action</th></tr>
<tr><td>23</td><td>In the “Run Command After Operation” window, do one of the following:<table><tr><th>If…</th><th>Then…</th></tr><tr><td>You want to run a command after the backup is complete</td><td>Select the “Yes, run a command after this operation” option.</td></tr><tr><td>You do want to run a command after the backup is complete</td><td>Select the “No, do not run a command after this operation” option.</td></tr></table></td></tr>
<tr><td>24</td><td>Click Next.

Result: The “Complete the Backup Wizard” window appears.</td></tr>
<tr><td>25</td><td>In the “Complete the Backup Wizard” window, verify the backup settings and click Finish.

Note
You can also schedule a backup process by selecting the Schedule button in the “Complete the Backup Wizard” window.

Result: The “Backup Status” window appears.</td></tr>
<tr><td>26</td><td>In the “Backup Status” window, click the Start Now button to initiate a backup process.</td></tr>
</table>

Note

SnapManager does not perform any special operation to delete the log files on a replica database after the production database backup in a CCR environment.

When a backup is created on a CCR replica database, Exchange writer handles the truncation of the log files automatically, on both the production and the replica databases.

Note

When you create a backup on a CCR configuration, SnapManager creates full database backups either on a CCR active node, using the Exchange store writer, or on a CCR passive node, using the Exchange replication writer.

Creating a secondary backup on another CCR node

When you create a backup on a CCR node, you can enable an option to allow SnapManager to create a copy database backup on another CCR node before the full database backup is created on the target node. This copy backup option is known as *secondary backup*. It can be an active node, or a passive node, depending on which node the primary backup will be created. This option is enabled by default.

To select this option in the Backup wizard, complete the following steps.

Step	Action
1	In the SnapManager main window, click Backup in the Scope pane. **Result:** SnapManager displays the list of storage groups in the Result pane and corresponding actions against the Backup functionality in the Actions pane.
2	Click Backup Wizard in the Actions pane. **Result:** The Welcome window appears.
3	Click Next. **Result:** The “Databases to Backup or Verify” window appears.
4	Select the storage groups that you want to back up or verify.
5	Click Next. **Result:** The “Backup or Verify Databases and Transaction Logs” window appears.

<table>
<tr><td>6</td><td colspan="2">In the “Select an operation” panel, select the type of operation.</td></tr>
<tr><td></td><td>If...</td><td>Then...</td></tr>
<tr><td></td><td>You want to back up databases and transaction logs</td><td>Select the “Back up databases and transaction logs” option.</td></tr>
<tr><td></td><td>You want create a database backup copy on another CCR node</td><td>Select the “Create a copy database backup on another CCR node along with current backup” check box below the “Backup databases and transaction logs” option.</td></tr>
<tr><td></td><td>You want to verify transaction logs and databases</td><td>Select the “Verify databases and transaction logs in the most unverified backups” option.</td></tr>
<tr><td>7</td><td colspan="2">Click Next to continue and follow the instructions in the Backup wizard to initiate a SnapManager backup.

For more information, see “Backing up a CCR-enabled database” on page 180.</td></tr>
</table>

When you select to create a copy of the secondary backup on a remote CCR node, SnapManager performs the following tasks:

- Connects to another CCR node to rename backups and updates the time stamp backup if there is another most recent backup.
- Creates a copy database backup on the remote CCR node, and deletes the older backups.

Note

SnapManager does not regroup the backups on the remote CCR node based on the CCR node storage system volume used by the Exchange databases.

- Creates full database backup on the CCR node on which the full backup was initialized and performs verification of the backup sets, if the Run Verification option is selected.
- Connects to the remote CCR node and copies the extra log files, which might be truncated from the primary node to the remote node.

Note

The secondary backup created on the remote is always *standard*. The secondary backup created on the remote node does not get verified even if the primary backup is verified.

What to do if your SnapManager backup fails

If your SnapManager backup fails, check the backup report for details about what SnapManager was trying to do when the failure occurred. You can also review the following list of common backup failures:

- "Snapshot copy limit reached" on page 191
- "SnapInfo directory being accessed" on page 192
- "SnapInfo directory out of space" on page 192
- "Data does not match" on page 192
- "Busy Snapshot copy" on page 192
- "Snapshot copy already exists" on page 192
- "Out of disk space" on page 193
- "SnapManager server initialization failed" on page 193

Snapshot copy limit reached

If any of the volumes containing the LUNs being backed up reach the Snapshot copy limit of 255, whether those Snapshot copies were created by SnapManager or not, SnapManager backup fails. For more information about the Snapshot copy limit, see "Maximum number of Snapshot copies you can retain" on page 13.

Note

Automatic backup deletion is performed only after a successful backup process is complete. Therefore, you must be able to create new Snapshot copies before you begin a new backup procedure.

SnapInfo directory being accessed

Because a SnapManager backup might include renaming a SnapInfo subdirectory and Windows does not allow a directory name to be changed while it is being accessed, accessing the SnapInfo directory with a tool like Windows Explorer could cause the backup to fail. Make sure that you do not hold any exclusive access to the SnapInfo directory on the Exchange host when a backup process is performed.

SnapInfo directory out of space

Expand the LUN that contains the SnapInfo directory.

Note

When you expand a LUN, make sure that sufficient space remains in the volume for Snapshot copy creation, so that SnapManager can continue to function correctly. For more information about volume sizing, see "Calculating volume size" on page 101.

Data does not match

You made changes to your Exchange data store since SnapManager was started. You can refresh your view by pressing F5, or you can restart SnapManager.

Busy Snapshot copy

If you initiate a backup process when a LUN backed by Snapshot copy exists, the result is a Snapshot copy that cannot be deleted; when you try, you get a "busy Snapshot copy" error and Event 249 is logged by SnapDrive in the event log. This can cause SnapManager backups to fail.

For information about recovering from this error, see "Problem deleting backups due to busy Snapshot copy error" on page 254.

Snapshot copy already exists

Either of the following circumstances might cause this error to occur:

- The system clock on the host running SnapManager might not be synchronized with the clock on the storage system. These two clocks must be synchronized in order for SnapDrive to function correctly.
- If a StoreVault Replication replication is running when you attempt to initiate a SnapManager backup process, the operation can fail. You can avoid this problem by making sure that any StoreVault replications have enough time to complete before you initiate another SnapManager backup process.

Out of disk space

This error occurs when an out-of-disk-space condition occurs on a storage system volume that stores an Exchange database or transaction log. If this occurs, resize the volume or expand the LUN.

SnapManager server initialization failed

Either of the following circumstances might cause this error to occur:

- You have exited the SnapManager application, but the smesrvr.exe process is still running. To correct this problem, terminate any orphaned SnapManager processes.
- The permissions associated with the SnapManager server account, or the server account itself, have been changed. In this case, SnapManager might not function correctly.

Verifying backup databases

If you created a database backup Snapshot copy without automatically verifying the databases at the time the backup was created, you can verify the databases in that backup as a separate operation. See the following topics for more information:

- "Information you need to specify for a database verification" on page 194
- "Starting or scheduling database verification" on page 196

Attention

If you attempt to perform a database verification (or a backup with database verification) when SnapManager is running from a Terminal Services client instead of from a system console, the operation will fail.

Information you need to specify for a database verification

A database integrity verification job is specified using a combination of parameters.

Job-specific parameters: Each time you start or schedule a database verification, you must specify the following information in either the Backup wizard or in the Backup and Verification window:

- The databases for which you want to verify any unverified backup Snapshot copies
- Within the selected databases, the backup management groups for which you want to verify any unverified backup Snapshot copies

  For more information, see "Using backup management groups in backup and verification" on page 198.
- For the selected databases and backup management groups, the number of unverified backup Snapshot copies you want to verify

  Note

  If you request verification of a greater number of unverified Snapshot copies than specified by your database and backup management group selections, the verification will proceed, and therefore all backups will be verified.
- Whether you want to run a command after the backup is complete (usually done to archive backups)

  This feature is typically used to automatically archive a backup, as described in "Using Run Command After Operation to archive automatically" on page 309.

- Whether you want to run the verification now or schedule it for later

Note

If you want to schedule the verification to run later, you also need to know the job scheduling information.

Verification settings: The following list summarizes the settings that pertain to database verification:

- Which Exchange server is used to perform database verification

  This is configured using the Verification Server tab of the Database Verification Settings dialog box, described in "Selecting the database verification server" on page 353.

  If you will be specifying a remote verification server, be sure it is set up properly, as described in "Requirements for a remote verification server" on page 29.

Note

Whether you run database verification either remotely or locally, the verification is performed on a LUN backed by Snapshot copy. If you take a Snapshot copy of the same volume while a LUN backed by Snapshot copy exists, you create a "busy Snapshot copy," which might cause problems when you attempt to delete some Snapshot copies. For this reason, you must be careful not to schedule backups while a verification is in progress. For information about busy Snapshot copies, see "Problem deleting backups due to busy Snapshot copy error" on page 254.

- Which method is used to access database backup Snapshot copies during database integrity verification

  For more information, see "Selecting the Snapshot copy access method for database verification" on page 358.

- *If SnapManager is installed with Exchange Server 2003 SP2, or higher, or Exchange Server 2007:* Whether to configure throttling of the database checksum verification rate

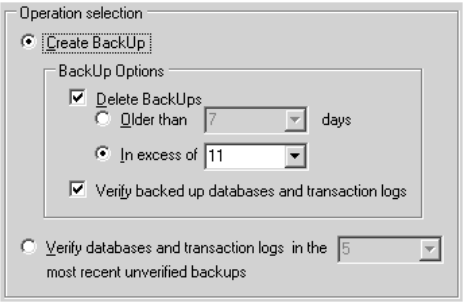
  For more information, see "Configuring verification throttling for database verification" on page 360.

- *If you must restore from an unverified backup:* Whether you want to override the verification requirement for restoring databases from SnapManager backups

  For more information, see "Overriding database verification during restore" on page 367.

Starting or scheduling database verification

To run or schedule database verification, complete the following steps *from the production Exchange server* (not from the remote verification server).

Step	Action
1	On the production Exchange server, click the Backup action window in the Action pane.
2	Select the storage group (Store) you want to run the verification on.
3	Select the "Verify Databases and Transaction Logs in the Most Recent Unverified Backups" option. 
4	Select how many of the most recent unverified backups you want to verify. **Note** Only unverified backups are counted. For example, if you select to verify the two most recent unverified backups, and the most recent backup's databases have already been verified, then the two previous backups are verified.
5	In the "Backup Management Group" field, select the backup management group of the backups you want to verify. If you want to verify the most recent backups regardless of their backup management group, select All.
6	If you want to run a command after the verification is complete, select the "Run Command After Operation" check box. This is usually done to archive backups. For details, see "Using Run Command After Operation to archive automatically" on page 309.

Step	Action
7	If your volume is a StoreVault Replication source volume and you do not want the destination volume to be updated after this verification is complete, clear the “Update StoreVault Replication After Operation” check box.
8	If your volume is a StoreVault Replication destination volume and you want to run integrity verification on the available destination volume, check the “Verify databases and transaction logs on the StoreVault Replication destination” check box.
9	Click Verify Now, and on the Backup Status window, click Start Now. **Note** To schedule the verification for later, click Schedule instead and follow the prompts in the dialog boxes. **Result:** Verification is run on the databases in the backup you selected. If verification is successful, a dialog box appears telling you so. If any backup database fails verification, delete that backup and create another.

Using backup management groups in backup and verification

When you create a database backup, you have the option to assign it to one of the backup management groups. The database Snapshot copy names and SnapInfo directory Snapshot copy names reflect the management group to which you assigned the backup. The purpose of backup management groups is to enable you to designate various levels of backup retention. See the following topics for more information:

- "How a backup is assigned a backup management group" on page 198
- "How backup management groups are used" on page 198
- "Changing the backup management group" on page 200

How a backup is assigned a backup management group

When you create a backup, you can assign it to any one of the SnapManager backup management groups:

- Standard
- Daily
- Weekly

When you start or schedule a database backup, the Backup wizard and the Backup and Verification window prepopulate the backup management group selection field with the Standard group.

The choice of backup management group—combined with the backup Snapshot copy naming convention selected (*unique* or *generic*)—affects the name assigned to the backup Snapshot copy. The name of each Snapshot copy created during a SnapManager backup operation includes information that identifies the Snapshot copy contents. This is described in "SnapManager Snapshot copy naming conventions" on page 143.

How backup management groups are used

The primary purpose of backup management group is to facilitate a database backup strategy. Backup management groups are used to determine which backups are targeted for automatic deletion of older backups, database verification for unverified backup Snapshot copies, and explicit deletion of backups.

For example, when you run or schedule a backup, you can specify how many of the most recent backups you want to retain. Only backups of the specified backup management group are deleted.

Note

The backup management group neither depends on nor enforces how often backups are performed. Backup management groups are only a backup labeling convention that you can assign to a backup set.

Options for a database backup: When you run or schedule a database backup, you can specify how many of the most recent backups you want to retain. Only backups of the specified backup management group are deleted. The procedural details are included in "Backing up databases" on page 166.

Options for a database verification: When you run or schedule a database verification separate from the database backup operation, you can limit the backups you want to verify by specifying a particular backup management group. The procedural details are included in "Verifying backup databases" on page 194.

Options for an explicit deletion of multiple backup Snapshot copies:

When you explicitly delete multiple backups, you can specify that only backups belonging to a certain backup management group be deleted. The procedural details are included in "Explicitly deleting backups and SnapInfo Snapshot copies" on page 244.

Backup example using backup management groups: Suppose your company wants to take regular backups between 7:30 a.m. and 7:30 p.m. You want to keep the last backup of the day and retain it for a few weeks, and you want to keep one backup per week for several months for archiving.

To achieve this using backup management groups, you could use the Standard backup management group for the backups during the day, and use a separate backup job to create one backup in the Daily management group at the end of the day. Then, once a week, you could use another job to create a backup in the Weekly backup management group.

You could then decide how many backups to retain independently for each backup management group. For example, you could keep ten Standard backups, seven Daily backups (one week's worth), and four Weekly backups (one month's worth).

If your Daily or Weekly backup job failed for any reason, you could promote the most recent successful Standard backup to replace the Daily or Weekly backup by changing its backup management group.

Changing the backup management group

Use the Change Backup Management Group dialog box to change the backup management group to which the selected backup set belongs.

To change the backup management group, complete the following steps.

Step	Action
1	Click Restore in the Scope pane. **Result:** SnapManager displays the list of storage groups in the Result pane.
2	Expand the storage group in the Result pane.
3	Double-click the backup whose management group you want to change. **Result:** SnapManager displays the corresponding actions that you can perform against this backup, in the Actions pane.
4	Click "Change Management Group" in the Actions pane. **Result:** The Change Backup Management Group dialog box appears.
5	Review the backups listed in the "Backups sharing this Snapshot" list. **Note** The backup management group for all these backups is changed if you complete this operation. This is because they share a common Snapshot copy.
6	In the New Management Group list, select the backup management group you want to change to. **Note** When you change a backup's backup management group, you also change that backup's name, because the name includes the backup management group.

Step	Action
7	Click OK. **Result:** The backup management group for this backup and all backups listed in the “Backups sharing this Snapshot” list is changed. **Note** The report for the backup management group change is in the Miscellaneous report directory.

Restoring Databases Using SnapManager 11

This section describes how to recover data from a SnapManager backup set by using SnapManager Restore. This section also explains:

- How to restore an LCR database copy
- How to restore a CCR database copy
- How to restore a database to the recovery storage group (RSG)
- How to restore databases created on a different Exchange Server and from the archived backup sets.

The following topics are covered in this section:

- "Understanding SnapManager Restore" on page 204
- "Guidelines for restoring SnapManager backups" on page 209
- "Restoring from a SnapManager backup" on page 211
- "Restoring from an LCR-enabled storage group" on page 218
- "Restoring to a recovery storage group" on page 226
- "Restoring to a recovery storage group" on page 226
- "Restoring backups created at different Exchange server locations in Exchange 2007" on page 235

Attention

You must run SnapManager from the system console, not from a Terminal Services client. Do not use Terminal Services for any type of SnapManager administration, because you might miss critical information that is displayed only in pop-up boxes at the system console.

Related topics:

- Chapter 9, "Understanding SnapManager Backup," on page 137
- Chapter 10, "Backing Up Databases with SnapManager," on page 165
- Chapter 12, "Managing Backup and Restore Snapshot Copies," on page 243

Understanding SnapManager Restore

The following topics are covered in this section:

- "What SnapManager Restore does" on page 204
- "How SnapManager Restore works" on page 204
- "SnapManager Restore types" on page 205
- "Importance of verifying databases to be restored" on page 206
- "About Restore Snapshot copies" on page 206
- "Transaction log sequence verification options" on page 206
- "What the exhaustive transaction log sequence verification does" on page 207
- "What the non-exhaustive transaction log sequence verification does" on page 207
- "About LUN Clone Split Restore Method" on page 208
- "About performing an up-to-the-minute restore after a point-in-time restore from the most recent backup" on page 208

What SnapManager Restore does

SnapManager Restore enables you to restore your Exchange databases either from a backup that you created previously with SnapManager Backup or from an archive and then optionally recover the databases up to their current state by replaying the associated transaction logs. This is necessary if your Exchange data becomes corrupted or unavailable.

With SnapManager 4.0 for Microsoft Exchange, you can restore the production backups, LCR-enabled backups, and CCR-enabled backups to either of the following locations:

- The same storage group
- The recovery storage group

SnapManager supports restoring an entire storage group or an individual database.

How SnapManager Restore works

SnapManager Restore uses the following process when restoring from a backup.

Stage	Process
1	Checks that the selected backup was verified, or that the Database Verification Override was selected. **Attention** You are strongly advised to restore only from verified backups. For details, see "Importance of verifying databases to be restored" on page 206.
2	Creates a Snapshot copy of the volume containing the storage group or database to be restored, so that the pre-restore state is preserved.
3	Restores the Exchange data from the Snapshot copy of the LUN.
4	Restores the required transaction log for replay.
5	Uses the Exchange recovery process to play forward transaction logs into the restored databases. **Note** On Windows Server 2003, the soft recovery process is used.

SnapManager Restore types

You can use SnapManager Restore to do either of the following types of restore:

- An up-to-the-minute restore
- A point-in-time restore

Up-to-the-minute restore: In an up-to-the-minute restore, all the transaction logs that were not committed to the databases, from the time the backup set was created up to the most current time, are played forward and applied to the databases. This includes transaction logs from the backup sets, as well as the existing transaction logs in the transaction log directory. A contiguous set of transaction logs is required for an up-to-the-minute restore to succeed.

This option is selected by default.

Example: Suppose you run SnapManager Backup every day at noon, and on Wednesday at 4 p.m. you decide to restore from a previous backup. For some reason, the backup set from Wednesday lunchtime failed verification, so you decide to restore from the Tuesday lunchtime backup. After that backup is restored, all the transaction logs are played forward and applied to the restored

databases, starting with those that were not committed when you created Tuesday's backup set and continuing through the latest transaction log written on Wednesday at 4 p.m.

Point-in-time restore: In this case, only the transaction logs that existed in the active file system at the time the backup was taken (and were not committed to the databases) are replayed. All the transaction logs beyond the point-in-time that exist in the transaction log directory belonging to the restored storage group are removed.

You can use this method to restore a database or storage group back to a time before a corruption occurred.

For more information about choosing the restore type, see "Guidelines for choosing the type of restore to perform" on page 209.

Importance of verifying databases to be restored

Using SnapManager for Microsoft Exchange, you can override the verification requirement when restoring from a SnapManager backup. However, you are strongly advised to restore only from verified backups. The verification process protects you from restoring a backup with any physical-level corruption. Physical-level database corruption can occur silently in Exchange databases. The only way to know whether a particular database backup incurred physical-level corruption is to run database verification on that backup.

About Restore Snapshot copies

Every time you perform a restore process, a Snapshot copy is created on the volume containing the transaction logs. The name of this Snapshot copy contains the prefix `rstrsnap__`.

After you verify that a restore process was completed successfully and you are satisfied with the results, you can delete the restore Snapshot copy using the Action menu. For details, see "Explicitly deleting Snapshot copies created by SnapManager Restore" on page 249.

Transaction log sequence verification options

When you perform a restore process, you can optionally choose to decrease the time the restore takes by skipping the pre-restore transaction log sequence and database metadata checks. If you skip these checks, and a problem exists with your transaction log sequencing or your database metadata, your restore will fail.

You can choose from the following metadata checks:

- An exhaustive check of the metadata

For this option, select both the Verify Transaction Log Sequence... and the Exhaustive Verification check boxes.

For more information about this option, see "What the exhaustive transaction log sequence verification does" on page 207.

- A quicker, less comprehensive check of the transaction logs

  For this option, select the Verify Transaction Log Sequence... check box and clear the Exhaustive Verification check box.

  For more information about this option, see "What the non-exhaustive transaction log sequence verification does" on page 207.

- No metadata verification

  For this option, clear both the Verify Transaction Log Sequence... and the Exhaustive Verification check boxes.

Note

For backward compatibility with previous SnapManager versions, select the exhaustive check, which is selected by default.

What the exhaustive transaction log sequence verification does

The exhaustive option of the transaction log sequence verification performs the following checks:

- The transaction log headers are analyzed, and the following conditions are verified:
  - The transaction logs are all present and sequenced correctly.
  - The signatures of all the transaction logs match.
  - Each transaction logs' create time matches the next log's previous time.
- A Snapshot copy of the databases in this backup is mounted, the database's headers are analyzed, and the database signature matches the log database signature.

What the non-exhaustive transaction log sequence verification does

The non-exhaustive option of the transaction log sequence (selected if you clear the Exhaustive Verification check box) uses the transaction log file names to verify that the transaction log sequence is correct and that all log files are present.

About LUN Clone Split Restore Method

There are different ways that a LUN can be restored from Snapshot copy depending on the version of Data ONTAP used. SnapDrive will use the LUN Clone Split Restore method for Data ONTAP version 7.1 or later. When using SnapManager or SnapDrive to restore the LUNs, this feature enables you to perform the restore operation quickly. Although the LUNs and the data contained in them are available immediately after the restore operation, you cannot create any new Snapshot copies (or SnapManager backups) until the LUN Clone Split process is completed. The LUN Clone Split status can be verified using the **"lun clone split status"** command on the storage system console. Additionally, SnapDrive 4.0 and later will display the LUN Clone Split status in the **"Operation Status"** column of the SnapDrive GUI.

About performing an up-to-the-minute restore after a point-in-time restore from the most recent backup

If you perform a point-in-time backup from the most recent backup and then decide to perform an up-to-the-minute backup from the same backup, SnapManager will successfully complete each operation. However, the results might not be what you intended, because any transactions that occurred after the backup was taken and before the point-in-time restore will not be restored. The reason is that when you perform the point-in-time restore, the transaction logs containing transactions recorded after the selected backup are removed.

For this reason, use caution when selecting a point-in-time restore.

Guidelines for restoring SnapManager backups

Guidelines for choosing the type of restore to perform

Follow these general guidelines to help you decide whether to use a point-in-time or up-to-the-minute restore:

- If you want to roll forward all the transactions up to the most current time, use an up-to-the-minute restore.
- If you want to recover the databases as they were at a particular point in time, for example, at the point when the most recent backup was created, use a point-in-time restore.
- For to an up-to-the-minute restore to succeed, a contiguous set of all required transaction logs must be in the SnapInfo folder and the storage group transaction log directory.
- After a point-in-time restore of a backup that is not the most recent one, all existing backups become point-in-time restorable only. Backups created after the restore will be available for up-to-the-minute restores.
- After a point-in-time restore of the most recent backup, you can still perform an up-to-the-minute restore from any backup, including the most recent backup. However, you will lose all transactions that occurred between when you created the last backup and when you performed the point-in-time restore.

  For more information about why this occurs, see "About performing an up-to-the-minute restore after a point-in-time restore from the most recent backup" on page 208.
- If you are restoring individual databases, you can perform only an up-to-the-minute restore.
- If you are restoring databases to the recovery storage group, you can perform only point-in-time restore.

Guidelines when restoring a backup

Follow these guidelines when restoring from a SnapManager backup:

- If possible, you should always use the most recent backup for an up-to-the-minute restore process. Otherwise, more transaction logs need to be replayed, causing the restore process to take more time.

  The most recent backup's name contains `recent` if you did not use the unique name option, or the most recent time stamp if you did.
- You can restore an entire storage group, or, if you configured your data store appropriately, individual databases. If you need to restore more than one storage group, you must run SnapManager Restore more than once.
- If you renamed a storage group since the backup was made, you cannot recover it from a backup taken before the storage group was renamed.
  - If you rename a storage group, make sure that you back it up as soon as possible.
  - If you must recover a storage group from a backup taken before the storage group was renamed, rename the storage group back to its old name, then recover it from the backup.

  Note

  When a storage group is renamed, all the databases in that storage group need to be dismounted. After they are all dismounted, the databases can be remounted. At this point Exchange will recognize the new storage group name and new SnapManager backups of this storage group can be created.
- If you are restoring the storage group to the recovery storage group, you can perform only a point-in-time restore process.

Restoring from a SnapManager backup

Ways to access SnapManager Restore

You can access SnapManager Restore to restore databases or storage groups from a SnapManager backup in two ways:

- From the SnapManager Restore Wizard

  For details, see "Information you need to perform a restore process" on page 211.
- From the SnapManager Restore in Actions pane

  For details, see "Restoring using the Restore Action window" on page 215.

Information you need to perform a restore process

You need to provide the following information to perform a SnapManager restore process:

- The storage group that you want to restore, or that contains the databases you want to restore

  Note
  All databases residing on the same LUN must be restored together.

- The location to which you want to restore the backup sets.

  You can restore the backup sets to any one of the following locations:

  - To the same storage group

    For more details, see "Restoring backups that were created on the same Exchange server" on page 235.
  - To the Recovery storage group

    For more details, see "Restoring a database to the recovery storage group in Exchange Server 2003" on page 229.

    For more details, "Restoring a database to the recovery storage group in Exchange Server 2007" on page 226.
- The items that you want to restore.

  You can select the production databases and LCR copies that you want to restore.
- Whether you want to perform an up-to-the-minute restore (the default) or a point-in-time restore

For more information about the restore types, see “SnapManager Restore types” on page 205. For more information about choosing a restore type, see “Guidelines for choosing the type of restore to perform” on page 209.

- Whether you want to perform a actual restore or only a test restore

Note

A test restore is not an actual restore. It helps verify the restore process.

- Whether you want to verify the transaction log sequence and database metadata before restore process

  For more information on this option, see “Transaction log sequence verification options” on page 206.

- If it is not a test restore, whether you want your Exchange databases to be mounted after the restore process is complete

Note

In the case of Exchange Server 2007, SnapManager does not recover the databases, if “Recover and mount databases after restore” option is not selected.
In the case of Exchange Server 2003, SnapManager recovers the databases, but does not mount it, if “Mount databases after restore” option is not selected.

- If it is a test up-to-the-minute restore process, whether you want to verify the current transaction logs

  This option confirms that all the required transaction logs are present.

- If the backup has not been verified previously, whether you want to verify the backup before restoring it

  You can use Verification Settings to specify the Database Verification Settings for restoring the SnapManager backup sets.

- If the set of operations specified for the restore operation is accurate

  You can verify the settings and confirm it before starting the actual restore process.

Restoring databases using the Restore wizard

To restore an Exchange storage group from a backup set using the SnapManager Restore wizard, complete the following steps.

Note

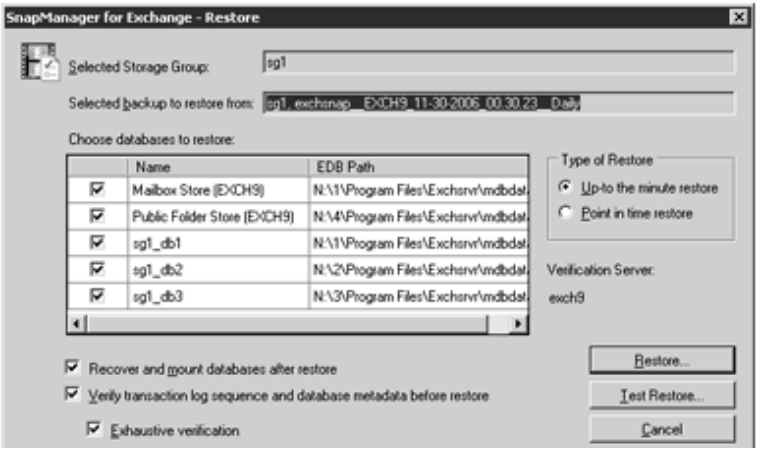
Only one storage group or any of the databases in that storage group can be restored at a time.

Step	Action
1	Make sure that all Explorer windows are closed on the Exchange server running SnapManager.
2	Disable any SnapManager operations that are scheduled to run against the Exchange data you are restoring, including any jobs scheduled on remote management or remote verification servers.
3	Click Exchange Server node in the Scope pane. **Result:** SnapManager displays the Exchange Server data store and the storage groups.
4	From the SnapManager Actions pane, select the SnapManager Restore wizard. **Result:** The SnapManager Welcome window appears.
5	Follow the instructions in the Restore wizard and go to "Restore Status" window. For a list of information you need to provide as you complete this step, see "Information you need to perform a restore process" on page 211.
6	Click "Start Now" to start the restore process. **Result:** Your database or storage groups are restored from the backup you selected.
7	After the restore process is complete, click OK. **Result:** Your restore process is now complete and your Exchange server comes back online.

Step	Action
8	You can optionally perform a SnapManager backup and verification to verify that your restored database is free of physical-level corruption.

Restoring using the Restore Action window

To restore all the Exchange databases from a backup using the SnapManager Restore action window, complete the following steps.

Step	Action
1	Make sure that all Windows Explorer windows are closed on the Exchange server running SnapManager.
2	Disable any SnapManager operations that are scheduled to run against the Exchange data you are restoring, including any jobs scheduled on remote management or remote verification servers.
3	Click Restore in the Scope pane. **Result:** SnapManager displays the backup sets in the Result pane.
4	Select the storage group (Store) that you want to restore.
5	Double-click the backup under the storage group that you want to restore. **Result:** SnapManager displays the list of actions that can be performed against this backup in the Actions pane.
6	Select Restore in the Actions pane. **Result:** The SnapManager for Exchange-Restore window appears. 
7	In the “Choose databases to restore” pane, select the databases that you want to restore.

<table>
<tr><th>Step</th><th colspan="2">Action</th></tr>
<tr><td rowspan="3">8</td><td colspan="2">In the Type of Restore window, select the type of restore process.</td></tr>
<tr><td>If…</td><td>Then…</td></tr>
<tr><td>You want an up-to-the-minute restore</td><td>Select the Up-to-the-Minute Restore option.</td></tr>
<tr><td>9</td><td>You want a point-in-time restore</td><td>Select the Point-in-Time Restore option.</td></tr>
<tr><td>9</td><td colspan="2">If you do not want to perform exhaustive verification of the transaction log sequence and database metadata before the restore process, clear the Verify Transaction Log Sequence and Database Metadata Before Restore and Exhaustive Verification check boxes.

For more information about these options, see “Transaction log sequence verification options” on page 206.</td></tr>
<tr><td>10</td><td colspan="2">If you want SnapManager to automatically remount your restored databases immediately after the restore, make sure that the “Recover and mount database after restore” check box is selected.</td></tr>
<tr><td rowspan="3">11</td><td colspan="2">Depending on the type of restore process, do either of the following:</td></tr>
<tr><td>If…</td><td>Then…</td></tr>
<tr><td>This is a test restore process</td><td>Click the Test Restore button and continue to Step 12.

Result: The “Select Test Restore Options” window is displayed.</td></tr>
<tr><td>This is not a test restore process</td><td>Click the Restore button and skip to Step 13.

Result: The “Restore Status” window, showing the tasks that are performed for this restore process is displayed.</td></tr>
</table>

Step	Action
12	In the Select Test Restore Options window, do one of the following: ◆ Select whether you want to check the current logs (for up-to-the-minute restores only) and run database verification, and then click OK. ◆ Select whether you want to verify databases and transaction logs on available destination volumes and then click OK. **Result:** The Restore Status window, showing the tasks that are performed for this restore process is displayed.
13	To start the restore process, click Start Now. **Result:** Your database or storage groups are restored from the backup that is selected.
14	After an actual restore process, you can optionally perform a SnapManager backup and verification to verify that your restored database is free of physical-level corruption.

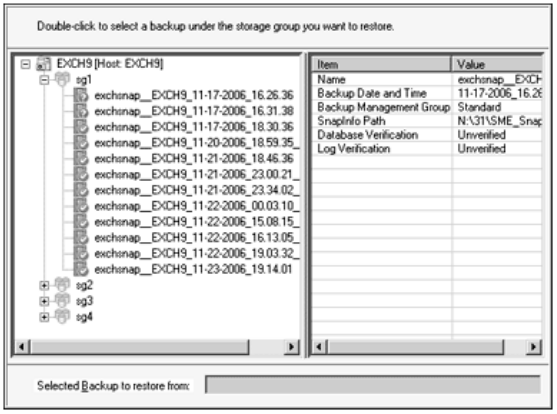
Restoring from an LCR-enabled storage group

You can restore Exchange databases from a backup set created from an LCR-enabled storage group. For more information see, "Restoring a backup from an LCR replica storage group" on page 218.

Restoring a backup from an LCR replica storage group

To restore the databases from a backup set created in an LCR location or in its original location using the SnapManager Restore wizard, complete the following steps.

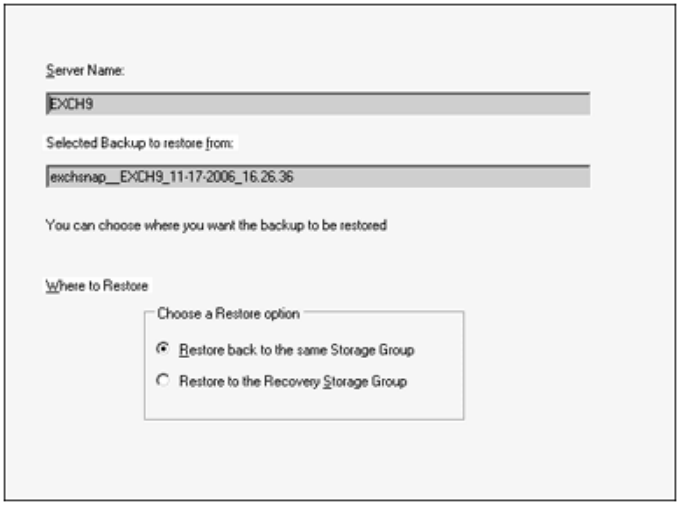
Step	Action
1	Make sure that all Windows Explorer windows are closed on the Exchange server running SnapManager.
2	Disable any SnapManager operations that are scheduled to run against the Exchange data you are restoring, including any jobs scheduled on remote management or remote verification servers.
3	Click Restore in the Scope pane. **Result:** SnapManager displays the Exchange Server data store and the storage groups in the Result pane. SnapManager displays the actions that you can perform against these backup sets in the Actions pane.
4	Click Restore Wizard in the Actions pane. **Result:** The Welcome window appears.
5	Click Next. **Result:** The "Which Exchange Server Created the Backup" window appears.
6	Select the "Restore SnapManager backups that were created on the same Exchange Server" option.
7	Click Next. **Result:** The "Choose the backup that you want to restore" window appears.

Step	Action
8	Select the storage group tree and the storage group that you want to restore. **Note** SnapManager uses a special naming convention to indicate the backup sets created in an LCR location. For example, the backup created from the LCR copy in Storage group1 is represented as Storage group1(LCR).
9	Double-click the backup set under the storage group that you want to restore. **Note** If you select a backup from Storage group1(LCR), the SnapManager uses the backup created on the LCR replica. **Result:** SnapManager displays the backup set properties in the right pane of the Restore wizard. **Note** If the backup is not verified, SnapManager displays an option in the message box to verify the backups before restore operation. 

<table>
<tr><th>Step</th><th colspan="2">Action</th></tr>
<tr><td>10</td><td colspan="2">In the “SnapManager backup” dialog box, do any one of the following:</td></tr>
<tr><td></td><td>If...</td><td>Then...</td></tr>
<tr><td></td><td>You want to verify the unverified backup</td><td>Select Yes.

Result: SnapManager displays a message box and prompts you to select an option to run integrity verification on available destination volumes.</td></tr>
<tr><td></td><td>You want to perform integrity verification on available destination volumes.</td><td>Select Yes in the SnapManager for Exchange message box.</td></tr>
<tr><td>11</td><td colspan="2">Click Next.

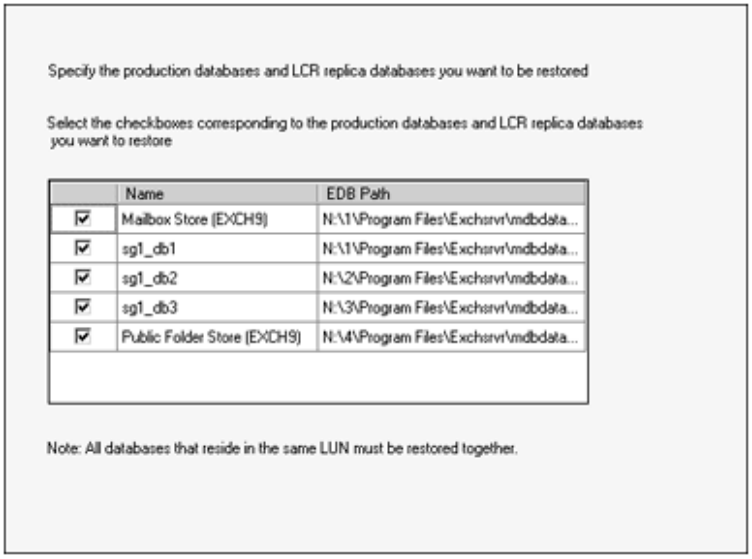
Result: The “Choose the target for back up restoration” window appears.</td></tr>
</table>

<table>
<tr><th>Step</th><th>Action</th></tr>
<tr><td>12</td><td>In the “Where to Restore” panel, select the location to which you want to restore the SnapManager backup.
 

<table>
<tr><th>If...</th><th>Then...</th></tr>
<tr><td>You want to restore to the same storage group</td><td>Select the “Restore back to the same Storage Group” option.</td></tr>
<tr><td>You want to restore to the recovery storage group</td><td>Select the Restore to the Recovery Storage Group option.

For more information, see “Restoring to a recovery storage group” on page 226.</td></tr>
</table></td></tr>
<tr><td>13</td><td>Click Next.

Result: The “Choose the items to be restored” window appears.</td></tr>
</table>

<table>
<tr><th>Step</th><th>Action</th></tr>
<tr><td>14</td><td>Select the check boxes corresponding to the production databases and the LCR replica databases that you want to restore.
 

Note
All databases that reside in the same LUN must be restored together.</td></tr>
<tr><td>15</td><td>Click Next.
Result: The Type of Restore window appears.</td></tr>
<tr><td>16</td><td>Select the type of restore option.
<table>
<tr><th>If…</th><th>Then…</th></tr>
<tr><td>You want an up-to-the-minute restore</td><td>Select the Up-to-the-Minute Restore option.</td></tr>
<tr><td>You want a point-in-time restore</td><td>Select the Point-in-Time Restore option.</td></tr>
</table></td></tr>
<tr><td>17</td><td>Click Next.
Result: The Test Restore window appears.</td></tr>
</table>

<table>
<tr><th>Step</th><th colspan="2">Action</th></tr>
<tr><td rowspan="3">18</td><td colspan="2">Select whether the restore process is a test restore or a restore.</td></tr>
<tr><td>If…</td><td>Then…</td></tr>
<tr><td>This is a test restore process</td><td>Click the Test Restore button and continue to Step 12.

Result: The Select Test Restore Options window is displayed.</td></tr>
<tr><td>This is not a test restore process</td><td>Click the Restore button and skip to Step 13.

Result: The Restore Status window, showing the tasks that are performed for this restore process is displayed.</td></tr>
<tr><td>19</td><td colspan="2">In the Select Test Restore Options window, do either of the following:
◆ Select whether you want to check the current logs (for up-to-the-minute restores only) and run database verification, and then click OK.
◆ Select whether you want to “verify databases and transaction logs on available destination volumes” and then click OK.

Result: The “Restore Status” window, showing the tasks that are performed for this restore process is displayed.</td></tr>
<tr><td>20</td><td colspan="2">Click Next.

Result: The “Verify options” window appears.</td></tr>
<tr><td>21</td><td colspan="2">If you do not want to perform exhaustive verification of the transaction log sequence and database metadata before the restore process, clear the Verify Transaction Log Sequence and Database Metadata Before Restore and Exhaustive Verification check boxes.

For more information about these options, see “Transaction log sequence verification options” on page 206.</td></tr>
</table>

<table>
<tr><th>Step</th><th colspan="2">Action</th></tr>
<tr><td>22</td><td colspan="2">Click Next.

Result: The Mount Options window appears.</td></tr>
<tr><td>23</td><td colspan="2">In the Mount Options window, perform the following steps based on your requirement.</td></tr>
<tr><td></td><td>If...</td><td>Then...</td></tr>
<tr><td></td><td>You want SnapManager to automatically recover and remount your restored databases immediately after the restore process</td><td>Select the Mount Database Automatically After Restore check box.</td></tr>
<tr><td></td><td>You want to verify the database settings</td><td>Click Verification Settings.

Result: The Database Verification Settings window appears.</td></tr>
<tr><td>24</td><td colspan="2">Click Next.

Result: The Confirm the set of operations window appears.</td></tr>
<tr><td>25</td><td colspan="2">Verify the restore settings and then click Finish.

Result: The Restore Status window appears.</td></tr>
<tr><td>26</td><td colspan="2">To start the restore process, click Start Now.

Result: Your database or storage groups are restored from the backup you selected.

Note
Database restore operation from LCR replica storage group replaces the database and log file paths, but retains the snapinfo directory path of original storage group.</td></tr>
</table>

Recovering an LCR-enabled storage group from corruption

When corruption occurs in a storage group that is LCR enabled, you should consult Microsoft Exchange Server documentation and use a Microsoft recommended method to recover a storage group. If an LCR recovery fails, you might want to consider using a backup to restore the storage group.

Note

SnapManager restores the database from a backup created from another LCR location to its own LCR location. After restoring the backup created on an LCR location, the location of the production database changes to the previous LCR location and the LCR is disabled.

Restoring to a recovery storage group

A recovery storage group enables you to mount a second copy of an Exchange mailbox store onto a production Exchange Server 2003 or Exchange Server 2007 when the original store is still running and serving to the Exchange clients. A recovery storage group is highly useful in the disaster recovery process.

In the normal Exchange recovery process, you need to manually create the recovery storage group and add the Exchange mailbox store through Exchange System Manager (ESM) on Exchange Server 2003 or through management shell cmdlets on Exchange Server 2007. You can then restore the mailbox from the backups created and stored in the recovery storage group.

SnapManager 4.0 for Exchange automates the mailbox store recovery process.

The following topics are covered in this section:

- "Restoring a database to the recovery storage group in Exchange Server 2007" on page 226
- "Restoring a database to the recovery storage group in Exchange Server 2003" on page 229
- "Disconnecting LUNs in a Snapshot copy mounted by a recovery storage group in Exchange Server 2003" on page 230
- "Restoring multiple databases to a recovery storage group" on page 232
- "Restoring unverified backup to the recovery storage group" on page 233
- "Command line support for the recovery storage group" on page 233
- "Limitations of using a recovery storage group" on page 233

Restoring a database to the recovery storage group in Exchange Server 2007

A recovery storage group allows you to restore databases from a backup, to extract the mailbox data, and to merge that data to the original storage group on the production server by using the Exchange Server Disaster Recovery Analyzer Tool (ExDRA) in Exchange Server 2007. SnapManager will perform only a point-in-time restore process to the recovery storage group during a restore operation.

To restore databases to the recovery storage group using the SnapManager Restore wizard in an Exchange Server 2007 environment, you need to specify the following details:

- In the "Choose the target for backup restoration" window, select the "Restore to Recovery storage group" option.

- In the “Choose the items to be restored” window, select the check boxes corresponding to the databases and LCR copies that you want to restore.

  Note

  SnapManager for Exchange does not display the public folder database in the Restore wizard. You cannot restore public folder databases to the recovery storage group.

- In the “Choose Recovery Storage Group” window, select the destination Exchange server to which you want to restore the SnapManager backup set.

  Note

  By default, the “Delete the existing storage group” check box is selected during the restore process and it will be deleted as part of the restore operation. SnapManager does not allow you to restore to an existing recovery storage group. If you try to restore to an existing recovery storage group, SnapManager does not allow you to proceed further and displays a warning message.

- Specify the name of the new recovery storage group to which you want to restore the selected backup sets. For more information about the SnapManager restore process, see “Restoring from a SnapManager backup” on page 211.

As part of the restore to the recovery storage group operation, SnapManager performs the following operations:

- Destroys the existing recovery storage group
- Creates a new recovery storage group
- Adds databases to the new recovery storage group
- Mounts databases on the new recovery storage group

Destroying a recovery storage group in Exchange Server 2007: With SnapManager 4.0, you can delete the recovery storage group. This feature is available through the following graphical user interface elements:

- Backup view

You can use the Backup view to destroy the recovery storage group.

To delete the recovery storage group using the SnapManager “Backup view” complete the following steps.

Step	Action

1	In the SnapManager main window, click Backup in the Scope pane. **Result:** SnapManager displays the list of storage groups in the Result pane and the corresponding actions against Backup in the Actions pane.
2	In the Backup window, select the recovery storage group that you want to delete.
3	Select Delete Storage Group in the Actions pane. **Result:** SnapManager performs the following actions: ❖ Dismounts the recovery storage group from Exchange Server 2007. ❖ Disconnects all the database LUNs in the Snapshot copy. ❖ Deletes the recovery storage group from the target Exchange Server 2007.

Creating a recovery storage group in Exchange Server 2007: A recovery storage group is created as part of the SnapManager restore operation. By default, SnapManager provides this group with a default recovery storage group name that is a combination of the original storage group name and -RSG appended to it.

For example, if the original storage group name is SG2, the recovery storage group name would be *SG2-RSG*.

You can change the default recovery storage group name either in the user interface or specify the name in the command line interface.

Adding databases to a recovery storage group in Exchange Server 2007: You can add databases to the recovery storage group using the Restore wizard during the SnapManager restore operation. To add databases to the recovery storage group, in the “Choose the items to be restored” window, select the check boxes corresponding to the databases and LCR copies that you want to restore to the recovery storage group.

Mount databases on a recovery storage group in Exchange Server 2007: When the Exchange Information Store service restarts, the databases in the recovery storage group will not be mounted automatically. To mount databases on a recovery storage group using SnapManager, select the “Mount databases automatically after the restore” check box in the “Mount Options” window in the Restore wizard.

Restoring a database to the recovery storage group in Exchange Server 2003

A recovery storage group allows you to mount a copy of a mailbox store onto a production Exchange Server 2003 server and to recover data within the restored mailbox store while the current store is running. During the Exchange recovery process, you need to manually create the recovery storage group and add a mailbox store by using the Exchange System Manager (ESM) on Exchange Server 2003.

Restoring databases to a recovery storage group in Exchange Server 2003 involves lot of manual intervention, because there is no application programming interface provided for creating and managing recovery storage groups.

Following are the key steps to restore databases to the recovery storage group in an Exchange Server 2003:

1. SnapManager mounts the databases and transaction log LUNs onto the Snapshot copy created by the selected backup.
2. SnapManager performs soft recovery on the databases during the restore operation.
3. You need to manually create the recovery storage group and add databases to it by using the ESM in Exchange Server 2003.

   To create a recovery storage group in Exchange Server 2003, complete the following steps.

Step	Action
1	In Exchange System Manager, right-click the server on which you intend to place the recovery storage group, point to New, and click Recovery Storage Group.
2	Name the recovery storage group, and set the transaction log location, and the system path location.
3	Click OK.

Note

SnapManager does not allow you to restore to an existing recovery storage group. You must delete the existing recovery storage group and disconnect all the database and log LUNs of the existing recovery storage group before you can restore a backup to a new recovery storage group.

To add the databases to a recovery storage group, complete the following steps.

Step	Action
1	In Exchange System Manager, find the server on which you created the recovery storage group, right-click the recovery storage group and then click *Add Database to Recover.* **Result:** Exchange automatically determines which databases can be added to the recovery storage group and presents you with a list from which to choose.
2	In the "Select database to recover" dialog box, click the database that you want to recover and then click OK. **Note** If the recovery storage group already contains a database, Exchange limits the list of databases to those in the same storage group as the database that has already been added to the recovery storage group.
3	Name the database, and define the paths for the database and streaming database files.
4	Click OK.

Disconnecting LUNs in a Snapshot copy mounted by a recovery storage group in Exchange Server 2003

To disconnect the LUNs of a recovery storage group in Exchange Server 2003, using SnapManager "Backup view", complete the following steps.

Step	Action
1	In the SnapManager main window, click Backup in the Scope pane. **Result:** SnapManager displays the list of storage groups in the Result pane and the corresponding actions against the Backup in the Actions pane.
2	In the Backup window, select the recovery storage group that you want to disconnect.

3	Select Disconnect LUNs in the Actions pane. **Result:** SnapManager disconnects all the database LUNs in the Snapshot copy that belongs to that recovery storage group. **Note** In Exchange Server 2003, SnapManager can only disconnect the LUNs; you need to use the Exchange System Manager (ESM) to delete the recovery storage group.

Restoring multiple databases to a recovery storage group

To restore multiple databases to a recovery storage group using SnapManager, complete the following steps.

Step	Action
1	From the Actions pane, launch the SnapManager Restore wizard. **Result:** The Welcome window appears.
2	Go to the "Choose the target for back up restoration" window.
3	In the Where to Restore panel, select the Restore to the Recovery Storage Group option.
4	Click Next. **Result:** The "Choose the items to be restored" window appears.
5	Select the check boxes corresponding to the production databases and the LCR replica databases that you want to restore. **Note** You cannot add a database from the "same storage group" into the existing recovery storage group. If you attempt to perform this operation, you can select all the databases that you want to recover, SnapManager will delete the existing recovery storage group and add selected databases to the newly created recovery storage group on Exchange Server 2007. In the case of Exchange Server 2003, SnapManager does not allow you to proceed if the recovery storage group exists. You need to manually remove the recovery storage group through ESM.
6	Follow the instructions in the Restore wizard to complete the restoration of multiple databases to a recovery storage group.

Restoring unverified backup to the recovery storage group

As a part of a normal restore process, SnapManager verifies the backup Snapshot copies prior to the actual restore operation.

If you need to perform a quick restoration of a SnapManager backup, you can select the "Override database verification requirement for restore" option. In such cases, SnapManager restores the unverified backup directly to the recovery storage group. To restore an unverified backup to the recovery storage group, complete the following steps.

Step	Action
1	In the Actions pane, select Backup Verification Settings. **Result:** The Database Verification Settings dialog box appears.
2	In the Database Verification Settings dialog box, click the Override Verification tab.
3	Select the "Override database verification requirement for restore" check box. **Attention** You are strongly advised to restore only from verified backups. For details, see "Importance of verifying databases to be restored" on page 206.
4	Select OK to enable the "Override database verification" option.

Command line support for the recovery storage group

You can restore databases to a recovery storage group by using the `restore-backup` cmdlet with appropriate parameter in the SnapManager command line interface. For more information, see Appendix A, "SnapManager Command-Line Reference," on page 323.

Limitations of using a recovery storage group

Following are some of the limitations that you should know when you work with recovery storage groups in SnapManager:

- You cannot restore a public folder store to the recovery storage group.
- You cannot create and destroy a recovery storage group on Exchange Server 2003 using SnapManager. You need to manually create and destroy a recovery storage group.

- You cannot use SnapManager to add, mount, and dismount databases in a recovery storage group on Exchange Server 2003. You need to add, mount, and dismount databases manually.
- You cannot perform up-to-the-minute database recovery to a recovery storage group.
- You cannot restore databases to a recovery storage group from the backups created by other backup utilities.
- You cannot change the configuration settings of a recovery storage group, such as renaming it and changing the database paths after creating it.

Restoring backups created at different Exchange server locations in Exchange 2007

This section explains how the SnapManager Restore wizard enables you to select the Exchange server locations on which the databases were backed, and restore the databases.

See the following topics for more information:

- "Restoring backups that were created on the same Exchange server" on page 235.
- "Restoring backups created on different Exchange servers" on page 235.
- "Restoring backups from an archive" on page 239.

Restoring backups that were created on the same Exchange server

You can restore the SnapManager backups that were created on the same Exchange server to either of the following locations:

- The same storage group
- The recovery storage group

For information about restoring to the recovery storage group, see "Restoring a database to the recovery storage group in Exchange Server 2007" on page 226.

Restoring backups created on different Exchange servers

If you choose to restore SnapManager backups created on different Exchange servers, you need to specify the required details in the "Exchange Servers where backups were created" window during the restore operation.

Note

In order to use the restore backup set created on another Exchange server for a particular storage group, all database LUNs, transaction log LUNs, and SnapInfo LUNs must be replicated to the destination.

To restore backups created on different Exchange servers, complete the following steps.

Step	Action
1	In the SnapManager main window, click Restore in the Scope pane. **Result:** SnapManager displays the list of storage groups in the Result pane and the corresponding actions the Restore in the Actions pane.
2	Click Restore Wizard in the Actions pane. **Result:** The Welcome window appears.
3	Go to the Which Exchange Server Created the Backups window.
4	Select the "Restore backup created on a different server" option.
5	Click Next. **Result:** The "Exchange Server Where Backups were created" window appears.
6	Select from the "Exchange Server where the databases were backed up" list the Exchange server to which the databases were backed up. By default, SnapManager restores the backups to the Exchange server on which the restore operation is initiated. To restore the backups from a different Exchange server to the Exchange server where the restore operation is initiated, you must first remap the source LUNs to the Exchange server on which the restore operation is initiated, using either the same drive letters or volume mount points (both drive letters and volume mount points) that were assigned for the original Exchange server.
7	In the "Enter the SnapInfo directory path of the backups" field, type the SnapInfo directory path.
8	Click Next. **Result:** The "Choose the backup you want to restore" window appears.
9	Select a backup that you want to restore.

10	Click Next. **Result:** The “Choose the target for back up restoration” window appears.
11	In the “Where to restore” panel, select a restore option. You can select either to restore to the same storage group or to the recovery storage group.

<table>
<tr><td>12</td><td colspan="2">Follow the instructions in the Restore wizard and go to “Mount Options” window.</td></tr>
<tr><td></td><td>If...</td><td>Then...</td></tr>
<tr><td></td><td>You want to recover and mount database after the restore process</td><td>Select the “Recover and mount database after restore” check box.</td></tr>
<tr><td></td><td>You want to associate all mailboxes in the newly restored databases to the currently connected Exchange server</td><td>Select the “update user accounts associated with mailboxes in restored databases to point to mailbox server with the new name” check box.

Note
If you restore the backup created on a different server and enable the “update user accounts associated with mailboxes in restored databases to point to mailbox server with the new name”, SnapManager for Exchange uses the Exchange cmdlet <code>Move-Mailbox -ConfigureOnly</code> internally to connect all of the mailboxes in the newly restored database to the currently connected Exchange server.

For information about restoring to the recovery storage group, see “Restoring a database to the recovery storage group in Exchange Server 2007” on page 226.</td></tr>
</table>

Restoring backups from an archive

To restore backups from an archive, complete the following steps.

Step	Action
1	In the SnapManager main window, click Restore in the Scope pane. **Result:** SnapManager displays the list of storage groups in the Result pane and the corresponding actions against the Restore in the Actions pane.
2	Click Restore Wizard in the Actions pane. **Result:** The Welcome window appears.
3	Go to the Which Exchange Server Created the Backups window.
4	Select the Restore from Archive option.
5	Click Next. **Result:** The "Exchange Server Where Backups were created" window appears.
6	Select from the Backup Exchange Server list the Exchange server on which the archive backup was originally created. **Note** While restoring from archive, restore the archived SnapInfo directory to a temporary location. This SnapInfo directory must be part of the same backup set as the restored LUN that contains the Exchange databases. The restored SnapInfo directory must have the SnapInfo file, and the .xml files.
7	In the "SnapInfo Directory Path" field, type the path of the SnapInfo directory.
8	Click Next. **Result:** The "Choose the backup that you want to restore" window appears.
9	Select a backup that you want to restore.

10	Click Next. **Result:** The “Choose the target for back up restoration” window appears.
11	In the “Where to restore” panel, select a restore option. You can select either to restore to the same storage group or the recovery storage group.

<table>
<tr><td>12</td><td colspan="2">Follow the instructions in the Restore wizard and go to the Mount Options window.</td></tr>
<tr><td></td><td>If...</td><td>Then...</td></tr>
<tr><td></td><td>You want to recover and mount database after the restore process</td><td>Select the “Recover and mount database after restore” check box.</td></tr>
<tr><td></td><td>You want to associate all mailboxes in the newly restored databases to the currently connected Exchange server</td><td>Select the “update user accounts associated with mailboxes in restored databases to point to mailbox server with the new name” check box.

Note
If you restore the backup created on a different server and enable the “update user accounts associated with mailboxes in restored databases to point to mailbox server with the new name”, SnapManager for Exchange uses the Exchange cmdlet <code>Move-Mailbox -ConfigureOnly</code> internally to connect all of the mailboxes in the newly restored database to the currently connected Exchange server.

For information about restoring to the recovery storage group, see “Restoring a database to the recovery storage group in Exchange Server 2007” on page 226.</td></tr>
</table>

Managing Backup and Restore Snapshot Copies 12

This section describes how to delete Exchange backup and restore Snapshot copies. The following topics are covered in this section:

- "Explicitly deleting storage group backups" on page 244
- "Explicitly deleting an individual backup" on page 252
- "Problem deleting backups due to busy Snapshot copy error" on page 254

Attention

Do not use SnapDrive or the storage system administration tools to delete Snapshot copies created by SnapManager. Doing so will leave behind unwanted data that cannot be removed.

Attention

You must run SnapManager from the system console, not from a Terminal Services client. Do not use Terminal Services for any type of SnapManager administration, because you might miss critical information that is displayed only in pop-up boxes at the system console.

Related topics:

- Chapter 9, "Understanding SnapManager Backup," on page 137
- Chapter 10, "Backing Up Databases with SnapManager," on page 165
- Chapter 11, "Restoring Databases Using SnapManager," on page 203

Explicitly deleting storage group backups

Use the "Delete backups" dialog box to explicitly delete multiple Snapshot copies from *one or more storage groups*. You can delete entire backup sets, only the SnapInfo Snapshot copies related to selected backup sets, or Snapshot copies created during previous restore operations. See the following topics for more information:

- "Explicitly deleting backups and SnapInfo Snapshot copies" on page 244
- "Explicitly deleting Snapshot copies created by SnapManager Restore" on page 249

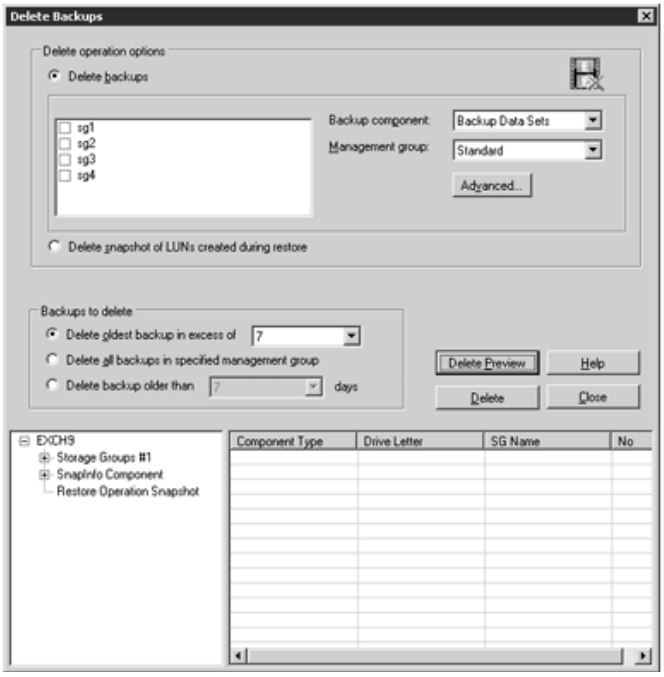
Note

To explicitly delete an individual backup, use the SnapManager Restore tab, as described in "Explicitly deleting an individual backup" on page 252.

Explicitly deleting backups and SnapInfo Snapshot copies

To explicitly delete backups (or only the SnapInfo Snapshot copies related to those backup sets) that contain one or more selected storage groups, complete the following steps.

Step	Action
1	In the SnapManager main window, select Action > Delete Backup. **Result:** The Delete Backups dialog box displays.
2	Select the Delete Backups option.

Step	Action
3	If you want to display a list of the backup components on your SnapManager system, double-click an backup component under the stoage group.  **Note** You cannot select an individual backup component for deletion using this list.
4	Select one or more storage group sets whose backups are to be deleted.

Step	Action
5	To expand the scope of the deletion to include backups that contain **only some** of the selected storage groups (in addition to backups that contain **all** of the selected storage groups), do the following: **a.** Click Advanced to open the "Advanced Options" dialog box. **b.** Select the "Delete backups that contain databases belonging to one or more of the selected storage groups" option. **Result:** For this backup deletion operation only, multiple backup deletions will delete backups containing any one or more of the selected databases. **Note** This option is useful only if you created backups that did not contain all storage groups in a storage group set. For easiest backup administration, it is best if you always back up an entire storage group set.

Step	Action
6	The Backup Component selection narrows the scope of the deletion by specifying the type of backup components to be deleted. This option is set to Backup Data Sets by default, so that you will delete entire backup sets, including related transaction logs and SnapInfo directories. You can narrow this selection further by selecting SnapInfo Snapshot copies Only. **Note** Usually you delete complete backup sets. However, if you need a way to free some space or reduce your Snapshot copy count without deleting a SnapManager backup, you can delete SnapInfo Snapshot copies without affecting the associated backup.
7	The Management Group selection further narrows the scope of the deletion by specifying the backup management group of the backups you want to delete. This option is set to Standard by default, but you can change it to Daily, Weekly, or All.
8	If you want to retain up-to-the-minute restore ability for older backups in other backup management groups, leave that option selected. To access this option, click Advanced to open the "Advanced Options" dialog box. ◆ If you select this option, transaction logs will be deleted *only from the specified backup management group*; transaction logs will not be deleted from other backup management groups. ◆ If you clear this option, transaction logs will be deleted *from other backup management groups* as well. **Note** If you selected All for the backup management group, this option has no effect and is disabled. For more information about this option, see "Option to retain up-to-the-minute restore ability" on page 157.

<table>
<tr><th>Step</th><th colspan="2">Action</th></tr>
<tr><td rowspan="4">9</td><td colspan="2">Use the “Backups to delete” panel to specify which backups, of those in the specified storage group and backup management group, that you want to delete.</td></tr>
<tr><td>If you want to delete…</td><td>Then…</td></tr>
<tr><td>The oldest backups so that only a specified number of backups remain for that backup management group (quantity-based deletion)</td><td>Do the following:
a. Select the “Delete oldest backups in excess of” option.
b. Specify how many of the newest backups in the specified backup management group you want to preserve.</td></tr>
<tr><td>All the backups in the specified backup management group</td><td>Select the “Delete all backups in the specified management group” option.</td></tr>
<tr><td>Only the backups that are older than a specified number of days (age-based deletion)</td><td>Do the following:
a. Select the “Delete backups older than” option.
b. Specify the number of days for which you want to keep the most recent backups.</td></tr>
</table>

Step	Action	
10	**If you want to…**	**Then…**
	See what backup components would be deleted with the parameters you have entered without deleting them	Click Delete Preview and proceed to Step 11. **Result:** The Delete Backup Data Set Preview window is displayed. After a moment, a count and list of the backup components identified for deletion are displayed.
	Delete the backup components	Click Delete. **Result:** The backup components identified by your selections are deleted. When the deletion is complete, a status popup is displayed. You have completed this procedure.
11	If, after previewing the deletion, you want to delete the backup components listed in the preview, click Delete on the Delete Backup Data Set Preview window. **Result:** The backup components listed in the preview window are deleted.	

Explicitly deleting Snapshot copies created by SnapManager Restore

To delete Snapshot copies created during previous restores, complete the following steps.

Note
This is the only way to delete Snapshot copies created by SnapManager Restore.

Step	Action
1	In the SnapManager main window, select Action > Delete Backup. **Result:** The Delete Backups dialog box displays.
2	Select the “Delete snapshot of LUNs created during restore” option.

<table>
<tr><th>Step</th><th colspan="2">Action</th></tr>
<tr><td>3</td><td colspan="2">If you want to display a list of the backup components on your SnapManager system, double-click an backup component under the stoage group.
Note
You cannot select an individual backup component for deletion using this list.</td></tr>
<tr><td>4</td><td colspan="2">Use the “Snapshots to delete” panel to specify which restore Snapshot copies you want to delete.</td></tr>
<tr><td></td><td>If you want to delete…</td><td>Then…</td></tr>
<tr><td></td><td>The oldest restore Snapshot copies so that only a specified number of backups remain (quantity-based deletion)</td><td>Do the following:
a. Select the “Delete oldest snapshots in excess of” option.
b. Specify how many of the newest restore Snapshot copies you want to preserve.</td></tr>
<tr><td></td><td>All the restore Snapshot copies</td><td>Select the “Delete all snapshots created during restore” option.</td></tr>
<tr><td></td><td>Only the restore Snapshot copies that are older than a specified number of days (age-based deletion)</td><td>Do the following:
a. Select the “Delete backups older than” option.
b. Specify the number of days for which you want to keep the most recent restore Snapshot copies.</td></tr>
</table>

<table>
<tr><th>Step</th><th colspan="2">Action</th></tr>
<tr><td rowspan="3">5</td><td>If you want to…</td><td>Then…</td></tr>
<tr><td>See what restore Snapshot copies would be deleted without deleting them</td><td>Click Delete Preview and proceed to Step 6.

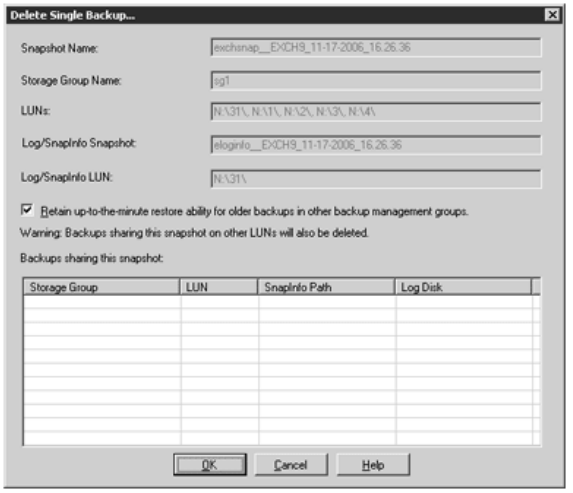
Result: The Delete Backup Data Set Preview dialog box appears. After a moment, a count and list of the restore Snapshot copies identified for deletion are displayed.</td></tr>
<tr><td>Delete the restore Snapshot copies</td><td>Click Delete.

Result: The restore Snapshot copies identified by your selections are deleted. When the deletion is complete, a status popup is displayed. You have completed this procedure.</td></tr>
<tr><td>6</td><td colspan="2">If, after previewing the deletion, you want to delete the restore Snapshot copies listed in the preview, click Delete on the Delete Backup Data Set Preview dialog box.

Result: The restore Snapshot copies listed in the preview window are deleted.</td></tr>
</table>

Explicitly deleting an individual backup

To delete an individual backup, complete the following steps.

Step	Action
1	Select the SnapManager Restore in the Actions pane.
2	Select the storage group (Store) in which the backup resides.
3	Click “Delete” option in the Actions pane. **Result:** The Delete Single Backup window appears.  **Note** You cannot delete the most recent backup for any storage group.
4	In the “Delete Single Backup” window, select the backups you want to delete.
5	Be sure to review the list of backups sharing this Snapshot copy; all of these backups will be deleted at the same time.

Step	Action
6	If you want to retain up-to-the-minute restore ability for older backups in other backup management groups, leave that option selected. ◆ If you select this option, transaction logs will be deleted *only from this backup management group*; transaction logs will not be deleted from other backup management groups. ◆ If you clear this option, transaction logs will be deleted *from other backup management groups* as well. For more information about this option, see "Option to retain up-to-the-minute restore ability" on page 157.
7	Click OK. **Result:** The backup is deleted.

Problem deleting backups due to busy Snapshot copy error

If you attempt to delete a backup and you get an error message saying that the Snapshot copy is busy and cannot be deleted, you have a backup that was taken of a LUN backed by another Snapshot copy. In this case, you need to delete the more recently taken backup before the older backup can be deleted.

To see if you have busy Snapshot copies, you can view your Snapshot copies in FilerView or use the storage system `snap list` command. For more information about deleting busy Snapshot copies, see the *System Administration Block Access Guide* for your version of Data ONTAP.

Note

To avoid this situation in the future, make sure that you do not take backups while you have any LUNs backed by Snapshot copies (for example, during a verification or while archiving from a LUN backed by a Snapshot copy). For more information about scheduling your SnapManager tasks, see "Recommendations for scheduling backups" on page 160.

Using StoreVault Replication with SnapManager 13

This section describes how SnapManager uses StoreVault Replication to enable you to replicate Exchange database backups to mirrored volumes and explains how integrity verification works for different SnapManager operations. The following topics are covered in this section:

- "Other documentation" on page 256
- "Understanding StoreVault Replication" on page 257
- "How SnapManager uses StoreVault Replication" on page 259
- "Scheduling StoreVault replication for SnapManager backups" on page 261

Other documentation

For more information about configuring and using StoreVault Replication, see the following guides:

- For an overview of StoreVault Replication—including a detailed explanation of what mirror volumes are, how they work, when to use or access data stored on a StoreVault Replication destination volume, and direction about how to set up and configure StoreVault Replication on a storage system—see *Data Protection: Online Backup and Recovery Guide* for your version of Data ONTAP.
- For details about how StoreVault Replication is used with SnapDrive to create a destination volume for replicating LUNs and for a description of StoreVault Replication—including reasons for using it and the benefits it offers—see your SnapDrive documentation.
- For details about how to connect to a LUN in a StoreVault Replication destination volume, see your SnapDrive documentation.
- For details about how to access Exchange data from mirrored volumes to recover from failure, see "Restoring your Exchange environment" on page 273.

Understanding StoreVault Replication

StoreVault Replication creates replicas of volumes hosting LUNs. StoreVault Replication mirrors a Snapshot copy of data on a source volume to one or more volumes configured as destinations of the source volume. StoreVault Replication can replicate a source volume to a destination volume on the same storage system or to a different storage system. When you use StoreVault Replication to replicate volumes from one storage system to another, the destination storage system can be in a different geographical location. This ability to duplicate data in different locations is a key component of a sound disaster recovery plan.

Data stored in a mirror on a destination volume can be accessed through SnapDrive. Because the mirror is volume wide, Snapshot copies of other data sets on the source volume are mirrored also.

StoreVault Replication updates the destination volumes to reflect incremental changes on the source volume. The result of this process is an online, read-only destination volume that contains the same data as the source at the time of the most recent update (using SnapManager Backup, in this case).

Attention

Because SnapManager uses StoreVault Replication in asynchronous mode, any disk writes that occurred on the source volume after the most recent StoreVault replication update are not available if a catastrophic failure occurs before the next update. This is because they were not replicated to the StoreVault Replication destination volume.

The following topics is covered in this section:

"Requirements for using StoreVault Replication with SnapManager" on page 257

Requirements for using StoreVault Replication with SnapManager

To use StoreVault Replication with SnapManager, you must have previously configured StoreVault Replication on both the source volume to be replicated and its destination volumes. How to complete these tasks is explained in your SnapDrive documentation. Your configuration must satisfy the following requirements:

- There must be one or more StoreVault Replication source volumes hosting LUNs.
- There must be one or more StoreVault Replication destination volumes for each source volume.

- The size of the destination volumes must be equal to or greater than the size of the source volume.
- StoreVault Replication licenses must be enabled on both the source and destination storage systems.
- You must manually configure and initialize the StoreVault Replication replication between source and destination volumes.
- You must disable the StoreVault Replication schedule on your storage system.
- You must configure the StoreVault Replication as asynchronous.

How SnapManager uses StoreVault Replication

The following topics are covered in this section:

- "When StoreVault Replication updates occur" on page 259
- "StoreVault replication type" on page 259
- "StoreVault replication unit" on page 259
- "How StoreVault Replication works" on page 259

When StoreVault Replication updates occur

If Exchange data backed up by SnapManager resides in a volume that is configured as a StoreVault Replication source volume with one or more appropriately configured destination volumes, a SnapManager backup of an Exchange database stored on that volume causes SnapDrive to request a StoreVault Replication update for that volume. The schedule you define for backups sets the schedule for mirror replication.

StoreVault replication type

When you use StoreVault Replication to replicate SnapManager backups, StoreVault replication is asynchronous. This means that changes made between SnapManager backups are not reflected in the StoreVault Replication target volume, and any restore from the target volume would restore the databases to their state at the time of the last SnapManager backup. However, you can use SnapDrive to minimize the time between StoreVault Replication replications.

For more information about scheduling your StoreVault replications, see "Scheduling StoreVault replication for SnapManager backups" on page 261.

StoreVault replication unit

When you use StoreVault Replication to replicate SnapManager backups, you can replicate only volumes, not qtrees. StoreVault Replication qtree replication is not supported by SnapManager.

How StoreVault Replication works

In previous releases of SnapManager for Microsoft Exchange, the StoreVault Replication mirror update was always initiated for each Snapshot copy as it was taken. This approach resulted in redundant mirror updates. With SnapManager 3.0 for Microsoft Exchange and later, the mirror update request is delayed until SnapManager explicitly requests it, after the SnapManager backup is complete.

Note

If you do not want the StoreVault Replication destination volume to be updated after a backup is made, you can override the update using the Backup wizard or the Backup tab.

The following table provides an overview of how StoreVault Replication destination replication works.

Stage	Process
1	Configure StoreVault Replication relationship between source volumes and destination volumes. Create a Custom schedule with schedule parameters ("- - - -"). Initialize the Mirror to perform initial transfer of contents from source volume to destination volume
2	Select the "Update StoreVault Replication after operation" option for the operation.
3	If any volume whose data is captured in the backup is a StoreVault Replication source volume, SnapDrive requests information about all StoreVault Replication destination volumes for the source volume.
4	SnapDrive sends a StoreVault Replication destination update request to all the related destination volumes.
5	StoreVault Replication updates the destination volumes to reflect incremental changes on the source volume.

Scheduling StoreVault replication for SnapManager backups

The following topics are covered in this section:

- "Replication scheduling considerations" on page 261
- "Advantages of SnapDrive rolling Snapshot copies" on page 261
- "Scheduling replication for SnapManager using both SnapManager and SnapDrive" on page 262
- "Setting a StoreVault replication schedule" on page 264
- "Example schedule" on page 265

Replication scheduling considerations

When you configure the storage system volume containing your Exchange data as a StoreVault Replication source volume, every time a SnapManager backup is taken, the StoreVault Replication destination volume is optionally updated.

Taken alone, this schedule might not provide an optimal StoreVault replication schedule. This is because any changes that occur between replications are not replicated to the destination volume until the next replication update. Any restore from the destination volume would restore the Exchange data to its state at the last backup time; subsequent changes to the Exchange data store would not be restored.

Rather than increasing the frequency of SnapManager backups, you can use the rolling Snapshot copy capability of SnapDrive to provide frequent replication of the LUNs that contain the Exchange transaction logs. With more current transaction logs, a restore from the destination volume replays the transaction logs, resulting in an up-to-the-minute restore for the time of the last transaction log update. This method enables you to keep your destination volume more current without running the risk of overlapping your SnapManager operations.

Advantages of SnapDrive rolling Snapshot copies

When you use the SnapDrive update mirror, special Snapshot copies called rolling Snapshot copies are used. These Snapshot copies are created only for StoreVault replication. For more information about rolling Snapshot copies, see your SnapDrive documentation.

There are three major advantages to using SnapDrive rolling Snapshot copies to augment your StoreVault replication schedule for SnapManager:

- Fewer changes are made to the Exchange data between replications.

When you use SnapDrive to initiate frequent updates to the transaction logs, a restore from the destination volume replays the transaction logs, resulting in an up-to-the-minute restore for the time of the last transaction log update.

- Fewer SnapManager backups are required.

  It is not recommended to take SnapManager backups every few minutes. This can result in overlapping SnapManager operations and more difficulty managing the large number of resulting backups.

- Fewer Snapshot copies are retained.

  A maximum of two rolling Snapshot copies are retained at any time.

Scheduling replication for SnapManager using both SnapManager and SnapDrive

To create a StoreVault replication schedule for your SnapManager backups using both SnapManager and the SnapDrive command-line interface tool (`sdcli`), complete the following steps.

Step	Action
1	Configure a mirror on the storage system for the volume occupied by the LUNs backed up by SnapManager. Create an empty replication schedule ("- - - -") where you would normally enter the schedule parameters. See "Setting a StoreVault replication schedule" for an example.
2	Schedule your SnapManager backups according to your local requirements, using either the SnapManager Backup wizard or the Backup window. For more information about SnapManager backup schedules, see "Recommendations for scheduling backups" on page 160 and "Backing up databases" on page 166.

Step	Action
3	Add the `sdcli` command to the Windows Scheduled Tasks using the appropriate command-line switches. Take the following requirements into account: ◆ You must know the letter of the drive where the transaction logs reside. ◆ The task must run under the same account as the SnapDrive service. **Example:** The following command can be scheduled successfully on the local host, assuming that Z: is the drive where the transaction logs reside: `sdcli snap update_mirror -d Z` For more information about `sdcli`, see your SnapDrive documentation.

Setting a StoreVault replication schedule

The following table summarizes the steps involved in creating and initializing a StoreVault replication schedule using FilerView.

Step	Action
1	Launch the FilerView application. **Result:** The FilerVolume Administration window appears.
2	Click to expand Volumes, in the left pane. **Result:** The application displays all the options that you can perform with volumes.
3	Click Manage. **Result:** The Manage Volumes window appears.
4	Select the check box corresponding to the volume that you want to manage.
5	Click Restrict.
6	Click StoreVault Replication in the left pane. **Result:** The application displays the source storage system, destination storage system, and the operations that you can perform on that StoreVault Replication instance.
7	Click Add. **Result:** The Add StoreVault Replication Entry window appears.
8	Select the destination volume from the list.
9	Select the qtree, if required.
10	Enter the StoreVault Replication source location and storage system.
11	In the “Restart Mode” list, select how to restart the transfer.
12	In the “Maximum Transfer Rate” text box, type the data transfer limit.
13	In the “Schedule” list, select either Preset schedule or Custom schedule.
14	Click Add to include a StoreVault Replication entry in the filer.

Step	Action
15	Click Advanced. **Result:** The application displays the StoreVault Replication settings, status, and corresponding details.
16	Click Initialize. **Result:** StoreVault Replication status becomes StoreVault replicated.

Example schedule

The following table shows an example of a schedule documenting the additional intervals when the volume containing the transaction logs is replicated. The schedule shown in this table allows for a thirty-minute elapse time between the SnapManager backup and the transaction logs drive replication.

You might need to adjust the timings in this example for your environment to account for these requirements:

- The first supplemental replication after the backup must not begin before the backup is complete, including verification, and the ensuing StoreVault Replication volume update is also complete.
- The subsequent supplemental replications must not begin before the previous supplemental replication is complete.

Regularly scheduled SnapManager backup	Supplemental StoreVault replication of transaction logs
7:00 a.m.	7:30 a.m. 8:30 a.m. 9:30 a.m. 10:30 a.m. 11:30 a.m. 12:30 p.m.

Regularly scheduled SnapManager backup	Supplemental StoreVault replication of transaction logs
1:00 p.m.	1:30 p.m. 2:30 p.m. 3:30 p.m. 4:30 p.m. 5:30 p.m. 6:30 p.m. 7:30 p.m. 8:30 p.m. 9:30 p.m.
10:00 p.m.	10:30 p.m.

Performing Disaster Recovery with SnapManager 14

This section describes how you can prepare for disaster, and then use SnapManager and either StoreVault Replication or archiving to restore Exchange databases that were destroyed or compromised because of catastrophic conditions. The following topics are covered in this section:

- "Guides you should read and have at hand" on page 268
- "Preparing for disaster recovery" on page 269
- "Restoring your Exchange environment" on page 273

Guides you should read and have at hand

In addition to this guide, you should be familiar with the following guides and have them at hand, available for reference during disaster recovery:

- For information about how to connect to and use the LUNs stored in a mirrored destination volume, see your SnapDrive documentation.
- For information about administering Data ONTAP, see the *System Administration Storage Management Guide* for your version of Data ONTAP.
- For information about data replication using StoreVault Replication, see the *System Administration Data Protection Guide* for your version of Data ONTAP.
- For detailed information about disaster preparedness and recovery for Microsoft Exchange Server, see the following document published by Microsoft Corporation:
  - For Exchange Server 2003, see *Exchange Server 2003 Disaster Recovery Operations Guide*. This TechNet guide is available on the Microsoft Web site from a link in Knowledge Base article 867704.
- For additional information about disaster recovery in the Microsoft environment, see
  - Microsoft Windows documentation
  - Microsoft Exchange documentation

Preparing for disaster recovery

Preparing for disaster ahead of time is key to recovering from it.

- "Overview" on page 269
- "Backing up your Exchange environment" on page 271
- "Replicating your Exchange Server environment" on page 271

Overview

The first steps to recovery from catastrophic failure of an Exchange database or storage system should take place long before the event occurs.

Recommendations for disaster recovery preparation: Every environment and site is unique and every company has different requirements, depending on the amount of time recovery can take, archiving resources, and other factors. Taking these differences into account, consider the following general disaster recovery preparation recommendations:

- If you are using StoreVault Replication to replicate your data, keep the storage system storing the destination StoreVault Replication volumes in a different physical location than your primary production system. In extreme cases, an entire site can be destroyed in a catastrophic event.
- If you are using archiving, the archive media, such as a NearStore® system or tape, should be located off site.
- Instate a policy of redundant knowledge by ensuring that more than one person knows how to restore the system.
- Record your Exchange data configuration, and keep detailed records and logs of changes you make to your Windows and Exchange environments. Keep hardcopy duplicates of these records off site.

Components required to restore your environment: To be able to reconstruct your Exchange environment after a catastrophic failure, you must be able to recover the following three components:

- Windows environment

  You can either back up or replicate your Windows environment.

  For more information about backing up your Windows environment, see "Backing up your Exchange environment" on page 271.

  For more information about replicating your Windows environment, see "Replicating your Exchange Server environment" on page 271.
- Exchange server

You can either back up your Exchange server or reconstruct it using the Exchange recovery mode. To be able to reconstruct your Exchange server, you must have restored or replicated your Windows environment exactly.

For more information about backing up your Exchange server, see "Replicating your Exchange Server environment" on page 271.

- Exchange data

  You use SnapManager for Microsoft Exchange to create backups of your Exchange data, then move that data off site, either by archiving those backups or using StoreVault Replication to replicate them to another storage system at a remote site.

Two methods to get Exchange data off site: You can use either of these methods to get your Exchange data off site for disaster recovery:

- You can use StoreVault Replication to replicate your storage system data to a storage system in another location.

  For more information about using StoreVault Replication with SnapManager, see "Using StoreVault Replication with SnapManager" on page 255.

- You can archive the data to physical media, such as tapes, and store that media off site.

  For more information about archiving Exchange data, see "Archiving SnapManager Backups" on page 293.

If you're unsure which method to use, see the following table, which outlines advantages and disadvantages of each method:

Method to get Exchange data off site	Advantages	Disadvantages
Using StoreVault Replication	◆ Restoring from a StoreVault Replication destination is significantly faster than restoring from tape. ◆ The destination can be updated more frequently than tape, resulting in more current archives.	◆ Another storage system is required in the remote location. ◆ WAN connectivity to the remote location is required.

Method to get Exchange data off site	Advantages	Disadvantages
Archiving SnapManager backups	◆ The required equipment might already be available and in use.	◆ Restoring from tape is significantly slower than restoring from a storage system. ◆ Tapes must be stored and managed.

Backing up your Exchange environment

To be able to reconstruct your Exchange environment after a catastrophic failure, you must be able to restore both your Windows environment and your Exchange server.

Backing up your Windows environment: SnapManager for Microsoft Exchange, the Exchange server, and the storage systems are dependent on the Windows environment. Before you can use any of the processes in this section, the Windows environment must be completely restored. Therefore, it is important that you back up your Windows environment so that you can restore the same state as part of the recovery process.

To back up your Windows environment, you must complete, at a minimum, the following high-level process.

Task	Process
1	Back up your Exchange server, including your Windows operating system and any applications running concurrently with the Exchange server.
2	Use your backup utility to create and maintain a current emergency repair disk (ERD).

Replicating your Exchange Server environment

If you want the ability to recover from a total site outage in a minimum amount of time, you can replicate your Exchange Server 2003 environment to a remote site. Then, if the primary site is destroyed, you can re-create your Exchange environment on the replicated site.

Note the following facts about this site configuration:

- The Windows environment (Active Directory, Domain Controller, etc.) is replicated through the Wide Area Network (WAN) to the replicated site.

  For more information about replicating your Windows environment and using a replicated environment to recover from a disaster, see your Windows documentation.

- The Exchange data on the storage system is replicated using StoreVault Replication to a storage system on the replicated site.

  For more information about setting up StoreVault Replication, see your Data ONTAP *System Administration Data Protection Guide.*

Restoring your Exchange environment

This topic describes the recovery from catastrophic loss of a SnapManager for Exchange environment:

- "Overview" on page 273
- "Recovering Exchange data using archives" on page 276
- "Recovering Exchange data using StoreVault Replication" on page 280
- "Restoring a storage system volume using SnapManager backup archives" on page 282
- "Recovering a failed Exchange server" on page 283
- "About recovering both a failed storage system and a failed Exchange server" on page 286
- "Recovering both a failed storage system and Exchange server using StoreVault Replication" on page 287
- "Recovering both a failed storage system and Exchange server using archiving" on page 291

Overview

The following paragraphs outline the process of recovering from catastrophic loss of a SnapManager for Exchange environment.

Exchange environment recovery processes: Recovery from catastrophic loss of an Exchange environment that integrates SnapManager for Microsoft Exchange and storage systems is outlined in the following process.

Task	Process
1	Recovering the Windows environment All procedures in this document assume that you already recovered your Windows environment. For more information about recovering your Windows environment, see the Microsoft documentation listed in "Guides you should read and have at hand" on page 268.
2	Recovering the Exchange server This process is performed using the backup application you used to back up the Exchange server.

Task	Process
3	Recovering the Exchange databases This process is performed using SnapManager for Microsoft Exchange.

A SnapManager for Exchange restore from archive operation should be considered a "point-in-time" restore: A SnapManager for Exchange restore from archive operation is typically considered a point-in-time restore based on the time that the backup was created by SnapManager, regardless of whether the "Up-to-the-minute restore" option or the "Point-in-time restore" option was selected on the SnapManager Restore tab.

For a SnapManager up-to-the-minute restore operation to successfully restore an Exchange database up to the point of failure, a contiguous set of Exchange transaction log files that were generated between the time that the archived backup set was created and the time that the failure occurred would need to be available to SnapManager. This means that all SnapManager backups taken after the archived backup was created need to be online and available, in addition to any transaction logs that were generated between the time of the most recent SnapManager backup and the time of the failure.

The reason that a restore from archive is considered a point-in-time restore is that a restore from archive operation is typically performed when none of the SnapManager online backups are available or usable. Selecting the "Up-to-the-minute restore" option instructs SnapManager to use any contiguous log files that it can find to perform the restore. If it does not find any logs in addition to the logs captured by the backup which is being restored, then the restore will still succeed. The SnapManager restore report that is generated as part of the restore operation will include the file names of the Exchange transaction log files that were restored.

Rules and guidelines for disaster recovery: Before you perform disaster recovery using SnapManager for Microsoft Exchange, make sure that you understand the following rules and guidelines:

- If you archive only your database LUNs (and not the LUN containing the transaction logs), you will only be able to perform a point-in-time restore. The Exchange databases will be restored back to the time when the backup was created. Changes made to the databases after this time cannot be recovered.
- If you archive and restore your transaction log LUN along with the database LUNs, and the transaction log LUN contains transaction logs that

accumulated after the archived backup was created, then you have the option of selecting an up-to-the-minute restore. In this case, the database would be restored up to the time when the archive was created. Changes made to the database after the archive was created cannot be recovered.

- If you are using StoreVault Replication, you can use an up-to-the-minute restore to restore your databases to the point in time of the last StoreVault replication to the target volume containing the transaction logs LUN.
- If you are restoring from an archive, the LUN files from the archive must be restored into their original location in the active file system of the storage system's volume.
- The drive letters assigned to the LUNs that are restored must be the same drive letters that were used when the archive was created.
- You cannot recover a LUN or transaction logs into a read-only file system, such as a Snapshot copy.
- For SnapManager Restore to work properly, SnapManager for Microsoft Exchange must be licensed on the storage system that stores the Exchange databases or the local Windows machine running SnapManager.
- For SnapManager Restore to work properly, SnapRestore must be licensed on the storage system that stores the Exchange databases.
- The recovery processes in this guide do not address a large-scale disaster in which supporting Windows infrastructure, such as Active Directory and DNS, is damaged or lost. Before attempting recovery of the Exchange server or the storage system, you must recover the supporting infrastructure.

Which recovery procedure to use: You can use the following table to determine which recovery process most closely matches your needs.

If…	Then use…
You want to recover Exchange databases from a StoreVault Replication destination volume	"Recovering Exchange data using StoreVault Replication" on page 280
Your Exchange server is online and you want to recover Exchange databases from archive	"Recovering Exchange data using archives" on page 276
Your storage system volume has failed or been destroyed and you used archiving	"Restoring a storage system volume using SnapManager backup archives" on page 282

If…	Then use…
Your Exchange server has failed or been destroyed	"Recovering a failed Exchange server" on page 283
Both your Exchange server and your storage system have failed and you want to recover on the same hardware	The applicable procedure: ◆ "About recovering both a failed storage system and a failed Exchange server" on page 286 ◆ "Recovering both a failed storage system and Exchange server using StoreVault Replication" on page 287 ◆ "Recovering both a failed storage system and Exchange server using archiving" on page 291

Recovering Exchange data using archives

To restore the Exchange databases from an archive of a SnapManager backup set, complete the following steps.

Step	Action
Prepare your environment	
1	Identify and locate the archived backup set that you want to restore.
2	If your Exchange databases are still mounted, dismount all databases belonging to the storage group to be restored.
3	Note the drive letter belonging to the storage group to be restored from archive.
4	As an extra safety measure, use SnapDrive to manually create a Snapshot copy of the LUNs to be restored from archive.
5	Use SnapDrive to delete the LUNs to be restored to avoid a file name conflict when the LUNs are restored from archive.
Restore storage system data	

Step	Action
6	Using the archive tool you used to create the archive, restore the archived LUNs to the storage system volume.
7	Use SnapDrive to connect to the restored LUNs, using the same drive letters you used before.
8	Verify that the reconnected LUNs are accessible.
9	Restore the SnapInfo directory and all of its contents from the archive to a temporary location accessible from the SnapManager host. SnapManager requires the SnapInfo directory to restore from the archive, and will request this location in a later step. **Note** You might have archived only the SnapInfo directory or the entire LUN containing it. In either case, you now need access only to the SnapInfo directory on that LUN or to a copy of the SnapInfo directory.
Restore Exchange data	
10	Exit SnapManager if it is running, and click Restore Wizard in the Actions pane. **Result:** The SnapManager Restore wizard appears.
11	Go to “Which Exchange Server Created the Backups” window and select “Restore from Archive” option.
12	Click Next. **Result:** The Restore from Archive window appears.
13	In Restore from Archive window, select a Backup Exchange Server from the list.

Step	Action
14	In the SnapInfo Directory_Path, enter or browse to the path where the SnapInfo directory was restored. The path to the restored SnapInfo directory includes the following components: *\SME_snapinfo\server_name\storage_group_name\snapshot_name.* The *snapshot_name* should be the same name as the Snapshot copy from which the LUN file for the database was archived.
15	Click Next. **Result:** The "Choose the backup that you want to restore" window appears.
16	In "Choose the backup that you want to restore" window, double-click to select a backup under the storage group that you want to restore. If the backup is not verified, you are prompted whether to verify it. **Note** You can override the verification requirement; however, you are strongly advised to use only verified backups for restore.
17	Click Next. **Result:** The "Choose the target for back up restoration" window appears.
18	In Where to Restore panel, select a restore option.
19	Click Next. **Result:** The "Choose the items to be restored" window appears.
20	In the "Choose the items to be restored" window, select the databases and LCR copies that you want to restore.
21	Click Next. **Result:** The "Type of Restore" window appears.

Step	Action
22	Select a type of restore that you want to perform: ◆ Up-to the minute restore ◆ Point in time restore
23	Click Next. **Result:** The Test Restore window appears.
24	In Test Restore window, specify if this is an actual restore or test restore.
25	Click Next. **Result:** The Verify Options window appears.
26	In Verify Options window, if you want to verify the transaction log sequence and database metadata before restore, select the following check boxes: ◆ Verify transaction log sequence and database metadata before restore ◆ Exhaustive verification
27	Click Next. **Result:** The Mount Options window appears.
28	In Mount Options window, if you want the restored databases mounted after the restore process, select the following check boxes: ◆ Mount databases automatically after the restore ◆ Update user accounts associated with mailboxes in restored databases to point to mailbox server with the new name
29	Click Next. **Result:** The continuation of Mount Options window appears.
30	In the continuation of Mount Options window, click Verification Settings, if you want to verify the database integrity of the backups that you have selected.

Step	Action
31	Click Next. **Result:** The Confirm the set of operations window appears.
32	In Confirm the set of operations window, verify the restore operation settings and click Finish to proceed with the restore process. **Result:** The Restore Status window appears.
33	Click Start Now to begin the restore process.
34	After the restore is complete, launch the Outlook® client and verify that your data was properly restored and that the Exchange server is operating correctly.
35	Perform a SnapManager backup and verification to verify that your restored database is free of physical-level corruption.

Recovering Exchange data using StoreVault Replication

This section explains how to recover LUNs from a failed volume on a storage system or a failed storage system using StoreVault Replication. These LUNs contain the Snapshot copies of the databases to be restored.

You can configure StoreVault Replication to use a destination volume on the same storage system or a different, remote storage system. Whether the destination volume is on the same storage system as the failed volume or a different one, the procedure you follow to recover is largely the same.

To recover Exchange data using a StoreVault Replication destination volume, complete the following steps.

Step	Action
1	Identify the destination mirror volume so that you know the volume to mount when you encounter that step.

Step	Action
2	Ensure that the storage system hosting the StoreVault Replication destination volumes is online and that the volumes are available and shared through CIFS. For information about creating CIFS shares, see your SnapDrive documentation. For information about general storage system administration, see your *Data ONTAP System Administration Storage Management Guide.*
3	Make sure that all databases that are stored on LUNs on the failed volume are dismounted. For information about dismounting stores, see the Microsoft Exchange documentation.
4	From the SnapDrive MMC, disconnect the LUNs that resided on the failed volume. Take note of the drive letters or mount points that were used for these disks. For information about disconnecting LUNs, see your SnapDrive documentation. **Note** If you are unable to disconnect a LUN, it might contain databases that are still online, or there could be another application that is still accessing that LUN.

Step	Action
5	From the SnapDrive MMC or command-line interface, connect to the LUN files in the active file system of the StoreVault Replication destination volume. SnapDrive will also break the mirror during this process. **Note** Do not mount the Exchange databases yet. The SnapManager Restore process mounts the databases. If you get an error when connecting, such as "Disk is in exclusive use," use FilerView to ensure that the LUN is unmapped from all igroups and online. For information about connecting LUNs, see your SnapDrive documentation. **Result:** The LUN is automatically restored using the most recent Snapshot copy (which could have been created by SnapDrive or SnapManager).
6	Run SnapManager and use SnapManager Restore to restore the most recent backup for each storage group. For more information about using SnapManager Restore, see "Restoring Databases Using SnapManager" on page 203.
7	Launch the Outlook client and verify that your data was properly restored and that the Exchange server is operating correctly.
8	Perform a SnapManager backup and verification to verify that your restored database is free of physical-level corruption.

Restoring a storage system volume using SnapManager backup archives

This scenario explains how to recover LUNs from a failed storage system volume or a failed storage system using archived SnapManager backups.

To recover a failed storage system volume using SnapManager backup archives, complete the following steps.

Step	Action
1	Recover the storage system so that it is online and available. For information about bringing the storage system online and making it available to your client, see the *Software Setup Guide* and *System Administration Storage Management Guide* for your version of Data ONTAP.
2	Prepare the archive media and the backup application so that they are ready to be used for the recovery. If you are using a NearStore system, ensure that the data is accessible.
3	Perform the procedure for archive recovery described in "Recovering Exchange data using archives" on page 276.

Recovering a failed Exchange server

To recover an Exchange server, you must use NTBackup or a third-party backup and restore application, relying on its documentation for direction. To recover the Exchange databases, you use SnapManager.

This procedure assumes that backups of the Exchange server were made; it also assumes that the most recent backup includes the system state of the Exchange server just before the disaster occurred.

Recovering a failed Exchange Server 2003: To recover a failed Exchange Server 2003, complete the following steps.

If you are restoring to a different hardware, see the Microsoft Knowledge Base article 822945 for Exchange Server 2003.

Steps	Action
1	Ensure that the storage system is online and that the volumes containing the LUN files are available across CIFS. For information about creating CIFS shares, see your SnapDrive documentation. For information about general storage system administration, see the *System Administration Storage Management Guide* for your version of Data ONTAP.

<table>
<tr><th>Steps</th><th colspan="2">Action</th></tr>
<tr><td rowspan="4">2</td><td colspan="2">The server you restore Exchange on does not need to be the same hardware you were running Exchange on before the disaster. However, it must have the same name as the previous Exchange server, and it must have sufficient capacity.</td></tr>
<tr><td>If…</td><td>Then…</td></tr>
<tr><td>You are restoring your Exchange server back to the same hardware</td><td>Proceed to Step 3.</td></tr>
<tr><td>You are restoring your Exchange server to a brand new server</td><td>Name the new server using the same name as the original Exchange server and proceed to Step 3.
Note
If you are restoring from tape, your new hardware configuration must match the old hardware configuration exactly, including interface cards and firmware versions.</td></tr>
<tr><td>3</td><td colspan="2">Perform a full restore of the Exchange server, without the Exchange databases, using the backup application you used to create the backup.
See the documentation for your backup software.</td></tr>
<tr><td rowspan="3">4</td><td>If...</td><td>Then...</td></tr>
<tr><td>Your backup software backed up the SnapDrive software</td><td>Proceed to Step 5.</td></tr>
<tr><td>Your backup software was not configured to back up the SnapDrive software</td><td>Reinstall the same version of SnapDrive used before the disaster occurred.
For information about installing SnapDrive, see your SnapDrive documentation.</td></tr>
</table>

<table>
<tr><th>Steps</th><th colspan="2">Action</th></tr>
<tr><td>5</td><td colspan="2">Using SnapDrive, connect the LUNs, or ensure that they are connected, and that you are using the same drive letters used before the disaster.</td></tr>
<tr><td>6</td><td>If...</td><td>Then...</td></tr>
<tr><td></td><td>Your backup software backed up the Exchange Server software</td><td>Proceed to Step 7.</td></tr>
<tr><td></td><td>Your backup software was not configured to back up the Exchange Server software</td><td>Install Exchange and any required Exchange service packs in disaster recovery mode.

For Exchange Server 2003, see the Microsoft Knowledge Base article 822945.

Note
Do not mount any storage groups yet.</td></tr>
</table>

<table>
<tr><th>Steps</th><th colspan="2">Action</th></tr>
<tr><td rowspan="3">7</td><td>If...</td><td>Then...</td></tr>
<tr><td>Your backup software backed up the SnapManager software</td><td>Proceed to Step 8.</td></tr>
<tr><td>Your backup software was not configured to back up the SnapManager software</td><td>Reinstall the same version of SnapManager used before the disaster and run the Configuration wizard to ensure that your configuration matches exactly the configuration used before the disaster.
Note
Because you are reconstructing your original configuration, no data is moved by the Configuration wizard. However, running the Configuration wizard is necessary for SnapManager to function correctly.</td></tr>
<tr><td>8</td><td colspan="2">Restore the most recent backup using SnapManager Restore.
For more information about using SnapManager Restore, see “Restoring Databases Using SnapManager” on page 203.</td></tr>
<tr><td>9</td><td colspan="2">Launch the Outlook client and verify that your data was properly restored and that the Exchange server is operating correctly.</td></tr>
<tr><td>10</td><td colspan="2">Perform a SnapManager backup and verification to verify that your restored database is free of physical-level corruption.</td></tr>
</table>

About recovering both a failed storage system and a failed Exchange server

If both the storage system and the Exchange server fail, in most cases, you should recover the storage system first so that the data—or the space to recover the data—is available.

Successful recovery of the Exchange server depends on the existence of following components:

- A recent, usable backup of the Exchange server or a replicated Windows environment to enable the re-creation of the Exchange server
- Archive of a recent, verified SnapManager backup set or StoreVault Replication destination volumes containing the SnapManager backup set

Which failed storage system and server recovery procedure to use:

The procedure you use to recover both a failed storage system and a failed Exchange server depends on whether you employed StoreVault Replication or archiving. Use the appropriate procedure, as follows.

If you employed…	Then use…
StoreVault Replication	"Recovering both a failed storage system and Exchange server using StoreVault Replication" on page 287
Archiving	"Recovering both a failed storage system and Exchange server using archiving" on page 291

Recovering both a failed storage system and Exchange server using StoreVault Replication

To recover both the storage system and the Exchange server using StoreVault replication, complete the following steps.

Step	Action
1	Ensure that the storage system hosting the SnapManager destination volumes is online and that the volumes are available and shared through CIFS. For information about creating CIFS shares, see your SnapDrive documentation. For information about general storage system administration, see the *Data ONTAP System Administration Storage Management Guide* for your version of Data ONTAP.

<table>
<tr><th>Step</th><th colspan="2">Action</th></tr>
<tr><td>2</td><td colspan="2">Perform a full restore of the Exchange server, without the Exchange databases, using the backup application you used to create the backup.

For more information about restoring your Exchange server, see the documentation for your backup software and the appropriate Microsoft disaster recovery document as described in “Guides you should read and have at hand” on page 268.</td></tr>
<tr><td rowspan="3">3</td><td>If...</td><td>Then...</td></tr>
<tr><td>Your backup software backed up SnapDrive</td><td>Proceed to Step 4.</td></tr>
<tr><td>Your backup software was not configured to back up SnapDrive</td><td>Reinstall the same version of SnapDrive used before the disaster occurred.

For information about installing SnapDrive, see your SnapDrive documentation.</td></tr>
</table>

Step	Action
4	From the MMC on the Exchange server, use SnapDrive to connect to the LUNs in the active file system of the StoreVault Replication destination volume. Make sure that you use the same drive letters for the same LUNs as your original configuration. **Note** Do not mount the Exchange databases yet. The SnapManager Restore process mounts the databases. If you get an error when connecting, such as "Disk is in exclusive use," use FilerView to ensure that the LUN is unmapped from all igroups and online. For information about connecting LUNs, see your SnapDrive documentation. **Result:** The mirror is broken and the LUN is restored from the most recent SnapManager or SnapDrive Snapshot copy. Another LUN restore will be performed in a later step, during the SnapManager restore.

<table>
<tr><th>Step</th><th colspan="2">Action</th></tr>
<tr><td>5</td><td>If...</td><td>Then...</td></tr>
<tr><td></td><td>Your backup software backed up SnapManager</td><td>Proceed to Step 6.</td></tr>
<tr><td></td><td>Your backup software was not configured to back up SnapManager</td><td>Reinstall the same version of SnapManager used before the disaster and run the Configuration wizard to ensure that your configuration matches exactly the configuration used before the disaster.

Note
Because you are reconstructing your original configuration, no data is moved by the Configuration wizard. However, running the Configuration wizard is necessary for SnapManager to function correctly.</td></tr>
<tr><td>6</td><td colspan="2">Restore the most recent backup using SnapManager Restore.

For more information about using SnapManager Restore, see “Restoring Databases Using SnapManager” on page 203.</td></tr>
<tr><td>7</td><td colspan="2">Launch the Outlook client and verify that your data was properly restored and that the Exchange server is operating correctly.</td></tr>
<tr><td>8</td><td colspan="2">Perform a SnapManager backup and verification to verify that your restored database is free of physical-level corruption.</td></tr>
</table>

Recovering both a failed storage system and Exchange server using archiving

To recover both the storage system and the Exchange server using archiving, complete the following steps.

Step	Action	
1	Bring the failed storage system back online.	
2	Perform a full restore of the Exchange server, without the Exchange data, using the backup application you used to create the backup. For more information about restoring your Exchange server, see the documentation for your backup software and the appropriate Microsoft disaster recovery document as described in "Guides you should read and have at hand" on page 268.	
3	**If...**	**Then...**
	Your backup software backed up SnapDrive	Proceed to Step 4.
	Your backup software was not configured to back up SnapDrive	Reinstall the same version of SnapDrive used before the disaster occurred. For information about installing SnapDrive, see your SnapDrive documentation.
4	Using the archive tool you used to create the archive, restore the archived database LUNs to the storage system volume.	
5	**If...**	**Then...**
	You archived the LUNs containing the SnapInfo directory and the transaction logs	Restore these LUNs.
	You did not archive the LUNs containing the SnapInfo directory and the transaction logs	Create new LUNs using the same drive letters as your original configuration, in the same volumes as they were before.

<table>
<tr><th>Step</th><th colspan="2">Action</th></tr>
<tr><td>6</td><td colspan="2">Using SnapDrive on the Exchange server, connect to the LUNs you restored from archive with the same drive letters as your original configuration.

Note
Do not mount the Exchange databases yet. The SnapManager Restore process mounts the databases.</td></tr>
<tr><td rowspan="3">7</td><td>If...</td><td>Then...</td></tr>
<tr><td>Your backup software backed up SnapManager</td><td>Proceed to Step 8.</td></tr>
<tr><td>Your backup software was not configured to back up SnapManager</td><td>Reinstall the same version of SnapManager used before the disaster and run the Configuration wizard to ensure that your configuration matches exactly the configuration used before the disaster.

Note
Because you are reconstructing your original configuration, no data is moved by the Configuration wizard. However, running the Configuration wizard is necessary for SnapManager to function correctly.</td></tr>
<tr><td>8</td><td colspan="2">Perform the procedure for archive recovery described in “Recovering Exchange data using archives” on page 276, starting with Step 9.</td></tr>
</table>

Archiving SnapManager Backups 15

This section describes how to create offline archives of Snapshot copies containing SnapManager backup sets. The following topics are covered in this section:

- "Understanding SnapManager backup set archival" on page 294
- "Choosing the best way to archive your SnapManager backups" on page 297
- "Using NDMP or dump to archive SnapManager backups" on page 298
- "Using a Windows backup utility to archive SnapManager backups" on page 302
- "Using Exchange Backup Agent to archive Exchange backups" on page 306
- "Using Run Command After Operation to archive automatically" on page 309

Understanding SnapManager backup set archival

This topic provides background information about archiving SnapManager backup sets.

The following topics are covered in this section:

- "Why organizations archive data" on page 294
- "Importance of archiving a complete backup set" on page 294
- "SnapManager backup sets" on page 294
- "SnapManager Snapshot copy naming conventions" on page 295
- "Guidelines for archiving" on page 295
- "Considerations for scheduling SnapManager Backup for archiving" on page 296
- "Archiving individual storage groups or databases" on page 296

Why organizations archive data

Organizations archive data for many reasons, central of which is disaster recovery. Archiving data enables an organization to create a complete, self-consistent replica of a collection of data suitable for bringing back online at some future date. Where backup is concerned with users accidentally destroying files or individual hardware components failing, disaster recovery addresses recovery from events that might disable an entire building or geographical area.

Organizations archive data for purposes other than disaster recovery. Space constraints often require that older data be archived. Reasons organizations archive and restore data are as diverse as their businesses. Some organizations restore data for use in historical analysis, some restore data for use in litigation.

Importance of archiving a complete backup set

Archived data might be used to re-create an Exchange data store from the ground up. For this reason, it's important to understand all the components of a SnapManager backup set, and what those components are named, so that you know that your archives contain all the data required to restore your Exchange data.

SnapManager backup sets

A SnapManager backup set includes the following components:

- Exchange database Snapshot copies
- Exchange transaction log Snapshot copies

- SnapInfo directory Snapshot copy

SnapManager Snapshot copy naming conventions

The Snapshot copy names will be as follows:

- Exchange database and transaction log Snapshot copies
  - For the standard backup management group:

    `exchsnap__`*exchangeservername_date_time*
  - For all other backup management groups:

    `exchsnap__`*exchangeservername_date_time__backupmgmtgroup*
- SnapInfo directory Snapshot copy
  - For the standard backup management group:

    `eloginfo__`*exchangeservername_date_time*
  - For all other backup management groups:

    `eloginfo__`*exchangeservername_date_time__backupmgmtgroup*

Note

If you did not select the Use Unique Name option when you created the SnapManager backup, the most recent Snapshot copy name contains `recent` instead of *date_time.* This is for backward compatibility with previous versions of SnapManager, which did not include the Run Command After Operation feature.

Guidelines for archiving

Follow these guidelines when you create archives:

- Only archive verified backups.

  If you are not sure whether a backup is verified, you can use the SnapManager Restore tab to check; a backup with a green check mark is verified.
- Create an archive of the most recent backup.
  - If you didn't use the unique name option when the backup was created, the most recent Snapshot copy in the storage system's LUN drive volume that stores the Exchange databases is always named /exchsnap_*servername*_recent or /exchsnap_*servername*_recent_*backupmgmtgroup*. *Servername* is the name of the Exchange server from which the Snapshot copy was taken, and *backupmgmtgroup* is the name of the backup management group.
  - If you used the unique name option, look for the Snapshot copy with the most recent date and time.

- LUNs cannot be archived using the CIFS or NFS protocols. Use the storage system's `dump` command or an NDMP backup application to archive LUNs.

Considerations for scheduling SnapManager Backup for archiving

Scheduling SnapManager backups for archiving must take into consideration many factors, including the following:

- Archive method used
- Service Level Agreements for disaster recovery
- Number of SnapManager backups performed per day
- Exchange client activity schedules
- Backup verification time

Archiving individual storage groups or databases

Archiving individual storage groups or databases from SnapManager backups is not recommended. This task requires a full understanding of the Snapshot copy naming conventions used by SnapManager for Microsoft Exchange and should not be attempted without knowing which Snapshot copies contain the appropriate storage groups and transaction logs for a given point in time. Archiving complete Exchange server backups (all storage groups) is recommended.

Choosing the best way to archive your SnapManager backups

There are different methods for collecting the necessary parts of the SnapManager backup set for archiving. They each have their own advantages and disadvantages. Read the section for each method to decide which one works best for your organization. The three methods are as follows:

- Use NDMP or the storage system's `dump` command to archive the LUNs containing the Exchange data and the SnapInfo directory directly from the storage system to the archive medium.

  For more information about this method, see "Using NDMP or dump to archive SnapManager backups" on page 298.

- Mount the LUNs in a SnapManager backup Snapshot copy and share it, then use NTBackup or another Windows backup utility to copy the LUNs' contents to the archive medium.

  For more information about this method, see "Using a Windows backup utility to archive SnapManager backups" on page 302.

- Create an Exchange copy-type backup directly to the archive medium using an Exchange-aware backup application.

  For more information about this method, see "Using Exchange Backup Agent to archive Exchange backups" on page 306.

Using NDMP or dump to archive SnapManager backups

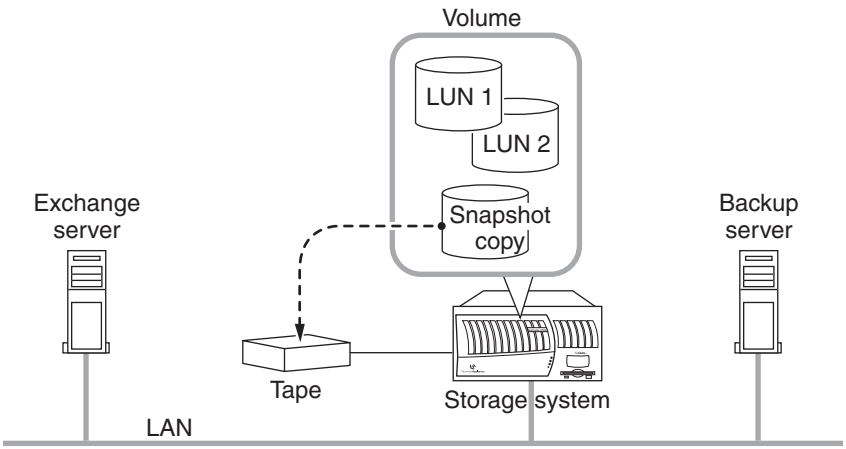
You can use NDMP or the storage system's `dump` command to archive the LUNs containing the Exchange data and the SnapInfo directory directly from the storage system to the archive medium. NDMP and the `dump` command are the most efficient methods for creating archives of the LUN drive files. See the following topics for more information:

- "About this method" on page 298
- "Path name to use when archiving using NDMP or dump" on page 299
- "Usage example" on page 300

About this method

When you use NDMP or `dump` to archive your SnapManager backups, you use NDMP or the storage system's `dump` command to archive each LUN that contains data for that backup set. Using NDMP or the `dump` command enables you to archive your SnapManager backup sets without involving Exchange or the Exchange server at all. Snapshot copies are taken of the LUNs, then copied to the archive medium and deleted.

This archive method is represented by the following diagram:



Archiving using NDMP or dump

For more information about backing up storage system data to tape, see the *System Administration Data Protection Guide* for your version of Data ONTAP.

Advantages: Using NDMP or `dump` to archive SnapManager backups provides the following advantages:

- Because this method does not rely on mounting a Snapshot copy, it does not risk the creation of busy Snapshot copies.
- Because this method archives the entire raw LUN, restoring is simply a matter of replacing the LUNs.
- If your archive procedure does not send the data over the network, this method can be significantly faster than other methods.

Disadvantages: The advantages of using NDMP or `dump` to archive SnapManager backups must be weighted against the following disadvantages:

- Because you are archiving raw LUNs, the entire LUN containing the Exchange data is archived, so you archive more data than you need.

  If archiving extra data is undesirable, you can use NTBackup or another Windows backup utility to back up the corresponding SnapInfo directory. This must be coordinated so that the two pieces of the archive are kept together for later retrieval.
- If you archive the SnapInfo directory separately, you must ensure that you get both required components from different locations into the same archive.

Path name to use when archiving using NDMP or dump

When using NDMP or `dump` to archive your SnapManager backups, specify the database LUN using its absolute path name

`/vol/`*volume_name*`/.snapshot/`*snapshot_name*`/`*LUN_name*

three variables represent the following text strings:

Variable	Description
volume_name	Name of the volume containing the data to be archived
snapshot_name	Name of the Snapshot copy containing the LUNs to be archived For more information about SnapManager Snapshot copy naming conventions, see "SnapManager Snapshot copy naming conventions" on page 295.
LUN_name	Name of the LUN containing the data to be archived

For example, the absolute path name of the LUN `exch1db.lun` in the Snapshot copy `exchsnap__SRVR3_01-20-2006_12.05.58_Daily` on the volume `ExchVol`n is.

```
/vol/ExchVol/.snapshot/exchsnap__SRVR3_01-20-
2006_12.05.58__Daily/exch1db.lun
```

Usage example

Suppose you want to use a script to archive your SnapManager backups to tape in the following environment:

- The script is run on the computer running Exchange and SnapManager.
- The name of the storage system is `storagesystem1`.
- The name of the LUN containing the Exchange databases is `exch1db.lun`.
- The name of the LUN containing the Exchange transaction logs and the SnapInfo directory is `exch1logs.lun`.
- The name of the volume containing the Exchange databases is `Exchvol`.

Example script: The following script uses the storage system `dump` command to dump the database, transaction logs, and SnapInfo LUNs to tape. This script relies on `rsh` functioning on the Exchange server using the SnapManager user account.

```
REM Back up the LUN containing the Exchange database.
REM For this example, a level 0 backup is performed
REM to the tape device named nrst0a.

rsh storagesystem1 dump 0f nrst0a
/vol/ExchVol/.snapshot/%1/exch1db.lun

REM Before appending the next backup to the tape,
REM reposition to the end of the tape so the next
REM write will not overwrite the existing data.

rsh storagesystem1 mt -f nrst0a eom

REM Back up the LUN containing the Exchange
REM transaction log files and the SnapManager SnapInfo
REM directory.

rsh storagesystem1 dump 0f nrst0a
/vol/ExchVol/.snapshot/%2/exch1logs.lun
```

Invoking the script and passing parameters: To invoke this script using the SnapManager Run Command After Operation feature, use the following command:

```
C:\SnapManager Scripts\scriptname.txt $ExchSnapshot $InfoSnapshot
```

The command-line parameters `%1` and `%2` might provide values similar to the following, respectively:

- `exchsnap__SRVR3_01-20-2006_12.05.58__Daily`
- `eloginfo__SRVR3_01-20-2006_12.05.58__Daily`

For more information about the Run Command After Operation feature, see "Using Run Command After Operation to archive automatically" on page 309.

Invoking the script without using command-line parameters: If you prefer not to use the Run Command After Operation feature and you are not using the unique name option for your backups, you can hardcode the Snapshot copy names into the script.

For example, the `dump` command for the database might look like this, for an Exchange server named `SRVR3`:

```
rsh storagesystem1 dump 0f nrst0a
/vol/Exch/.snapshot/exchsnap__SRVR3__recent__Daily/exch1logs.lun
```

Using a Windows backup utility to archive SnapManager backups

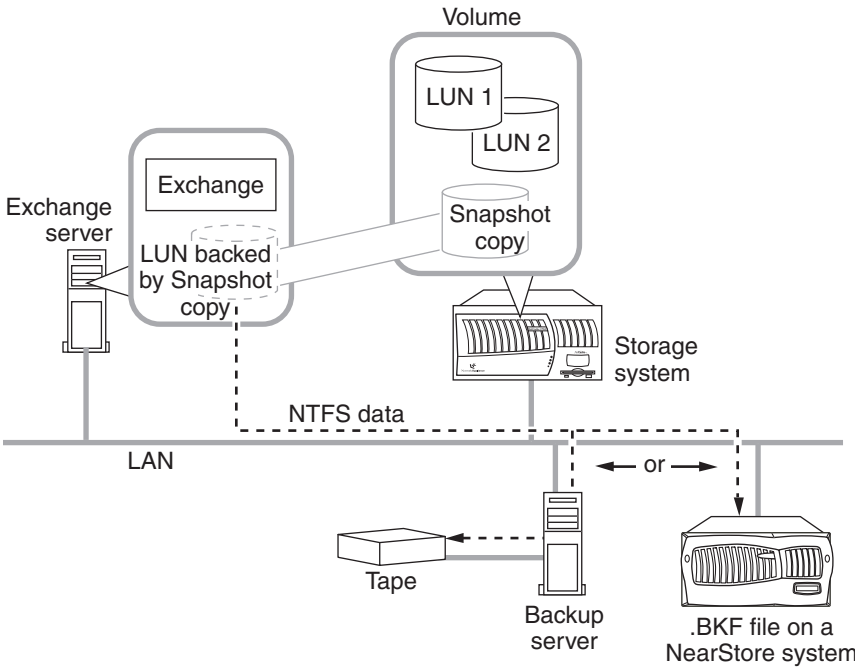
The following topics discuss archiving SnapManager backups using a Windows backup utility:

- "About this method" on page 302
- "Usage example" on page 303
- "Using centralized backup software" on page 305

About this method

When you use a Windows backup utility to archive your SnapManager backups, you mount the LUNs backed by the backup Snapshot copy you want to archive, and then use NTBackup or another Exchange-aware Windows backup utility to copy the archive data to your archive medium. In this case, the NTFS data is backed up, rather than the raw LUNs.

This archive method is represented by the following diagram:



Archiving using Windows backup utility

Note

The LUN does not need to be mounted on the Exchange server; another computer can be used for this function.

Components that must be included in the archive: The archive must include the following two components:

- The SnapInfo directory as it was backed up directly from the Exchange server
- The Exchange data as extracted from the LUN backed by Snapshot copy

Advantages: Using a Windows backup utility to archive SnapManager backups provides the following advantages:

- Because you are archiving NTFS data, not raw LUNs, you can archive exactly the data that you need, and no more.
- The procedures and tools used for this method are probably familiar and available to you.

Disadvantages: The advantages of using a Windows backup utility to archive SnapManager backups must be weighed against the following disadvantages:

- Because this method relies on mounting a Snapshot copy, you must be careful to avoid scheduling any backups while the archiving is performed. This is because creating a Snapshot copy of a mounted Snapshot copy results in a Snapshot copy that cannot be deleted. For more information about busy Snapshot copies, see "Problem deleting backups due to busy Snapshot copy error" on page 254.
- You must make sure that you get both required components from different locations into the same archive.

Usage example

Suppose you want to use a script to mount a Snapshot copy of the LUNs that contain the Exchange databases, back up the databases using NTBackup, dismount the LUNs, and then back up the SnapInfo directory in the following environment:

- The script is run on the computer running Exchange and SnapManager.
- The drive letter for the Exchange database is S:.
- The Snapshot copy is mounted as drive V:.

  The drive letter used for the LUN mount must be available when the script is run.

Example script: The following script mounts a Snapshot copy of the LUNs that contain the Exchange databases and backs them up using NTBackup. It then dismounts the LUNs and backs up the SnapInfo directory. The `/N` and `/D` options are used to demonstrate the options to name the tape and add a description.

```
REM Mount a LUN backed by the Snapshot copy of the Exchange
REM database as drive letter V:\.

sdcli snap mount -k s -s %1 -d v

REM Use NTBackup to back up the database files. The path
REM to the databases in your environment might be different.

ntbackup backup "V:\Program Files\Exchsrvr\mdbdata" /N %1 /D %2

REM Dismount the Snapshot copy mounted as drive letter V:\.
REM The below example is shown with an optional parameter (-f)
REM to forcefully disconnect the drive letter.

sdcli snap unmount -d v -f

REM Use NTBackup to back up the snapinfo directory.
REM This backup appends the media so as not to
REM overwrite the database backup. The path to the
REM snapinfo directory is passed as the third
REM parameter on the command line used to launch
REM this script.

ntbackup backup %3 /T%1 /A
```

Invoking the script and passing parameters: To invoke this script using the SnapManager Run Command After Operation feature, use the following command:

```
C:\SnapManager Scripts\scriptname.txt $ExchSnapshot $SnapInfoName
$SnapInfoPath
```

The command-line parameters `%1`, `%2`, and `%3` might provide values similar to the following, respectively:

- %1: `exchsnap__SRVR3_01-20-2006_12.05.58__Daily`
- %2: `01-20-2006_12.05.58__Daily`
- %3: `I:\SME_SnapInfo\SRVR3\SG_First Storage Group\01-20-2006_12.05.58__Daily`

For more information about the Run Command After Operation feature, see "Using Run Command After Operation to archive automatically" on page 309.

Using centralized backup software

When using a centralized backup model, it might be possible to initiate a backup job by running a command on a centralized backup server or by running the command on the Exchange server through the third-party agent that came with your backup software.

You can consult the documentation that came with your centralized backup software to determine which command to run as well as which server to run it on (the centralized backup server or the Exchange server). Then, you can use the Run Command After Operation feature to trigger the backup. See "Using Run Command After Operation to archive automatically" on page 309.

If you plan to run the command on the Exchange server, then you need take no extra steps.

If you plan to run the command on a centralized backup server, then you need to install SnapManager on it. You also need to configure the SnapManager application on the Exchange server, to run the command on a remote machine (the centralized backup server).

Note

To run the command remotely, you need to install SnapManager on the remote server even if it does not have Exchange Server installed. Although SnapManager needs to be installed, it need not be configured.

There are additional ways that a command can be run remotely, but this document only covers doing it through SnapManager.

Using Exchange Backup Agent to archive Exchange backups

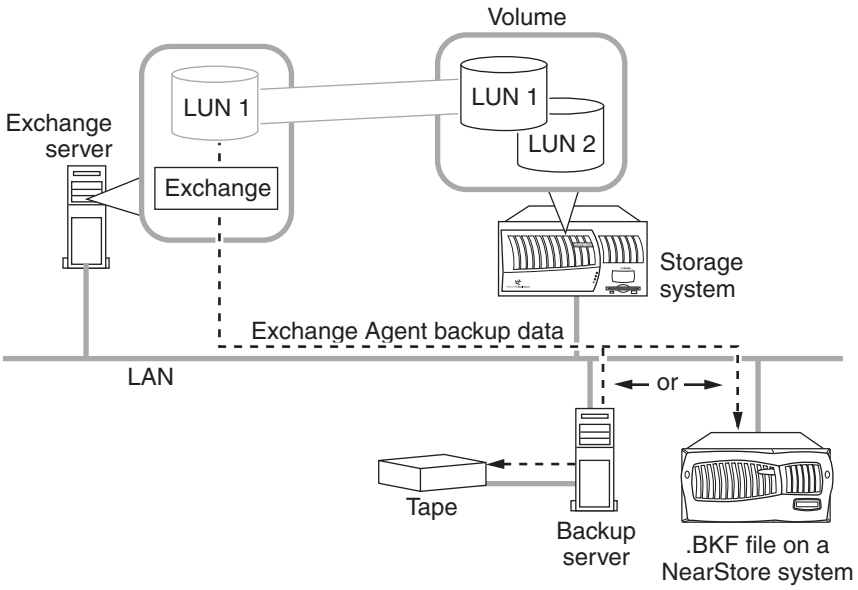
The following topics discuss archiving Exchange backups using the Exchange Backup Agent in a SnapManager environment:

- "About this method" on page 306
- "Usage example" on page 307
- "Using centralized backup software" on page 307

About this method

When you use Exchange backups to archive your SnapManager backups, you use NTBackup (which, in turn, uses the Exchange Backup Agent) to create a copy backup of your Exchange databases. In this case, the Exchange data itself is captured and archived. Because SnapManager is not used to create the backup, it also is not used to perform the restore, so the SnapInfo directory does not need to be archived for this method.

This archive method is represented by the following diagram:



Archiving using Exchange backup

Attention

You must use a copy or differential backup for this method. Performing any other type of backup causes your existing SnapManager backups to become unusable for an up-to-the-minute restore.

Advantages: The advantage of this approach is that the procedures and tools used for this method are probably familiar and available to you.

Disadvantages: The disadvantage of this approach is that no SnapManager backups can be initiated while this method is in use.

Usage example

The following script launches NTBackup and tells it to perform a copy-type backup through the Exchange backup agent.

Before you can use this script, you need to use the NTBackup GUI to create a `.BKS` file that contains the storage groups you want to back up.

This script assumes that it is being run on the computer running Exchange and SnapManager.

Example script:

```
REM Launch NTBackup

ntbackup backup "@c:\MyConfig.BKS" /M copy
```

Note

Although this archive method does not use SnapManager backups, it can be invoked using the Run Command After Operation feature. For more information about the Run Command After Operation feature, see "Using Run Command After Operation to archive automatically" on page 309.

Using centralized backup software

When using a centralized backup model, it might be possible to initiate a backup job by running a command on a centralized backup server or by running the command on the Exchange server through the third-party agent that came with your backup software.

You can consult the documentation that came with your centralized backup software to determine which command to run as well as which server to run it on (the centralized backup server or the Exchange server). Then, you can use the Run Command After Operation feature to trigger the backup. See "Using Run Command After Operation to archive automatically" on page 309.

If you plan to run the command on the Exchange server, then you need take no extra steps.

If you plan to run the command on a centralized backup server, then you need to install SnapManager on it. You also need to configure the SnapManager application on the Exchange server, to run the command on a remote machine (the centralized backup server).

Note

To run the command remotely, you need to install SnapManager on the remote server even if it does not have Exchange Server installed. Although SnapManager needs to be installed, it need not be configured.

There are additional ways that a command can be run remotely, but this document only covers doing it through SnapManager.

Using Run Command After Operation to archive automatically

SnapManager includes the ability to automatically run your own program or script after a backup or database verification operation finishes successfully. This feature, called Run Command After Operation, is typically used to automatically archive a backup. See the following topics for more information:

- "How you can launch your own program or script" on page 309
- "Command arguments pass information to your program or script" on page 310
- "Specifying the command to be run after the operation succeeds" on page 312
- "Running a script from a UNC path on a Windows Server 2003 system" on page 315

Attention

Make sure that you archive all components of a backup set together. For more information, see "SnapManager backup sets" on page 294.

Note

When any one of the storage groups is offline, and if you a initiate a backup using the Run Command After Operation, the backup operation will fail for that particular job. The Run command After Operation option will be executed after successful operations.

How you can launch your own program or script

When you start or schedule a SnapManager backup or database verification operation, you can specify that SnapManager automatically run a command after the operation finishes successfully. If you select this option, you will be prompted to specify the following information:

1. The host system from which the command is to be run
2. The full path of the command that you want SnapManager to run after the backup or database verification finishes successfully
3. Any parameters that are to be passed to the command

   Because the command is invoked from within the context of a specific backup or database verification, you can pass the command information about the components of that operation.

In your script, any occurrence of the text string `%1` corresponds to the first parameter passed; the text string `%2` corresponds to the second parameter, and so on.

Command arguments pass information to your program or script

The Run Command After Operation feature supports the following variables, which can pass operation-specific information to your program or script.

Variable	Description

`$ExchSnapshot`	Expands to the name of an Exchange database Snapshot copy. Examples:
	`exchsnap__winsrvr3__01-31-2006_15.03.09`
	`exchsnap__winsrvr3__recent`
	Note
	The number of database Snapshot copies in a SnapManager backup set depends on the number of volumes used to store the storage groups included in the backup.

`$InfoSnapshot`	Expands to the name of a SnapInfo directory Snapshot copy. Examples:
	`eloginfo__winsrvr2__01-31-2006_15.03.09`
	`eloginfo__winsrvr2__recent`

`$SnapInfoName`	Expands to the name of the SnapInfo directory. Examples:
	`WINSRVR3__01-23-2006_16.21.07__Daily`
	`WINSRVR3__recent`
	Note
	If you use this variable, you must also provide the correct path to the directory.

`$SnapInfoPath`	Expands to the name of the SnapInfo subdirectory. Example: `I:\SME_SnapInfo\EXCH__WINSRVR3\SG__First Storage Group\WINSRVR5_01-06-2006_11.52.36`

The `$SnapInfoPath` variable is automatically enclosed within double quotes so that the actual path name can contain spaces without affecting the script invocation on the Windows command line. If you do not want the double quotes to appear in your command line, remove them from the Command Arguments field in the Run Command After Operation dialog box.

Specifying the command to be run after the operation succeeds

While specifying a SnapManager backup or verification operation, you can use the Run Command After Operation dialog box to specify the details of the command you want to run after the backup or verification operation finishes.

Note

You can specify default values for the command arguments so that you do not have to enter the command information each time you initiate a backup or verification. For details, see "Managing the Run Command After Operation default settings" on page 371.

Procedure: To run a command or invoke a batch file after backup or verification, complete the following steps.

Step	Action	
1	Open the Run Command After Operation dialog box.	
	From the...	**Do this...**
	Backup and Verification tab	**1.** Specify a database backup or a verification of the databases and transaction logs in the most recent backups. **2.** Select the Run Command After Operation option. **3.** Click Backup Now or Verify Now.
	Backup Wizard	**1.** Step through the wizard to specify a full database backup, a transaction log only backup, or a database verification. **2.** In the Run a Command After the Operation window, select the option labeled "Yes, run a command after this operation", and then click Next.
	Result: The Run Command After Operation dialog box appears and displays the current default settings.	

Step	Action
2	In the “Specify a computer where...” box, type or browse to select the name of the host on which your program or script resides. **Note** It is mandatory to install the SnapManager on a machine that you specified, but it need not be configured.
3	In the “Specify the full path...” box, browse to select your program or script. **Note** If the script is stored on a network share, use the UNC path rather than the network drive letter to specify the script’s location. If SnapManager is installed on a Windows Server 2003 system, then add the network location to Internet Explorer's list of trusted sites, otherwise the command could fail silently

Step	Action
4	Form the command input string in the Command Arguments box. You can do this using any combination of the following methods: ◆ To enter text directly into the Command Arguments box, click in the box and type the desired text. ◆ To enter a SnapManager variable into the Command Arguments box, do the following: **a.** If necessary, click in the Command Arguments box to position the cursor. **b.** In the SnapManager Variables list, select the variable you want to enter. For more information, see "Command arguments pass information to your program or script" on page 310. **c.** Click Select. **Notes:** ◆ The `$SnapInfoPath` variable is automatically enclosed within double quotes so that the actual path name can contain spaces without affecting the script invocation on the Windows command line. If you do not want the double quotes to appear in your command line, remove them from the Command Arguments field in the Run Command After Operation dialog box. ◆ If more than one Snapshot copy exists for this operation, you must include that Snapshot copy type's variable name once for every Snapshot copy. If you do not, you cannot create a complete archive. For details, see "Command arguments pass information to your program or script" on page 310.
5	Repeat Step 4 as needed until the Command Arguments box contains the arguments you want to pass to your program or script.

Step	Action
6	Click OK to apply your changes, close the Run Command After Operation dialog box, and return to the backup or verification setup process. **Result:** After when the backup or verification finishes successfully, the command you specified, with the Snapshot copy and SnapInfo information for this backup operation inserted, runs automatically.

Example: Suppose you want to run the script `C:\SnapManager Scripts\scriptname.bat` with the following parameters:

- Name of the database Snapshot copy
- Name of the specific SnapInfo directory
- NTFS path to the SnapInfo directory

For more examples, see "Using NDMP or dump to archive SnapManager backups" on page 298 and "Using a Windows backup utility to archive SnapManager backups" on page 302.

Running a script from a UNC path on a Windows Server 2003 system

If SnapManager is installed on a Windows Server 2003 system, then attempting to launch a script from a UNC (Uniform Naming Convention) path might cause SnapManager to hang. If this occurs, the log file shows no indication of the failure other than it is missing the last line of text: "The specified command has been launched successfully."

Windows Server 2003 ships with Internet Explorer's Enhanced Internet Explorer Security Configuration enabled. This setting is restrictive and prevents batch files located on a network share from running. The network location will need to be added to Internet Explorer's list of trusted sites.

To run a script from a UNC path on a Windows Server 2003 system, complete the following steps.

Step	Action
1	Log in to the Windows Server 2003 system that will be running the script. ◆ This system can be the same system that is running SnapManager, or it can be a different server. ◆ You must log on using the same user account that SnapManager is configured to use. For more information, see "Understanding SnapManager COM server identity account requirements" on page 22.
2	Launch Internet Explorer.
3	In the menu bar, select Tools > Internet Options. **Result:** The Internet Options dialog box appears.
4	In the Internet Options dialog box, do the following: **a.** Select the Security tab. **b.** In the Security tab, select the Local intranet icon, and then click Sites. **Result:** The Local Intranet dialog box appears.
5	In the Local Intranet dialog box, do the following: **a.** In the "Add this Web site to the zone" box, enter the host name of the machine from where the script will be launched. **b.** Click Add. **Result:** The host name is added to the Web Sites list.
6	Click Close to close the Local Intranet dialog box.
7	Click OK to close the Internet Options dialog box.

Step	Action
8	To verify your changes, browse to the network location where the script resides and launch the script. **Result:** The script should now run normally without security prompts. **Note** Although the script should run, it might actually fail to complete properly because the SnapManager variables are not be passed to the script in this test.

Note

These security settings are specific to each user account on each machine. You will need to repeat this procedure for on all machines that might be used to run scripts and for all users that might launch the script on each machine. You will also need to repeat these steps if you start using a different user account to run SnapManager.

Managing SnapManager Reports 16

This section describes how to use and manage the reports that SnapManager automatically creates for every operation performed. The following topics are covered in this section:

- "Understanding SnapManager reports" on page 320
- "Deleting SnapManager reports" on page 321
- "Printing SnapManager reports" on page 322

Related topics:

- "Uninstalling SnapManager" on page 39
- "Managing the event notification options" on page 373

Attention

You must run SnapManager from the system console, not from a Terminal Services client. Do not use Terminal Services for any type of SnapManager administration, because you might miss critical information that is displayed only in pop-up boxes at the system console.

Understanding SnapManager reports

SnapManager reports list step-by-step details for every SnapManager operation you perform, the final status of the operation, and error messages for any errors encountered during the operation.

The SnapManager Report directory provides four folders, which contain the reports for each of these operation types:

- Backup
- Config
- Debug
- Delete Snapshot
- Miscellaneous
- Restore

About changing the report directory

You can use the Report Directory Settings to change the directory where your SnapManager reports are stored. You might want to do this if you find that you have limited space in the original report directory.

If you change the path, you can no longer see the reports created before the path was changed, but they are still accessible. You can look at them by changing the Report Directory Settings back to the original setting and selecting Refresh from the View menu.

Attention

Do not use a disk that contains Exchange or SnapManager data for the report directory; it is restored from Snapshot copy when you perform a SnapManager Restore.

Deleting SnapManager reports

To delete any of the reports from the Report directory, complete the following steps.

Step	Action
1	Click the Reports in the Scope pane.
2	Select the appropriate report in the SnapManager Report directory.
3	Right-click the report directory or the individual report that you want to delete and select Delete All.
4	Click the dialog box that appears, prompting for whether you want to delete the report. **Result:** The report is deleted.

Printing SnapManager reports

SnapManager for Microsoft Exchange provides the following two ways to print reports:

- Directly to the printer from within the displayed report on the Result pane
- From within Notepad

Printing a displayed report to the printer

To send a displayed report to the printer, complete the following steps.

Step	Action
1	Click the SnapManager Reports in the SnapManager Scope pane.
2	Click the appropriate report directory and select the report you want to print.
3	Right-click anywhere within the displayed report in the Result pane and select Print.

Printing a report using Notepad

To print a report using Notepad, complete the following steps.

Step	Action
1	Click the SnapManager Reports in the SnapManager Scope pane.
2	Click the appropriate report directory.
3	Right-click the report name in the Result pane and select Open with Notepad.
4	From within Notepad, select the Print option on the File menu.

SnapManager Command-Line Reference A

This section details the SnapManager 4.0 for Microsoft Exchange operations you can execute using the new SnapManager command line functionality. This new function allows you to create scripts to invoke SnapManager functionality without using SnapManager graphical user interface (GUI).

The following topics are covered in this section:

- "Launching SnapManager for Exchange PowerShell" on page 323
- "Guidelines for using the commands" on page 324
- "new-backup" on page 325
- "verify-backup" on page 331
- "restore-backup" on page 336
- "get-backup" on page 342
- "delete-backup" on page 344

Launching SnapManager for Exchange PowerShell

To launch the SnapManager for Exchange PowerShell, complete the following steps.

Step	Action
1	Go to Start > Programs > > SnapManager for Exchange PowerShell. **Result:** SnapManager for Exchange PowerShell command-line interface is displayed.

Guidelines for using the commands

Observe the following guidelines when using the SnapManager command-line tool:

- All parameters and options are case-insensitive. So using the option "-Daily" will achieve the same results as using "-daily".
- Some of the options must be invoked in a particular order. For best results, use the order given in the synopsis for all options.
- When a parameter value string contains spaces, be sure to enclose it in single quote. For example, use **'First Storage Group'** rather than **First Storage Group**.

The following topics introduce you to all of the SnapManager for Exchange PowerShell supported cmdlets:

- "new-backup" on page 325
- "verify-backup" on page 331
- "restore-backup" on page 336
- "get-backup" on page 342
- "delete-backup" on page 344

new-backup

This section explains the new-backup cmdlet synopsis, detailed description, usage, its corresponding parameters, examples and related links.

Name

new-backup

Synopsis

This cmdlet enables you to backup the Exchange databases using SnapManager for Exchange PowerShell command-line interface.

Detailed Description

This command enables you to initiate a backup or verification job, with all of the options available through the SnapManager GUI.

This command also supports the ubiquitous parameters:

-Debug (-db), -ErrorAction (-ea), -ErrorVariable (-ev)

-OutBuffer (-ob), -OutVariable (-ov), and -Verbose (-vb).

To learn more see help about_ubiquitous_parameters.

Usage

```
new-backup -Clusteraware <SwitchParameter> -lcr <SwitchParameter> -
VerifyOnDestVolumes <List
ofsourcestoragesystem:sourcevolume:destinationstoragesystem:destin
ationvolume> -Verify <SwitchParameter> -Server <String[]> -
StorageGroup <list of storage groups separated by comma> -
ManagementGroup <String[Standard, Weekly, Daily]> -UpdateMirror
<SwitchParameter> -VerDestVolume <SwitchParameter> -NoUTMRestore
<SwitchParameter> -NoTruncateLogs <$False> -Throttle <Integer> -
VerificationServer <String[name of the server]> -UseMountPoint
<Switch Parameter> -CCRActiveNode <Boolean value $True | $False> -
MountPointDir <String[specific mount point directory]> -
RetainBackups <Integer> -RetainDays <Integer> -
Command<SwitchParameter> -RunCommand <String[]> -GenericNaming
<Default value: $False> -BackupCopyRemoteCCRNode <Boolean-$ True |
$False> [<CommonParameters>]
```

Parameters

-Clusteraware <Switch>: This flag assumes significance only when scheduling jobs in cluster configurations. This flag will faciliate scheduling the same job in multiple cluster nodes to improve fault tolerance.

In the case of Single Copy Cluster, if a job is scheduled with -Clusteraware flag, the job will run only if the host in which it is scheduled is the active node of the cluster.

In the case of Cluster Continuous Replica, the -clusteraware is processed with the context of -CCRActive $True or $False parameter.

If a job is scheduled with -Clusteraware flag, the job will runly only:

- If the host in which the job is scheduled is a CCR active node and if the job targets the active node using -CCRActiveNode $True.
- If the host in which the job is scheduled is a CCR passive node and if the job targets the passive node using -CCRActiveNode $False.

-VerifyOnDestVolumes <List of sourcestoragesystem:sourcevolume:destinationstoragesystem:destinationvolume>: Use this parameter to override the existing StoreVault Replication relationships.

-Verify<SwitchParameter>: This parameter is a switch. Use this to verify the backed up SnapManager databases and transaction logs.

-Server<Target Exchange Server name>: Denotes the target Exchange server name.

-StorageGroup<List of storage groups>: Use this parameter to specify the list of storage groups to be verified during backup operation.

Note

If invalid storage groups are specified in the new-backup cmdlet during backup operation, SnapManager for Exchange PowerShell fails the new-backup cmdlet operation with an appropriate error message and will not selectively backup any valid storage groups. Scheduled jobs and backup scripts will also fail when there is an invalid storage group configuration.

Note

-lcr flag will be processed, only if the storage groups are not specified explicitly using the -StorageGroup flag.

-lcr<SwitchParameter>: In Exchange Server 2007, by default, the **`-lcr`** flag is $false and in such cases only the production storage groups are backed up.

- In Exchange Server 2007, set the **`-lcr`** flag as $true, if you want to back up only the replica storage groups.

- If you specify the list of storage groups explicitly, the -lcr storage group is ignored.

Note
In Exchange Server 2003, the -lcr flag is not supported.

-ManagementGroup<[Standard, Weekly, Daily]>: Denotes the backup or verify operation that is performed on a daily, or weekly, or standard basis.

-UpdateMirror <SwitchParameter>: This parameter is a switch, which if specified starts a StoreVault Replication synchronization after the backup operation.

StoreVault Replication updates the specified volume to reflect incremental updates on a source volume. If a SnapManager volume is enabled for StoreVault Replication usage, the StoreVault Replication destination will be updated from the source volume.

-VerDestVolume<SwitchParameter>: Use this parameter to verify the StoreVault Replication destination volume.

-NoUTMRestore<SwitchParameter>: This parameter is a switch, which if specified does not retain up-to-the-minute restore ability. The logs are deleted for any backups deleted as part of this backup operation. This will not retain the up-to-the-minute restore ability for older backups that remain after the delete phase of a backup operation.

-NoTruncateLogs<$False>: This parameter is a switch, which if specified does not allow the backup of truncated transaction logs. This option can be used to conserve space on the LUN containing the backed up Exchange transaction logs.

-Throttle<Integer>: Use this parameter to define the throttling value to be used during the verification operation.

-VerificationServer<Server name>: This parameter is a switch, which if specified overrides the preconfigured SnapManager verification settings. It denotes the host to be used as the verification server for the verification phase of a backup operation.

-UseMountPoint<SwitchParameter>: This parameter is a switch, which if specified mounts the Snapshot copy to a NTFS directory. During a SnapManager verification operation, Snapshot copies are mounted in a default NTFS directory for database verification. This option is effective, when there are no available drive letters to mount the Snapshot copies during database verification. It overrides the preconfigured SnapManager verification settings.

-CCRActiveNode<Boolean-$True or $False>: This parameter is a Boolean value ($True or $False). The value specifies whether the connection is to an active or a passive node, respectively.

-BackupCopyRemoteCCRNode<Boolean-$True or $False>: This parameter is a Boolean value ($True or $False). Use it to create a secondary backup on a remote node.

-MountPointDir<MountPoint directory path>: Use this parameter to specify which mount point directory a Snapshot copy will be mounted to during database verification.

-RetainBackups<Integer>: This parameter denotes the number of backups to retain after the delete phase during SnapManager backup operation.

-RetainDays<Integer>: Denotes that the deletion of backups is to be based on an "older than number of days" policy. Use this option in conjunction with the "RetainBackups" option. It specifies the number of days after which a backup is to be deleted. Absence of this option denotes a deletion policy based on retained backup count.

-Command<SwitchParameter>: This is a switch parameter that indicates run command after operation.

-RunCommand<Windows path and the script name>: This parameter runs the specified command after the SnapManager backup or verification operation is complete. It defines the complete path for the command to be run after the backup or verify operation is complete.

Note

You need to specify this command explicitly, the preconfigured command does not run after the backup or verification operation.

-GenericNaming<$False>: Use this parameter to specify the generic naming convention to be used for the SnapManager backup sets.

Short form for new-backup cmdlet parameters

The following table lists all of the new-backup parameters and the short form of each.

Parameter	Short form
VerifyonDestVolumes	vermirror
Verify	ver
Server	svr

Parameter	Short form
storagegroup	sg
managementgroup	mgmt
UpdateMirror	updmir
VerDestVolume	verdest
NoUTMRestore	noutm
NoTruncateLogs	notrunc
Throttle	-throt
VerificationServer	versvr
UseMountPoint	mp
CCRActiveNode	ccrnode
-MountPointDir	mpdir
-retainbackups	-rtbackups
-RetainDays	-rtdays
-Command	cmd
-Runcommand	-runcmd
-commandserver	-cmdsvr
-GenericNaming	gen
-lcr	-

Examples

EXAMPLE #1: `new-backup -Server 'EXCHSRVR' -ManagementGroup 'Standard' -NoTruncateLogs $False -RetainBackups 8 -Command -RunCommand 'C:\WINDOWS\system32\svript1.bat'-CommandServer 'SNAPMGR-48' -StorageGroup 'alaska','3' -Verify -VerificationServer 'Snapmgr-48' -Throttle 1 -UseMountPoint -MountPointDir 'C:\ProgramFiles\\SnapManager for Exchange\SnapMgrMountPoint'`

This command creates a new backup of two storage groups on EXCHSRVR in the Standard backup management group (the default), using the unique naming convention (the backup will be named using the date-time stamp). Run Command After Operation is performed, and all older backups are deleted except for the eight most recent ones.

Example #2: `new-backup -Server 'EXCHSRVR3' -StorageGroup SG1, SG2`

This command creates a new backup of two storage groups on EXCHSRVR3 in the Standard backup management group (the default), using the unique naming convention (the backup will be named using the date-time stamp). No verification or command after operation is performed, and no older backups are deleted.

Example #3: `new-backup -Server 'EXCHSRVR3' -StorageGroup SG1, SG2 - VerificationServer - SRVR7 -retainbackups 3 -ManagementGroup daily`

This command creates a new backup in the Daily backup management group. The backup is verified on SRVR7, and all older Daily backups are deleted except for the three most recent ones. No StoreVault replication is initiated after the backup, even if the volume is a StoreVault Replication source volume.

Example #4: `new-backup -Server 'SNAPMGR-55' -ManagementGroup 'Standard' -NoTruncateLogs $False -StorageGroup 'First Storage Group' -Verify -VerificationServer 'SNAPMGR-55' -VerDestVolume -UpdateMirror -BackupCopyRemoteCCRNode $False`

This command creates a backup and performs verification on the destination volumes.

Example #5: `new-backup -Server 'SNAPMGR-55' -ManagementGroup 'Standard' -NoTruncateLogs $False -StorageGroup 'First Storage Group\LCR' -BackupCopyRemoteCCRNode $False`

This command creates a backup of the LCR database.

verify-backup

This section explains the verify-backup cmdlet synopsis, detailed description, usage, its corresponding parameters, examples and related links.

Name

verify-backup

Synopsis

This cmdlet enables you to verify the backup sets using the SnapManager for Exchange PowerShell command-line interface.

Detailed Description

This command enables you to verify the SnapManager backup sets with all of the options available through the SnapManager GUI.

This command also supports the ubiquitous parameters:

-Debug (-db), -ErrorAction (-ea), -ErrorVariable (-ev)

-OutBuffer (-ob), -OutVariable (-ov), and -Verbose (-vb).

To learn more see help about_ubiquitous_parameters.

Usage

```
verify-backup -Clusteraware <SwitchParameter> -lcr <Boolean $true
or $False> -VerifyOnDestVolumes <List
ofsourcestoragesystem:sourcevolume:destinationstoragesystem:destin
ationvolume> -Server <System.String[]> -ManagementGroup
<System.String[Standard, Weekly, Daily]> -StorageGroup <List of
storage groups separated by comma> -UpdateMirror <SwitchParameter>
-VerDestVolume <SwitchParameter> -Throttle <Integer> -
VerificationServer <System.String[]> -UseMountPoint
<SwitchParameter> -MountPointDir <System.String[specific mount
point directory]> -CCRActiveNode <$true | $false> -VerifyBackups
<Integer> [<CommonParameters>]
```

Parameters

-lcr<SwitchParameter>: In Exchange Server 2007, by default, the **-lcr** flag is $false and in such cases only the production storage groups are backed up.

- In Exchange Server 2007, set the **-lcr** flag as $true, if you want to back up only the replica storage groups.

- If you specify the list of storage groups explicitly, the -lcr storage group is ignored.

Note

In Exchange Server 2003, the -lcr flag is not supported.

-VerifyOnDestVolumes <List of sourcstoragesystem:sourcevolume:destinationstoragesystem:destinationvolume>: Use this parameter to override the existing StoreVault Replication relationships.

-Server<String>: Denotes the target Exchange server name.

-StorageGroup<List of storage groups>: Use this parameter to specify the list of storage groups to be verified during backup operation.

-ManagementGroup<[Standard, Weekly, Daily]>: Denotes the backup or verify operation that is performed on daily, or weekly, or standard basis.

-UpdateMirror<SwitchParameter>: This parameter is a switch, which if specified starts a StoreVault Replication synchronization after the backup operation.

StoreVault Replication updates the specified volume to reflect incremental updates on a source volume. If a SnapManager volume is enabled for StoreVault Replication usage, the StoreVault Replication destination will be updated from the source volume.

If **`-VerDestVolume`** parameter is specified, the **`-UpdateMirror`** parameter will be evaluated as $true.

-VerDestVolume<SwitchParameter>: Use this parameter to verify the StoreVault Replication destination volume.

-Throttle<Integer>: Use this parameter to define the throttling value to be used during the verification operation.

-VerificationServer<String>: This parameter is a switch, which if specified overrides the preconfigured SnapManager verification settings. It denotes the host to be used as the verification server for the verification phase of a backup operation.

-UseMountPoint<SwitchParameter>: This parameter is a switch, which if specified mounts the Snapshot copy to a NTFS directory. During a SnapManager verification operation, Snapshot copies are mounted in a default NTFS directory for database verification. This option is effective when there are no available drive letters to mount the Snapshot copies during database verification. It overrides the preconfigured SnapManager verification settings.

-CCRActiveNode<Boolean-$True or $False>: This parameter is a Boolean value ($True or $False). The value specifies whether the connection is to an active, or a passive node, respectively.

-MountPointDir<String>: When this parameter is specified, it uses the defined mount point directory. Use this to specify which mount point directory a Snapshot copy will be mounted to during database verification.

-VerifyBackups<Integer>: Use this parameter to verify the unverified SnapManager backup sets. The default value is one, but you can specify the number of backups that you want to verify.

Short form for verify-backup cmdlet parameters

The following table lists all of the verify-backup parameters and the short form of each.

Parameter	Short form
VerifyonDestVolumes	vermirror
Server	svr
storagegroup	sg
managementgroup	mgmt
UpdateMirror	updmir
VerDestVolume	verdest
NoUTMRestore	noutm
NoTruncateLogs	notrunc
Throttle	-throt
VerificationServer	versvr
UseMountPoint	mp
CCRActiveNode	ccrnode
-MountPointDir	mpdir
-VerifyBackups	verbkups
-lcr	-

Examples

Example #1:

```
verify-backup -Server 'SNAPMGR-48' -ManagementGroup
'Standard' -StorageGroup 'alaska','3' -VerifyBackups 1 -
VerificationServer 'Snapmgr-48' -Throttle 1 -UseMountPoint -
MountPointDir 'C:\Program Files\\SnapManager for
Exchange\SnapMgrMountPoint'
```

Example #2: `verify-backup -Server 'SNAPMGR-55' -ManagementGroup 'Standard' -StorageGroup 'Second Storage Group','First Storage Group' -VerifyBackups 5 -VerificationServer 'SNAPMGR-48' -UseMountPoint -MountPointDir 'C:\Program Files\\SnapManager for Exchange\SnapMgrMountPoint'`

restore-backup

This section explains the restore-backup cmdlet synopsis, detailed description, usage, its corresponding parameters, examples and related links.

Name

restore-backup

Synopsis

This cmdlet enables you to restore the storage groups and databases.

Detailed Description

This command enables you to restore the SnapManager backup sets with all of the options available through the SnapManager GUI.

This command also supports the ubiquitous parameters:

-Debug (-db), -ErrorAction (-ea), -ErrorVariable (-ev)

-OutBuffer (-ob), -OutVariable (-ov), and -Verbose (-vb).

To learn more see help about_ubiquitous_parameters.

Usage

```
restore-backup -Backup <String> -RestoreLastBackup <Integer> -
VerifyOnDestVolumes <List
ofsourcestoragesystem:sourcevolume:destinationstoragesystem:destin
ationvolume> -Verify <SwitchParameter> -VerifyMetadata
<SwitchParameter> -ExhaustiveVerification <SwitchParameter> -Server
<String[]> -DestinationServer <String[]> -AutoMount
<SwitchParameter> -TestRestore <SwitchParameter> -storagegroup
<String[]> -targetstoragegroup <String[]> -Database <List of
databases separated by comma> -RestoreFromArchive <SwitchParameter>
-RestorefromServer <SwitchParameter> -BkUpServer <String[]> -
SnapInfoDirectory <String[]> -PointInTime <SwitchParameter> -
VerDestVolume <SwitchParameter> -VerificationServer <String[]> -
CCRActiveNode <Boolean value -$True | $False> -OverrideVer
<SwitchParameter> -CheckLog <SwitchParameter> -Destination
<String[]> -DestinationServer <String[]> [<CommonParameters>]
```

Parameters

Backup<String>: use this parameter to specify the name of the backup that you want to restore.

RestoreLastBackup<Integer>: use this parameter to restore backups without specifying the name. If you try to use the Backup and RestoreLastBackup parameters together, SnapManager for Exchange cmldet ignores the RestoreLastBackup cmdlet and uses the backup parameter during restore operation.

A typical usage example of the restore-lastbackup parameter follows:

restore-backup -restorelastbackup = 1 -backup = 'backup name'

If the -restorelastbackup parameter value is 1, SnapManager ignores this parameter and uses the -backup parameter during the restore operation.

Note

The default value of this parameter is 0, which means that SnapManager will restore the latest backup. If the value is 1, SnapManager restores second-to-latest backup.

-VerifyOnDestVolumes <List of sourcstoragesystem:sourcevolume:destinationstoragesystem:destinationvolume>: Use this parameter to override the existing StoreVault Replication relationships.

-Verify<SwitchParameter>: Use this parameter to verify the backed up databases and transaction logs.

-VerifyMetadata<SwitchParameter>: Use this parameter to verify the metadata and transaction logs.

-ExhaustiveVerification<SwitchParameter>: Use this parameter to perform exhaustive database verification.

-Server<String>: It denotes the name of Exchange server to be connected.

-DestinationServer<String>: It denotes the name of the target server where the recovery storage group will be created. This parmeter is specified for restoring to a recovery storage group during the restore operation.

-AutoMount<SwitchParameter>: Use this parameter to mount the databases automatically after the restore operation.

-TestRestore<SwitchParameter>: Use this parameter to perform test restore operation. The default value for this parameter is false.

storagegroup<String>: Use this parameter to specify the source storage group.

targetstoragegroup<String>: Use this parameter to specify the destination storage group.

Database<List of databases separated by comma>: Use this parameter to specify the list of databases separated by commas. If you do not specify the database parameter, SnapManager cmdlet restores all databases.

-RestoreFromArchive<SwitchParameter>: Use this parameter to restore from the archived SnapManager backup sets.

-RestorefromServer<SwitchParameter>: Use this parameter to restore backup sets created on a different Exchange server.

Note

You can restore the backups created on a different Exchange server to the server on which the restore operation was initiated. Before you can restore databases to server other than your current Exchange server, you must remap the source LUNs to the current exchange server, using the same drive letter that was assigned to the original Exchange server.

-Rehomemailbox<SwitchParameter>: This is a switch parameter, and it is used as an optional parameter with the Restore backup created from another server, or Restore from archive option in Exchange Server 2007. It updates the user accounts associated with mailboxes in restored databases to point to the mailbox server with the new name.

Note

This optional parameter is not a valid usage with Restore to Recovery Storage Group.

BkUpServer<String>: Use this parameter to specify the name of the server on which the backup was created. Use this parameter only with the restore from archive and the restore from server where the backup was originally created.

-SnapInfoDirectory<String>: Use this parameter to specify the SnapInfo directory path for the archived backup set during the restore operation. Use this parameter only with restore from archive and the restore from server parameters.

PointInTime<SwitchParameter>: Use this parameter to perform a point-in-time restore operation.

-VerDestVolume<SwitchParameter>: Use this parameter to verify the StoreVault Replication destination volume.

-VerificationServer<String>: This parameter, which if specified overrides the preconfigured SnapManager verification settings. It denotes the host to be used as the verification server for the verification phase of a backup operation.

-CCRActiveNode<Boolean-$True or $False>: This parameter is a Boolean value ($True or $False). The value specifies whether the connection is to an active, or a passive node, respectively.

-OverrideVer<SwitchParameter>: Use this parameter to perform override verification for the databases.

CheckLog<SwitchParameter>: use this parameter to specify the transaction logs.

-Destination<String>: use this parameter to specify whether the backup need to be restored to the same storage group or to the recovery storage group. The default value for this parameter is “tosamesg”. You can specify “torsg”, if you need to restore the backup to recovery storage group.

DestinationServer<String>: use this parameter to specify the name of the destination Exchange server.

Short form for restore-backup cmdlet parameters

The following table lists all of the restore-backup parameters and the short form of each.

Parameter	Short form
Backup	bkup
RestoreLastBackup	rstlast
VerifyonDestVolumes	vermirror
Verify	ver
VerifyMetadata	vermetadata
Exhaustive verification	exhver
Server	svr
AutoMount	mt
TestRestore	test
storagegroup	sg
targetstoragegroup	tarsg
Database	dbs
RestoreFromArchive	rstarc
RestorefromServer	rstserver

Parameter	Short form
BkUpServer	bksvr
SnapInfoDirectory	sifdir
PointInTime	pit
VerDestVolume	verdest
VerificationServer	versvr
CCRActiveNode	ccrnode
OverrideVer	ovr
CheckLog	chklog
Destination	-
DestinationServer	dstsvr
Rehomemailbox	-

EXAMPLES

The following examples show a few of the ways the `restore-backup` cmdlet can be invoked. You can invoke these operations from the SnapManager for Exchange PowerShell command line interface.

Example #1:
```
restore-backup -server 'SNAPMGR-48' -storagegroup
"First Storage Group" -backup 'exchsnap__SNAPMGR-55_11-10-
2006_13.36.24'
```

This command performs a simple SnapManager restore operation.

Example #2:
```
restore-backup -server 'SNAPMGR-48' -StorageGroup
"First Storage Group" -RestoreFromArchive -BkUpServer SNAPMGR-54 -
backup 'exchsnap__SNAPMGR-54_11-10-2006_14.47.18' -
SnapInfoDirectory 'K:\SME_Snap\InfoEXCH__SNAPMGR-48A\SG__WZ00\12-
04-2006_14.47.18'
```

This command performs a SnapManager "restore from archive" operation.

Example #3:
```
restore-backup -server 'SNAPMGR-48' -StorageGroup
"First Storage Group" -RestoreFromServer -BkUpServer SNAPMGR-54 -
backup exchsnap__SNAPMGR-54_11-10-2006_14.47.18 -SnapInfoDirectory
'K:\SME_SnapInfo'
```

This command restores backup sets created on a different Exchange Server.

Example #4:
```
restore-backup -server 'SNAPMGR-48' -storagegroup
"First Storage Group" -backup 'exchsnap__SNAPMGR-55_11-10-
2006_13.36.24' -destination torsg -TargetStorageGroup Test_rsg
```

This command restores backup sets to a recovery storage group named Test_rsg.

get-backup

Name

get-backup

Synopsis

This cmdlet enables you to retrieve the SnapManager backup sets, depending on the input criteria specified in the SnapManager for Exchange PowerShell command-line interface.

Detailed Description

This command enables you to get the backup sets for the specified criteria.

This command also supports the ubiquitous parameters:

-Debug (-db), -ErrorAction (-ea), -ErrorVariable (-ev)

-OutBuffer (-ob), -OutVariable (-ov), and -Verbose (-vb).

To learn more see help about_ubiquitous_parameters.

Usage

```
get-backup -Server <System.String[]> -ManagementGroup
<System.String[Standard, Weekly, Daily]> -StorageGroup <name of the
storage group> -CCRActiveNode <$true | $false> [<CommonParameters>]
```

Parameters

-Server<String>: Use this parameter to specify the name of the backup server.

storagegroup<List of storage groups>: Use this parameter to specify the name of the storage group.

-Managementgroup<[Standard, Weekly, Daily]>: It denotes whether the backup or verify operation is performed on a daily, or weekly, or standard basis.

-CCRActiveNode <Boolean-$True or $False>: This parameter is a Boolean value ($True or $False). The value specifies whether the connection is to an active, or a passive node, respectively.

Short form for get-backup cmdlet parameters

The following table lists all of the verify-backup parameters and the short form of each.

Parameter	Short form
Server	svr
storagegroup	sg
managementgroup	mgmtgroup
CCRActiveNode	ccrnode

Example

```
get-backup -Server 'SNAPMGR-48' -ManagementGroup 'Standard' -
StorageGroup 'alaska','3'
```

delete-backup

Name

delete-backup

Synopsis

This cmdlet enables you to delete the SnapManager backup sets.

Detailed Description

Use this command to delete the SnapManager backup sets.

This command also supports the ubiquitous parameters:

-Debug (-db), -ErrorAction (-ea), -ErrorVariable (-ev)

-OutBuffer (-ob), -OutVariable (-ov), and -Verbose (-vb).

To learn more see help about_ubiquitous_parameters.

Usage

```
delete-backup -Server <System.String[]> -backup <System.String[]> -
NoUTMRestore -StorageGroup <name of the storage group> -
CCRActiveNode <$true | $false> [<CommonParameters>]
```

Parameters

-Server<String>: Use this parameter to specify the name of the backup server.

storagegroup<String>: Use this parameter to specify the name of the storage group. If you specify the name of the storage group, the delete-backup cmdlet will try to identify the specified backup with reference to the storage group. Otherwise the cmdlet will automatically default to the first storage group contained by the specific backup set.

-backup<String>: use this parameter to specify the name of the backup set.

-CCRActiveNode<Boolean-$True or $False>: This parameter is a Boolean value ($True or $False). The value specifies whether the connection is to an active, or a passive node, respectively.

-NoUTMRestore<SwitchParameter>: This parameter is a switch, which if specified does not retain up-to-the-minute restore ability. The logs are deleted for any backups that are deleted as part of the backup operation. This will not retain the up-to-the-minute restore ability for older backups that remain after the delete phase of a backup operation.

Short form for delete-backup cmdlet parameters

The following table lists all of the delete-backup parameters and the short form of each.

Parameter	Short form
Server	svr
storagegroup	sg
-backup	-
CCRActiveNode	ccrnode
NoUTMRestore	noutm

Examples

Example #1: `delete-backup -backup 'exchsnap__SNAPMGR-55_11-10-2006_13.39.16'`

This command deletes a specific SnapManager backup set of specified storage group.

Example #2: `delete-backup -storagegroup 'sg4 (LCR)' -backup 'exchsnap__KRISHNA-SVR18 _11-10-2006_13.39.16' -verbose -confirm`

This command deletes the Snapshot copy of the specified LCR backup set.

Example #3: `delete-backup -storagegroup 'sg2' -backup 'exchsnap__KRISHNA-SVR18__11-01-2006_18.12.22' -NoutmRestore -verbose -confirm`

This command deletes a specific backup set that belongs to the storage group **`'sg1'`** without up-to-the-minute restore ability.

Redirecting the cmdlet output

You can use the *out-file* command to redirect the output of the cmdlet.

Default behavior

Database and log verification: Running verification after a backup operation is the default. The -nc option will suppress the behavior. Use the -nc option to suppress this behavior and override the verification server specified in the SnapManager GUI.

Management group: The default option is Standard, where backups are marked with standard backup management group specification.

Backup retention: Backup retention defaults to the “In excess of” policy, where backups are deleted base on backup count. The `-rd` option will override this option and set the policy to one based on date.

Backup naming: The naming of backups defaults to the Unique naming policy where the most recent backup is named using the text string `_recent`.

Configuring SnapManager Application Settings B

This section describes SnapManager application settings that can be configured or changed at any time after SnapManager has been installed. The following topics are covered in this section:

- "Overview of SnapManager application settings" on page 348
- "Managing a different Exchange server" on page 350
- "Changing the Exchange user account" on page 351
- "Enabling or disabling database migration back to local disks" on page 352
- Managing the database verification settings
  - "Selecting the database verification server" on page 353
  - "Selecting the Snapshot copy access method for database verification" on page 358
  - "Configuring verification throttling for database verification" on page 360
  - "Overriding database verification during restore" on page 367
- "Managing the backup setting" on page 370
- "Managing the Run Command After Operation default settings" on page 371
- "Managing the event notification options" on page 373

Attention

You must run SnapManager from the system console, not from a Terminal Services client. Do not use Terminal Services for any type of SnapManager administration, because you might miss critical information that is displayed only in pop-up boxes at the system console.

This section *does not* describe the following topics:

- Settings that can be configured only with the Configuration Wizard
- Settings that are specific to the context of a particular backup or a database verification operation

This information is described in other, related topics in this guide.

Related topics:

- "Settings configurable only with the Configuration wizard" on page 116
- Chapter 10, "Backing Up Databases with SnapManager," on page 165
- Chapter 11, "Restoring Databases Using SnapManager," on page 203

Overview of SnapManager application settings

The following table lists SnapManager application settings that can be configured or changed at any time after SnapManager has been installed. Shaded rows indicate settings that can also be configured using the Configuration wizard.

Application setting	How the setting can be accessed
Add servers to be managed	Actions pane
Exchange user account	Actions pane
Migrate databases to local disk	Actions pane
Database verification settings[1] ◆ Verification server ◆ Override for restore ◆ Verification throttling ◆ Mount point	◆ Actions pane ◆ Backup Wizard ◆ Restore Wizard
Backup settings	◆ Actions pane ◆ Backup Wizard ◆ Backup and Verification
Run Command After Operation[2] default settings	◆ Actions pane ◆ Within the context of a backup or database verification operation: ❖ Backup Wizard ❖ Backup and Verification window
Fractional space reservation policy settings ◆ Current status ◆ Policy settings	Actions pane
Report directory settings	Actions pane
Event notification settings ◆ Email ◆ Logging	◆ Configuration Wizard ◆ Actions pane

1. From the Configuration wizard, you can specify only the verification server. In order to access other verification settings (Override Verification, Throttling, and Access LUN in Snapshot copy), you must open the Verification Settings dialog box.
2. When the Run Command After Operation dialog box is opened from the Actions pane, only the default settings can be viewed or configured. See "Managing the Run Command After Operation default settings" on page 371. However, from within the context of a specific operation, the default settings are presented and then can be modified for this operation only. As an option, the default settings can be updated. See "Using Run Command After Operation to archive automatically" on page 309.

Managing a different Exchange server

Use the Add Servers to be Managed that appears in the Actions pane to connect to the Exchange server you want to manage and specify the security authentication method to be used to establish the connection. For more information, see “About the Add Servers to be Managed” on page 350.

About the Add Servers to be Managed

Use the Add Servers to be Managed to connect to a specific Exchange server. When you select the Exchange server from the list, SnapManager immediately connects to that server. This setting remains in effect, specifying the default Exchange server, until or unless you change it.

When you start SnapManager, the Add Server to be Managed window opens automatically if a *default Exchange server* has not yet been specified. You cannot proceed to use SnapManager until you successfully add an Exchange server. Thereafter, whenever the SnapManager application is started, it automatically connects to the default Exchange server using the default security authentication method.

If you later want to manage a *different Exchange server*, use the “Add Servers to be managed” option that appears in the Actions pane to connect, and manage an Exchange Server. You can manage multiple servers using the same snap-in instance.

Changing the Exchange user account

You can change the SnapManager server process account used to run SnapManager backup and restore operations.

To change the SnapManager server process account used to run SnapManager backup and restore operations, complete the following steps.

Step	Action
1	Open the SnapManager Server Identity Properties dialog box. ◆ From the SnapManager main window, go to the menu bar and select Options > Run SnapManager As. **Result:** The SnapManager Server Identity dialog box appears and displays the name of the current SnapManager account for this Exchange server.
2	Select the SnapManager server process account that you want to use to run SnapManager on this system: ◆ If you want to change the SnapManager server process account on this instance, select the "The launching user" option. ◆ If you want to make SnapManager accessible from a remote Exchange server or within an MSCS environment, select the "This user" option. This option is selected by default.
3	If you select the "This user" option, also do the following: **a.** Either enter the user account in the User box in *DomainName\UserName* format or click Browse to select the domain and user name. **b.** In the Password and the Confirm Password boxes, enter the password for this user account.
4	Click OK. This change will not take effect until you exit this SnapManager session and any currently running SnapManager jobs have completed. After you start a new SnapManager session, any SnapManager operations, such as backup and restore, will run under this newly specified account.

Enabling or disabling database migration back to local disks

The primary function of the Configuration wizard is to migrate Exchange databases to Data ONTAP LUNs so that the databases can be backed up and restored using SnapManager. If you select to stop using SnapManager as your data management tool, you can also use the Configuration wizard to migrate your databases back to local disks. However, by default, the Where to Move databases window of the Configuration wizard does not list any local drives unless you explicitly enable the“migrate databases to local disks” feature.

Related topics:

- “Configuring the Exchange data store” on page 118
- “Moving databases using the Configuration wizard” on page 124
- “Moving transaction logs using the Configuration wizard” on page 127

To enable or disable the ability to migrate databases from Data ONTAP LUNs back to local disks, complete the following steps.

Step	Action	
1	Open the Configuration Wizard Option Settings dialog box. To do this, click the Configuration Wizard in the Actions pane.	
2	View the current state of the “migrate databases to local disks” feature by noting whether the “Enable databases and transaction logs to be migrated back to local disk” option is enabled.	
	If...	**Then...**
	The option is selected	The migrate-back-to-local-disk feature is *enabled*.
	The option is not selected	The migrate-back-to-local-disk feature is *disabled*.
3	If you want to change the state of this option, click to select or deselect it. **Note** If you enable this option, it is reset the next time you start the SnapManager application.	
4	Click OK to close the dialog box.	

Selecting the database verification server

Verification of the databases in a backup set can be done on the production Exchange server (the Windows host system running the Exchange server used to service the end users) or on a remote verification system (a different Exchange server with Exchange management tools installed).

Running database verification on a production Exchange server is CPU-intensive for the Windows host and also involves a substantial amount of activity on the storage system. SnapManager offers three methods for managing database verification load:

- Deferred verification
- Remote verification
- Verification throttling

The three options for managing database verification load, which can be used separately or in any combination, are described in "Managing database verification load" on page 148.

Note

Both deferred verification and remote verification manage database verification load by separating database verification from the backup operation. Verification throttling manages database verification load by slowing down the verification throughput rate.

This topic provides detailed information about *remote verification*. For more information about remote verification, see the following topics:

- "Remote verification prerequisites" on page 354
- "How remote verification works" on page 354
- "Viewing or changing the verification server" on page 355

Note

When you change the database verification server, this change does not affect any database backup (with verification) or database verification-only jobs that are already scheduled. You will need to recreate the scheduled backup jobs.

Related topics:

- "How SnapManager checks database integrity in backup sets" on page 146
- "Selecting the Snapshot copy access method for database verification" on page 358
- "Configuring verification throttling for database verification" on page 360
- "Overriding database verification during restore" on page 367

Remote verification prerequisites

The following paragraphs describe the prerequisites for using a remote verification server.

Windows host requirements: Remote verification is performed using the same mechanisms used for local verification, except that the verification is performed on a different host than the one that initiated the backup. This is why you need SnapDrive and SnapManager installed on your remote verification server, as well as connectivity to the storage system (FCP or iSCSI). The requirements for a remote verification server are described in "Requirements for a remote verification server" on page 29.

LUN requirements: If you use a remote verification server to verify the databases in multiple databases in a single job, an additional LUN is required. For more information, see "Verifying multiple backup sets using a remote verification server" on page 147.

Verification server designation: To designate a remote verification server, see "Viewing or changing the verification server" on page 355.

How remote verification works

The following list of steps outline the process followed for remote verification.

1. The SnapManager backup with verification (or verification only) is initiated on the primary SnapManager host, which is configured to run verifications on the remote verification server.
2. The primary SnapManager host contacts the remote verification server and initiates the verification job.
3. The remote verification server uses SnapDrive to connect to a LUN backed by the Snapshot copy containing the databases to be verified.
4. The remote verification server performs the database verification on the LUN backed by Snapshot copy.
5. When the remote verification server completes the verification, it sends the results back to the primary SnapManager host.

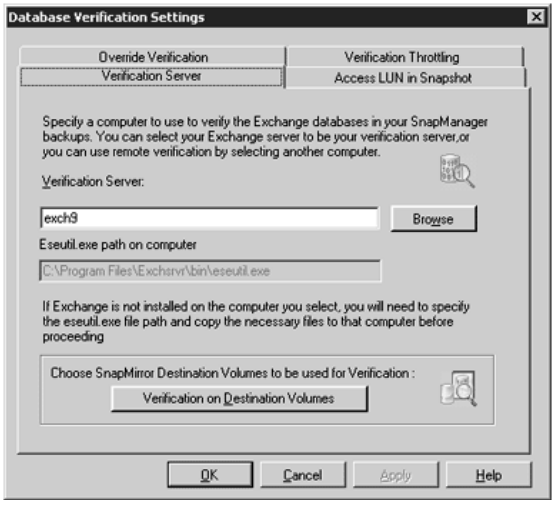
Note

Whether you run verification remotely or locally, the verification is performed on a LUN backed by Snapshot copy. If you take a Snapshot copy of the same volume while a LUN backed by Snapshot copy exists, you create a "busy Snapshot copy," which might cause problems when you attempt to delete some Snapshot copies. For this reason, you must be careful not to schedule backups while a verification is in progress.

Viewing or changing the verification server

To view or change the verification server, complete the following steps *from the production Exchange server.*

Step	Action
1	Connect to the *production Exchange server*, and then open the Database Verification Settings dialog box.



From the...	Do this...
SnapManager Management Console	Go to the Actions pane > Backup Verification Settings. **Result:** The SnapManager displays the Database Verification Settings dialog box.
Backup Wizard	Go to the Verify the Databases and Transaction Logs in this Backup window, and click Verification Settings.
Restore Wizard	Go to the Verify Database Integrity in the Selected Backup window (displayed only if you select to restore from an unverified backup), and then click Verification Settings.

Result: The Database Verification Settings dialog box appears. The Verification Server tab is active by default and displays the host name of the current verification server.

Step	Action
2	In the Verification Server box, type or browse to the Exchange server you want to use as the database verification server. **Note** If you plan to specify a remote verification server, ensure that the server is set up properly, as described in "Requirements for a remote verification server" on page 29.
3	Click OK. **Result:** The Verification Settings dialog box closes. **Note** Until you change these settings, database verification is run from the Exchange server you selected. It does not necessarily run on the system from which you opened the Database Verification Settings dialog box. It does not affect any database verification jobs that are already scheduled.

Selecting the Snapshot copy access method for database verification

Use the "Access LUN in Snapshot" tab to specify how SnapManager is to access database backup Snapshot copies during database integrity verification.

Related topics:

- "Selecting the database verification server" on page 353
- "Configuring verification throttling for database verification" on page 360
- "Overriding database verification during restore" on page 367

To specify which method is to be used to access database backup Snapshot copies during database integrity verification, complete the following steps.

Step	Action	
1	Select the "Access LUN in Snapshot" tab.	
	From the...	**Do this...**
	Configuration Wizard	Go to the Database Verification Server dialog box and click Advanced.
	SnapManager Management Console	Go to Actions pane > click Backup Verification Settings > Database Verification Settings, and then click the "Access LUN in Snapshot" tab.
	Backup Wizard	Go to the Verify the Databases and Transaction Logs in this Backup window, click Verification Settings, and then select the "Access LUN in Snapshot" tab.
	Restore Wizard	Go to the Verify Database Integrity in the Selected Backup window (displayed only if you select to restore from an unverified backup), click Verification Settings, and then click the "Access LUN in Snapshot" tab.

<table>
<tr><th>Step</th><th colspan="2">Action</th></tr>
<tr><td>2</td><td colspan="2">Assign either a drive letter or directory path to access the backup Snapshot copy as a mounted LUN.</td></tr>
<tr><td></td><td>If you want to...</td><td>Then...</td></tr>
<tr><td></td><td>Mount the Snapshot copy on the next available drive letter</td><td>Select the “Automatically assign available drive letter” option.</td></tr>
<tr><td></td><td>Mount the Snapshot copy on a specific NTFS mount point</td><td>Do the following:
a. Select the “Mount in an empty NTFS directory” option.
b. Enter or browse to the directory path of an NTFS mount point.
Note
This mount point will be used if SnapManager is configured to use drive letters but runs out of available drive letters.</td></tr>
<tr><td>3</td><td colspan="2">Click OK.
Result: The Verification Settings dialog box closes.</td></tr>
</table>

Configuring verification throttling for database verification

When installed with Exchange Server 2003 SP2, or higher, or Exchange Server 2007, SnapManager supports the ability to throttle the database checksum verification rate.

The following topics are covered in this section:

- "About database verification load" on page 360
- "Requirements for using the throttling option" on page 361
- "How the database verification throttling feature works" on page 361
- "The effect of using different throttling values" on page 361
- "Choosing the sleep interval" on page 362
- "Configuring the throttling option" on page 365
- "Entries in the SnapManager backup and verification report" on page 366

Related topics:

- "Database file integrity verification using Exchange Server 2007 integrity verification library" on page 146
- "Selecting the database verification server" on page 353
- "Selecting the Snapshot copy access method for database verification" on page 358
- "Overriding database verification during restore" on page 367

About database verification load

Database verification can place a significant load on both the Exchange server and the storage system. For this reason, verification can degrade Exchange Server response, particularly during peak work hours. With SnapManager 3.1 and earlier releases, there are two options for distributing this load by separating database verification database backup operations: *deferred database verification* and *remote database verification*.

With SnapManager 3.2 a third option for managing database verification was introduced, that you can combine with either or both of the existing options, to reduce the load even further. When installed with Microsoft Exchange Server 2003 SP2, or higher, SnapManager 3.2 supports the ability to throttle Eseutil (the Microsoft Exchange consistency checker utility) in database checksum verification mode.

SnapManager 4.0 for Microsoft Exchange supports a new option for managing database verification that uses the same database checksum algorithm, as Eseutil throttling. When installed with Microsoft Exchange Server 2007, SnapManager supports the ability to throttle ChkSgFiles (the Microsoft Exchange integrity

verification library) in database checksum verification mode. In Exchange Server 2003, the ChkSgFiles is installed only if the Exchange 2007 management tool is installed.

Requirements for using the throttling option

The SnapManager 4.0 for Microsoft Exchange supports two throttling options:

- Eseutil with Microsoft Exchange Server 2003
- ChkSgFiles with Microsoft Exchange Server 2007

The Eseutil throttling feature was first introduced with Exchange Server 2003 SP2, and SnapManager provides a configuration option for configuring this feature.

Note

Attempting to use the Eseutil throttling feature with earlier versions of SnapManager 3.2 or Exchange will have no effect.

The ChkSgFiles throttling feature is first introduced with Exchange Server 2007, and SnapManager provides a configuration option for configuring this feature.

How the database verification throttling feature works

Exchange Server 2003 SP2 or higher added a feature to `Eseutil.exe`, the Microsoft Exchange consistency checker utility, that can insert a one-second pause after a given number of I/O operations during the database physical consistency verification.

Exchange Server 2007 introduces a new feature ChkSgFiles, the Microsoft Exchange integrity verification library, that can that can insert a one-second pause after a given number of I/O operations during the database physical consistency verification.

The effect of using different throttling values

`Eseutil.exe and ChkSgFiles` reads 512 KB for each database checksum verification I/O operation. Therefore, when configuring the throttling value, the maximum throughput rate for database checksum verification is decreased to the following:

512 KB per I/O × x I/Os per second = 512 × x KB/second

To decrease the maximum throughput rate, decrease the number of I/O operations (x) that elapse between one-second pauses. The following examples illustrate the effect of using throttling values of 100, 150, 200, and 250 for x.

Number of I/O operations (*x*) between one-second pauses	Maximum possible database verification speed	
	Calculation	Maximum speed
100	512 KB/IO × 100 IO/sec = 51,200 KB/sec	50 MB/sec
150	512 KB/IO × 150 IO/sec = 76,800 KB/sec	75 MB/sec
200	512 KB/IO × 200 IO/sec = 102,400 KB/sec	100 MB/sec
250	512 KB/IO × 250 IO/sec = 128,000 KB/sec	125 MB sec

Note

Decreasing the `Eseutil.exe and ChkSgFiles` database verification throughput causes the database checksum verification to take longer to complete. This also means that a backup job that is configured with verification will also take longer to complete. However, decreasing verification throughput does not cause a backup job without verification configured to take any longer to complete.

Choosing the sleep interval

Calculate the appropriate sleep interval value to use *for each Exchange server.* This entails monitoring the read and write performance of the LUNs on which the Exchange databases reside and then adjusting the verification throttle setting so that the average and peak physical disk performance is below the maximum values determined by Microsoft.

To calculate the Eseutil or ChkSgFiles throttling value for a specific Exchange server, complete the following steps.

Step	Action
1	Launch the Windows Performance Monitor utility (also known as "Perfmon") on the machine that is the Exchange server.

Step	Action
2	Add the following Perfmon counters for each Data ONTAP LUN that contains an Exchange database: ◆ PhysicalDisk\Average Disk sec/Read ◆ PhysicalDisk\Average Disk sec/Write **Note** Monitor the LUNs containing the live Exchange databases, not the LUN in Snapshot copy that is mounted and verified by the verification process.
3	Monitor these pairs of values while a SnapManager verification job or a backup job with verification is in progress. Follow these guidelines: ◆ To monitor the SnapManager progress, watch the Backup Status window that is displayed during a manually launched backup job. ◆ If monitoring a backup with verification job, be sure to monitor the counters during the *verification portion* of the job. ◆ Multiple databases on the same Exchange server are verified sequentially, so be sure to monitor the counters for *all* of the database verifications. ◆ Monitor the counters during the busiest time of day that a verification or backup with verification job might occur.
4	The throttle setting is global, so select the reading from the database that exhibits the worst performance (highest readings).

Step	Action
5	Compare the measured values to the maximum values recommended by Microsoft. **PhysicalDisk\Average Disk sec/Read:** The average physical disk performance times determined by Microsoft are as follows: ◆ Average read time should be below 20 ms. ◆ Maximum peak read time should be below 50 ms. **PhysicalDisk\Average Disk sec/Write:** The maximum physical disk performance times determined by Microsoft are as follows: ◆ Average write time should be below 20 ms. ◆ Maximum peak write time should be below 50 ms. **Note** These values are good guidelines during *peak* Exchange usage hours. During *off-peak* Exchange hours, higher latencies may be acceptable.
6	If the measured values exceed the maximum values recommended by Microsoft, adjust the throttle setting to decrease the verification throughput rate.

Configuring the throttling option

To configure database verification throttling, complete the following steps on every Windows host system that will be performing database verification and is running Exchange Server 2003 SP2 or higher, or Exchange Server 2007.

Note

You can configure the throttling option on *all* systems involving database verification, but the `Eseutil or chksgfile` throttling feature are supported only by Exchange Server 2003 SP2, or higher, or Exchange Server 2007.

Step	Action	
1	Open the Backup Verification Settings in the Actions pane.	
	From the...	**Do this...**
	SnapManager 4.0 for Microsoft Exchange console	Select Backup Verification Settings in the Actions pane.
	Backup Wizard	Go to the Backup or Verify Databases and Transaction Logs window > select the Verify databases and transaction Logs in the most recent unverified backups option > select the backup management group for this option > click Verification Settings button in Database Verification Server window.
	Restore Wizard	Go to the Mount options window and click Verification Settings.
2	Select the Verification Throttling tab.	

Step	Action
3	Select or deselect the “Throttle database checksum verification” option to enable or disable the throttling feature. **Note** The “Throttle database checksum verification” option is accessible only if the verification server is installed with Microsoft Exchange Server 2003 SP2, or higher, or Microsoft Exchange Server 2007. **Result:** If you enabled the throttling feature, the “Pause for 1 second after *x* I/O operations” box displays the current sleep interval. The default value is 150. If you disabled the feature, the box is grayed out and inaccessible.
4	If you enabled the throttling feature, enter a positive integer value in the “Pause for 1 second after *x* I/O operations” box. The default value is 150. Enter the number I/O operations to complete before pausing for one-second during the database physical consistency check. Refer to the formula and example calculations in “The effect of using different throttling values” on page 361. It has been observed that using a value in the range of 100 to 250 is suitable for most environments.
5	Click OK.

Entries in the SnapManager backup and verification report

If you use Eseutil throttling, before each database verification, the SnapManager backup and verification report indicates whether the feature is enabled:

- If the feature is enabled, the report includes the following entry:
  `ESEUTIL throttling feature is enabled.`

If you use ChkSgFiles throttling, before each database verification, the SnapManager and verification report indicates whether the feature is enabled:

- If the feature is enabled, the report includes the following entry:

```
Running Integrity Verification using ChkSgFiles API
Throttle (Pause): 1000 ms per X I/O's
```

Overriding database verification during restore

You are strongly advised to restore only from verified backups. By default, SnapManager does not allow you to select an unverified backup as the source of the restore operation. However, if a verified backup is not available when you need to restore and you cannot wait for a verification to complete before restoring, you can override the verification requirement and restore directly from an unverified backup. For more information, see the following topics:

- "Configuring the database verification override option" on page 368
- "Entry in the SnapManager restore report" on page 369

Attention

If you must restore from an unverified backup, it is best to perform an up-to-the-minute restore. This way, if you discover later that the backup was corrupted, you can restore from another backup to recover.

Related topics:

- "Selecting the database verification server" on page 353
- "Selecting the Snapshot copy access method for database verification" on page 358
- "Configuring verification throttling for database verification" on page 360

Configuring the database verification override option

By default SnapManager Restore requires that you restore only from verified backups. To override this requirement until you exit the SnapManager application, complete the following steps.

<table>
<tr><th>Step</th><th colspan="2">Action</th></tr>
<tr><td>1</td><td colspan="2">Open the Verification Settings dialog box:
From the SnapManager Management Console, Go to Actions pane > click Backup Verification Settings.
From the Backup Wizard, go to the Verify the Databases and Transaction Logs in this Backup window and click Verification Settings.
From the Restore Wizard, go to the Verify the Database Integrity in this Backup window (displayed only if you select to restore from an unverified backup) and click Verification Settings.</td></tr>
<tr><td></td><td>From the...</td><td>Do this...</td></tr>
<tr><td></td><td>SnapManager Management Console</td><td>Go to the Actions pane > click Backup Verification Settings.</td></tr>
<tr><td></td><td>Backup Wizard</td><td>Go to the Verify the Databases and Transaction Logs in this Backup window and click Verification Settings.</td></tr>
<tr><td></td><td>Restore Wizard</td><td>Go to the Verify Database Integrity in the Selected Backup window (displayed only if you select to restore from an unverified backup) and click Verification Settings.</td></tr>
<tr><td>2</td><td colspan="2">Select the Override Verification tab.</td></tr>
<tr><td>3</td><td colspan="2">Configure the Override Database Verification Requirement for Restore option:
If you must restore from an unverified backup, select the option.
Otherwise, deselect the option or leave it deselected.
Note
If you enable this option, it is reset the next time you start the SnapManager application.</td></tr>
</table>

<table>
<tr><th>Step</th><th>Action</th></tr>
<tr><td>4</td><td>If a message box appears, do the following:

a. Heed the warning in the message box:

<pre>WARNING: An unverified backup may contain an image of an Exchange database that is physically corrupt. If the backup contains physical database corruption, this corruption will persist in the restored database.

Are you sure that you want to enable this option?</pre>b. If want to enable the option, click OK; otherwise, click No.

Result: The message box closes.</td></tr>
<tr><td>5</td><td>To close the dialog box and apply your change, click OK.

Note
If you are using the Restore wizard, selecting this option causes the “Verify the database integrity of this backup prior to restoring it” option to become accessible so that you can disable it.

<table><tr><th>If...</th><th>Then...</th></tr><tr><td>The override option is disabled (the default and recommended setting)</td><td>You cannot select an unverified backup as the source of the restore operation.</td></tr><tr><td>The override option is enabled (not recommended)</td><td>If you select an unverified backup as the source of the restore operation, you are given the option to proceed with the restore operation.

Note
This option is reset when you exit SnapManager.</td></tr></table></td></tr>
</table>

Entry in the SnapManager restore report

Before each database verification, the SnapManager restore report indicates if this option is enabled. If the feature is enabled, the report includes the following warning:

```
Database verification before restore was overridden.
```

Managing the backup setting

This topic describes how to specify the naming convention you want used to form database backup Snapshot copy names and SnapInfo directory Snapshot copy names.

To set the backup naming convention option, complete the following steps.

Step	Action
1	Access the backup naming convention option: ◆ From the SnapManager Management Console, Go to Actions pane> Backup Settings. ◆ From the Backup Wizard, go to the Select the naming convention for the newest backup window.
2	Select the naming convention you want used to form database backup Snapshot copy names and SnapInfo directory Snapshot copy names: ◆ If you want the most recent backup to be identified by the Snapshot copy name that includes the string `recent`, select the Use Generic option. ◆ If you want all Snapshot copy names, even for the most recent backup, to contain the Snapshot copy creation date and time, select the Use Unique option. This option is selected by default. This is the Snapshot copy naming convention used by SnapManager for Microsoft Exchange releases *prior to release 3.0*. For more detailed information, see "SnapManager Snapshot copy naming conventions" on page 143.
3	Click OK. **Result:** SnapManager will apply the selected naming convention to all subsequent backup operations.

Managing the Run Command After Operation default settings

You can configure default values that you want used to prepopulate the Run Command After Operation dialog box when it is opened from either Actions pane, or the Backup and Verification window, or the Backup Wizard.

Related topics:

- "Using a Windows backup utility to archive SnapManager backups" on page 302
- "Using Run Command After Operation to archive automatically" on page 309

To use the Run Command After Operation dialog box to configure default settings, complete the following steps.

Step	Action
1	Open the Run Command After Operation dialog box from the Actions pane. To do this, Go to Actions pane> click Default Run Command After Operation.
2	In the "Specify a computer where..." box, enter or browse to the name of the host on which your program or script resides.
3	In the "Specify the full path..." box, browse to your program or script.

Step	Action
4	Form the command input string in the Command Arguments box. You can do this using any combination of the following methods: ◆ To enter text directly into the Command Arguments box, click in the box and type the desired text. ◆ To enter a SnapManager variable into the Command Arguments box, do the following: **a.** If necessary, click in the Command Arguments box to position the cursor. **b.** In the SnapManager Variables list, select the variable you want to enter. For more information, see "Command arguments pass information to your program or script" on page 310. **c.** Click Select. **Note** The `$SnapInfoPath` variable is automatically enclosed within double quotes so that the actual path name can contain spaces without affecting the script invocation on the Windows command line. If you do not want the double quotes to appear in your command line, remove them from the Command Arguments field in the Run Command After Operation dialog box.
5	Repeat Step 4 as needed until the Command Arguments box contains the arguments you want to pass to your program or script.
6	Click OK to apply your changes and close the Run Command After Operation dialog box. **Result:** SnapManager verifies that the specified program exists on the specified system. Whenever the Run Command After Operation dialog box is opened from either the Backup and Verification window or the Backup Wizard, the boxes will be prepopulated with the values you specified as default settings. **Note** SnapManager does not run the command at this time.

Managing the event notification options

You can use either the Configuration wizard or the Auto Notification Settings dialog box to enable and configure the SnapManager event notification services. See the following topics for more information:

- "About the SnapManager event notification options" on page 373
- "Using the Auto Notification Settings dialog box" on page 374

About the SnapManager event notification options

The following event notification options can be configured from either the Configuration wizard or from the Auto Notification Settings dialog box.

SnapManager e-mail notification: SnapManager can notify you through e-mail (using SMTP) about the success or failure of the following types of events:

- SnapManager backup
- Database integrity verification
- SnapManager restore
- SnapManager configuration
- SnapManager fractional space reservation policy event execution

This option is disabled by default.

SnapManager syslog event logging: SnapManager events can be posted to the storage system syslog. This option is enabled by default.

AutoSupport notification: If AutoSupport is enabled on both the storage system and SnapManager, technical support receives automatic e-mail notification about any SnapManager events or storage system problems that might occur. This option is enabled by default.

The AutoSupport daemon monitors the storage system's operations and sends automatic messages to technical support to alert them to potential storage system problems. If necessary, technical support contacts you at the e-mail address that you specified to help resolve a potential system problem. The AutoSupport daemon is enabled by default on the storage system. For additional information, see the *System Administration Guide* for your version of Data ONTAP.

Limit AutoSupport notification to failure events: If AutoSupport is enabled on the storage system, you can limit the SnapManager events that are posted to the storage system syslog and AutoSupport (if enabled for SnapManager) to failure events only. The option to limit AutoSupport notification to failure events is enabled by default.

Using the Auto Notification Settings dialog box

To configure automatic event notification settings for SnapManager, complete the following steps.

Step	Action
1	Select Notification Settings in the SnapManager Actions pane,. **Result:** The Auto Notification Settings dialog box appears. **Note** The Configuration Wizard presents the same options in the Configure Automatic Event Notification window.
Configure E-mail Notification	
2	Optional. To enable e-mail notification, select the Send Email Notification option. By default, the automatic e-mail notification feature is disabled. **Note** SnapManager relies on and requires an external mail host at your site to send mail. The mail host is a host that runs a mail server that listens on the SMTP port (25).

Step	Action
3	In the four text boxes in the top half of the tab, enter the following information. **SMTP Server:** The host name or the IP address of the SMTP e-mail server or gateway to be used. **From:** The e-mail address of the sender of the notification. By default, the name `SMEAutoSender` is used. To specify a sender other than the default, use one of the following formats: ❖ *SenderAlias*<*SenderName@SenderDomain*.com> ❖ *SenderAlias* ❖ *SenderName@SenderDomain*.com **To:** The e-mail address of the recipient to whom the notification is to be sent. For more than one recipient, use a semicolon (;) to separate the addresses. **Subject:** The text to be appended to the following standard subject line, which is included in all notification messages: `Backup status at` *mm_dd_yyyy-hh.mm.ss* `from` *MachineName* By default, `SnapManager for Exchange` is used for the appended subject string.
4	Click Advanced. **Result:** The Advanced Event Notification Settings dialog box appears.
Configure Advanced Event Notification Settings	
5	In the E-mail Message Content panel, select one of the following types of body messages to include in the body of the e-mail: ◆ Send operation results summary **Note** If you select to send the operational results in summary format rather than in verbose format, you can also select the Include SnapManager Operation Report as an Attachment option. ◆ Send verbose operation results

Step	Action
6	Click Apply to commit your settings.
7	Click Advanced to open the Advanced E-mail Notifications Settings dialog box. To configure the SMTP mail notification settings, select either or both of the following two options: ◆ Only send notification when operation fails Specifies that you want e-mail notification sent only when a backup process or a verification process fails (off by default). ◆ Include SnapManager operation report as attachment Specifies that you want the status report to be attached to the e-mail notification (off by default).
8	Click OK to apply your settings and close the Advanced Email Notification Settings dialog box.
9	Click Send a Test Email. **Result:** SnapManager sends the e-mail notification, using the settings you specified, and displays a notification.
Configure Syslog Event Logging and AutoSupport	
10	If you want to enable posting of SnapManager events to the storage system syslog, select the Log SnapManager Events to Storage System Syslog option.
11	If SnapManager is configured to log events to the storage system syslog, you can also enable automatic notification about any SnapManager or storage system problems to technical support. To do this, select the Send AutoSupport Notification option.
12	If you want to limit SnapManager event logging to failure events, select the “On failure only” option.
13	Click OK. **Note** If you are using the Configuration wizard instead of the Auto Notification Settings dialog box, click Next.

Glossary

backup set

A *SnapManager backup set*, often referred to as a backup set, is the complete set of data required to form a restorable backup or archive: all Exchange data Snapshot copies, all transaction log Snapshot copies, and the SnapInfo directory.

Exchange

In this guide, the term *Exchange* is used to describe Microsoft Exchange Server 2007 or Microsoft Exchange Server 2003. Information about a particular version of Exchange will be labeled with the Exchange version number or numbers.

Exchange environment

The Exchange organization and the supporting Windows server environment.

Exchange organization

The entire Exchange deployment (all of the Exchange servers).

file system

The native Windows file system supported by SnapManager using NTFS.

LUN (Logical Unit Number)

A logical unit of storage that can be managed by SnapDrive in a SAN environment. Within the Windows operating system, LUNs appear as locally attached disks. The terms “LUN” and “virtual disk” are synonymous; this document uses the term “LUN”.

SFSR

Single File Snap Restore. An SFSR reverts a single file to the version of that file contained in a particular Snapshot copy. After a file has been restored using SFSR, all user-visible information (data and file attributes) for that file in the active file system are identical to the state contained in the Snapshot copy. SnapManager uses SFSR to restore a LUN to its state when a SnapManager backup was taken.

Snapshot copy

An online, read-only copy of a volume. For more information about Snapshot copies, see "SnapManager and Snapshot copies" on page 11.

storage group

This Microsoft concept refers to a group of one to five databases (information stores) and an associated set of transaction log files, all of which are mounted on the same Exchange server.

storage group set

One or more Exchange storage groups that belong to the same Exchange server and are stored on the same storage system volume.

Storage groups in the same storage group set are displayed in the same color and are all automatically preselected when one is selected to be backed up.

storage system

Any storage product that supports FCP (Fibre Channel Protocol) and iSCSI (SCSI over IP).

This guide refers to all storage products (filers, IBM N series storage systems, and NearStore systems) as storage systems. In other documentation, the terms *filer* and *appliance* have also been used to refer to storage systems.

virtual disk (LUN)

A logical unit of storage that can be managed by SnapDrive in a SAN environment. Within the Windows operating system, LUNs appear as locally attached disks.

volume

A logical unit of data storage on a storage system.

Windows server environment

A group of Windows servers providing basic services such as Active Directory, DNS, DHCP, and so on. Sometimes also referred to as a *Windows environment*.

LCR-enabled storage group

Local Copy Replication (LCR) enabled storage groups is a standalone server solution that uses asynchronous transaction log shipping to create and maintain a replica copy of the production storage group. Each production and replica storage group consists of a database and a set of transaction logs. Backups can be created of the production storage groups, replica storage groups, or both.

recovery storage group

This Microsoft concept enables the Exchange administrators to mount a second copy of an Exchange mailbox store onto a production Exchange Server 2003 or Exchange Server 2007 when the original store is still running and serving to the Exchange clients.

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